PERCEIVED USEFULNESS AND EASE OF USE FOR LEARNING MANAGEMENT SYSTEM AT UNIVERSITY LEVEL: A DESCRIPTIVE SURVEY

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NATIONAL UNIVERSITY OF MODERN LANGUAGES

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Candidate of **Master of Philosophy** at the National University of Modern Languages do hereby declare that the thesis **"Perceived Usefulness and Ease of use for Learning Management System at University Level: A Descriptive Survey** "submitted by me in partial fulfillment of MPhil degree, is my original work, and has not been submitted or published earlier. I also solemnly declare that it shall not, in future, be submitted by me for obtaining any other degree from this or any other university or institution.

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ABSTRACT

Title: Perceived Usefulness and Ease of Use for Learning Management System at University Level: A Descriptive Survey

The study was designed to assess students' perceived usefulness and ease of use for learning management system at university level. The major objective of study was to assess perception of students regarding LMS usefulness and ease of use and to examine the effect of external factors such as Task Technology Fit, Convenience and Self-efficacy on Latent variables of Technology Acceptance Model that is perceived ease of use and usefulness for learning management system among university students. Conceptual framework of the study was based on two models. Task Technology Fit (1995) and Technology Acceptance Model TAM 3(Venkatesh and Bala,2008). The research was based on quantitative research approach with descriptive research design. The population of study was 5250 undergraduate students enrolled spring session (2021) of three public sector universities (IIUI, NUML and AU) of Islamabad that were using learning management system for teaching learning. Proportionate stratified sampling technique was employed to select the sample. Data was collected with the help of adapted instrument. The questionnaires were distributed by the researcher among 525 undergraduate students. The rate of returned was 96%. Data was analyzed by utilizing Cronbach alpha reliability, item total correlation, inter section correlation, mean and Amos structural equation model (SEM). Findings revealed that majority students fall in undecided situation about LMS usefulness and ease of use. It was found that there was a significant positive direct effect of external factor such as technology factor, convenience and self-efficacy on perceived usefulness and ease of use. Based on findings, it was recommended that educational institutions may encourage teachers and learners to utilize online learning management system tool, resources and digital communication. Thus, it was recommended that Universities may arrange seminars and proper online training tutorials in order to help students to cope up with difficulties and make aware them about its productive use. Universities may hire software designers or web trainers to arrange onsite or online learning workshops for students in order to make them technically competent to use LMS.

Keywords: Learning Management System (LMS), Higher Education Commission (HEC).

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LIST OF ABBREVIATIONS

LMS	Learning Management System
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
SE	Self efficacy
CON	Convenience
BI	Behavior Intention
HEC	Higher Education Commission
IT	Information Technology
TTF	Task Technology Fit
ATT	Attitude towards use
TRA	Theory of Reasoned Action
UTAUT	Unified Theory of Acceptance and Use of Technology
PEV	Perceived Entertainment Value
IS	Information system
AVE	Average variance Extract
VU	Voluntary Use
WU	Web Usage Attitude
RMSR	Root Mean Square Residuals
CFI	Comparative Fit Index
AGFI	Adjusted Goodness of Fit index
GFI	Goodness of Fit index
NFI	Normed Fit index

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DEDICATION

This thesis is dedicated to my parents for their love, endless support and encouragement.

CHAPTER 1

INTRODUCTION

1.1 Background of the study

A globally contribution of information and communication technologies draw an impact on every field of life. The extensive use of information and communication technologies impacted every industry. It has sparked a number of changes in the educational field, such as the transition from paper books to digital books and from campus-based courses to online classrooms.

Universities are being pushed by the rapid growth of ICT and the internet to change the way they deliver education by implementing e-learning tools and communication systems to ensure constant communication with students. Instructions can be made more interactive by utilizing technology, which increases their effectiveness. One of these technologies supporting e-learning programmes is the learning management system.

The traditional mode of content consumption has evolved significantly to online mode. Since information and communication technology (ICT) became an essential component of our daily lives. From kindergarten to university, the advent of information and communication technology has resulted in significant educational changes. Traditional teaching methods have been replaced by online learning at educational institutions.

ICTs are now being developed authoritatively in the field of information and communications technology. Many researchers were focusing on information and communication technology because it has resulted in several changes in the field of education. A new educational paradigm known as electronic learning has been accompanied by information and communication technology. As a result, educational institutions are adopting these technologies to meet their educational objectives.

Online learning is the best way of learning for the lifelong learning and progress in technologies (Ahmed, Hussain and Farid, 2018). Due to significant advancements in electronic media and online learning possibilities, universities have switched to an online learning method. To meet the goals of their academic activities in online education, several universities use learning management systems. Consequently, the most powerful leading genre of distance education is virtual university which is gaining popularity worldwide including Pakistan (Ali, Ahmed, Shaikh, and Bukhari, 2011).

Electronic education is the term for the intentional use of information and communication technology (ICT). One of the most extensively utilized ICT technologies in educational institutions is the learning Management System (LMS). It is the most often utilized technologies in higher education and they can be free (Moodle) or paid (Blackboard). Access to a learning management system (LMS), according to Paulsen, is an important aspect in the achievement of electronic education. The term "Learning Management System" refers to a group of tools that allow teachers and students to access online educational content. Learning systems (LMSs) are "web software that allows educators to handle content dissemination, tasks, discussions, and some other instructional components of particular lectures" in the educational sector (Abu Shawar, 2009). According to (Pishva, 2010) Learning Management Systems became an essential aspect

among most educational institutions ‘instructional systems, and hybrid models that integrate online and in-class activities are gaining popularity.

The development of coaching and learning has altered through time as technology has advanced. In the same way, advances in information and communication technology have changed regular classrooms into smart learning environments. Sharing learning resources online, for example, has allowed students to learn anytime and wherever they choose. Teachers may now devote more time to teaching and learning because online attendance marking systems have drastically reduced the amount of time, they spend checking their students' attendance.

Now a days online learning is contributing large amount to educational sector. Most of higher educational institutions are using online learning tools for teaching learning. One of most important tools used by higher institutions was learning management system. Switching from face to face to online mode, teachers shared basic knowledge with students before next class through learning management system and discuss it later during class. Online mode of teaching learning process is useful for both teachers and students to join class online without considering time and place. It's more crucial than ever to incorporate these characteristics for a productive and well-organized teaching process given the growth of smart learning skills. Currently, it is prevalent for educational institutions to run their own Learning Management Systems (LMS) and offer a wide range of smart learning features to a large number of students online. Learning Management System can enable group chats, debates, paper division, project submission, tests, scoring and syllabus assessments. Furthermore, Learning Management System has a possibility to assist learners with divergent backgrounds together with values, age or gender.

Institutions were giving attention to online learning to cope up with the closure of institutions during covid-19. It is useful for students to maintain record of their lectures and assignments. Teachers have an opportunity to keep record of student's attendance, assignments and lectures. Learning management system help teaches to upload video lectures and assess student's performance online. Students can learn in an independent way through use of online learning mode. Through learning management system students can complete their task on time.

These days online learning is considered as a basic part of educational institution in teaching learning process. Online tools are important components of online learning. For online learning teacher upload lecture and assignment etc. on online learning tool like learning management system. Students can attend those lectures and assignment without considering time and place. Students who were unable to attend class for some reasons can benefit from online lectures as well. In Pakistan Various universities have started remote teaching and learning. It is very difficult to shift from face to face mode to online teaching mode especially for developing countries like Pakistan. Higher education commission was helping higher institutes to run online teaching learning process. Additionally, Higher Education Commission was offering trainings for teaching staff, so there should be no compromise on teaching learning process.

1.2 Rationale of the Study

After the Covid-19 pandemic all the universities shifted from physical classes to online mode of education. Today, most of institutions have implemented an LMS to aid in the teaching and learning activities. Universities were being encouraged by the rapid growth of ICT and the internet to reform their curricula by implementing e learning tools

and communication systems to enable constant communication with students. Instructions can be made interactive through the use of technology, which increases their effectiveness. LMS are one of the technologies that support e-learning initiatives (Coskuncay, 2013).

LMS integration with teaching and learning has grown in higher education. However, in order for an e learning to be successful, Institutions need to assess how well LMS is being used (Almarashdeh,2016). Universities should assess the LMS performance in terms of meeting learning objectives. The proper application of the technology is crucial to achieving the goals, yet these goals are typically not achieved (Legris, 2003). The success of such technology depends on the involvement of educators, learners, and university support. The success of the e-learning process is largely dependent on the instructors, who are among the key components of a learning management system (such as adequate technological execution, evaluation of the systems efficacy, and the participation of students and teachers) (Selim,2007). Technology expertise, experience, and perception of the professors and students are critical factors affecting how well technology is integrated into an online learning process, and they should be able to use it.

In the light of crucial role that learner plays in the adoption of LMS, researchers have sought to identify the significant elements influencing students' intention to use LMS and have suggested additional research in this area. Almarashdeh (2016) examined the perspective of the instructors in a distance learning course and proposed additional research to identify the driving forces behind instructors use of LMS. Coskuncay and Ozkan (2013) developed a model for how instructor use LMS and suggested future studies may expand the study model and include other contexts. In the subject of information system, more researches are required to pinpoint the institutional mechanism by which management can alter user's opinions and attitudes and encourage adoption (Hwang,2016).

A study conducted by Haleem etal.,(2021) was to investigate the factors affecting students satisfaction in the online learning envirnment.The study was run through smart PLS3 and the findings revealed that online learning self efficacy and technology compatibility was playing cruscial role in affecting students satisfaction in an online learning envirnment.

Navarro etal.,(2021) enlighten the engeneering student's satisfaction towards use of LMS. It was concluded that technology characteristic have a significant positive effect on Task Technology Fit. Fourthermore it was concluded by Navarro that Perceived usefulness and Perceived Ease of Use were playing a critical role in influening behavior intention to use LMS. The significant direct effect of Task Technology Fit on Behavior intention leads to perceived satisfaction.

According to Majdalawi (2014), the external factors like GPA, faculty and academic year have no significant influence on Perceived usability even though they significantly influence perceived utiity. Results showed that perceptions of utility and usability are elements that directly influence students' attitudes toward using Moodle, with the perception of usability being more important in shaping those attitudes than perceptions of usefulness. Both perceived utility and simplicity of use are influenced by the faculty. Ameen (2017) examined how various factors affected students' attitudes toward use of e-learning systems. In addition to other factors like system quality, facilitation settings, self-efficacy, and faculty support, researchers looked at the effects of perceived utility and ease of use. The findings exposed that each of these elements have a considerable influence on students' willingness, employing a Learning Management System for online learning. A comparative study was done by Memon (2019) to see the awareness ratio of teachers and students about Learning Management System. The results show that 80% of the participants had not read about learning management systems (LMS), while the remaining 20%,

including teachers and students of information technology (IT), had heard of one or two major LMS solutions.

The elements that impact students' views about utilizing a Learning Management System have been given a lot of thought , but up to researcher knowledge very few published national studies has been found in field of eLearning which has concentrated on the Learning Management System 's utility and ease of usage for students at university level. This is true even though Pakistan has one of the fastest-expanding LMSs among South Asian countries. To fill the gap in Pakistan, researcher selects the area of e-Learning that was learning management system tool. This research was designed to assess the perceived usefulness and ease of use for learning management system at university level. The purpose of this research was to determine whether students were satisfied with their use of LMS and to look at their perceptions of its usefulness and ease of use. This study set out to understand how university students viewed learning management systems as convenient and helpful tools for online learning.

1.3 Statement of the Problem

As an online learning technology, learning management system offers various facilities to teachers and students in online learning activities. It enhances students' performance in classroom tasks and enable students to participate actively in online learning without considering time and place. An instructor can use a learning management system as a platform to upload videos, images, and texts from various sources to make lectures more engaging for students. It allows learners to communicate and involved in discussion with instructor and their classmates. Learning management system make it very easy for trainers to update existing content and add new materials on same time.

The usefulness and ease of use are the main competencies that are demanded for acceptance of any technology by user. Keeping in view the importance of an online learning through learning management system, the researcher selected the area of online learning to assess student's opinions regarding usefulness and ease of use of Learning Management System at university level.

1.4 Research Objectives

1. To assess perceived usefulness for learning management system at university level.
2. To assess perceived ease of use for learning management system at university level.
3. To examine the effect of perceived ease of use on perceived usefulness for learning management system at university level.
4. To measure the effect of perceived ease of use on behavior intention to use learning management system.
5. To measure the effect of perceived usefulness on behavior intention to use learning management system.
6. To examine the effect of external factors on perceived ease of use for learning management system at university level.

6a. To examine the effect of technology factor on perceived ease of use for learning management system at university level.

6b. To examine the effect of convenience on perceived ease of use for learning management system at university level.

6c. To examine the effect of self-efficacy on perceived ease of use for learning management system at university level.

7. To determine the effect of external factors on perceived usefulness for learning management system at university level.

7a. To determine the effect of technology factor on perceived usefulness for learning management system at university level.

7b. To determine the effect of convenience on perceived usefulness for learning management system at university level.

7c. To determine the effect of self-efficacy on perceived usefulness for learning management system at university level.

1.5 Null Hypotheses

Ho1: There is statistically no significant effect of perceived ease of use on perceived usefulness for learning management system at university Level.

Ho2: There is statistically no significant effect of perceived ease of use on behavior intention to use learning management system at university level.

Ho3: There is statistically no significant effect of perceived usefulness on behavior intention to leaning management system at university level.

Ho4: There is statistically no significant effect of external factors on perceived ease of use for learning management system.

Ho4a: There is statistically no significant effect of technology factor on perceived ease of use for learning management system at university level.

Ho4b: There is statistically no significant effect convenience on perceived ease of use for learning management system at university level.

Ho4c: There is statistically no significant effect of self-efficacy on perceived ease of use for learning management system at university level.

Ho5: There is statistically no significant effect of external factors o perceived usefulness or learning management system at university level.

Ho5a: There is statistically no significant effect of technology factor on perceived usefulness for learning management system at university level.

Ho5b: There is statistically no significant effect of convenience on perceived usefulness for learning management system at university level.

Ho5c: There is statistically no significant effect of self-efficacy on perceived usefulness for learning management system at university level.

1.6 Conceptual Framework

The conceptual framework shows the contribution of technology factor and personal factor in contrast with technology acceptance model. Two models made up the conceptual framework: the task technology fit model and the technology acceptance model. One-way relationship was defined in Conceptual framework of the study where external factors such as technology factor, social and personal factor has contribution as independent variable whereas perceived ease of use and perceived usefulness were

dependent variables in conceptual framework. TTF model presented by Goodhue (1995) and TAM model presented by Venkatesh and Bala (2008) were both used by researcher for present study.

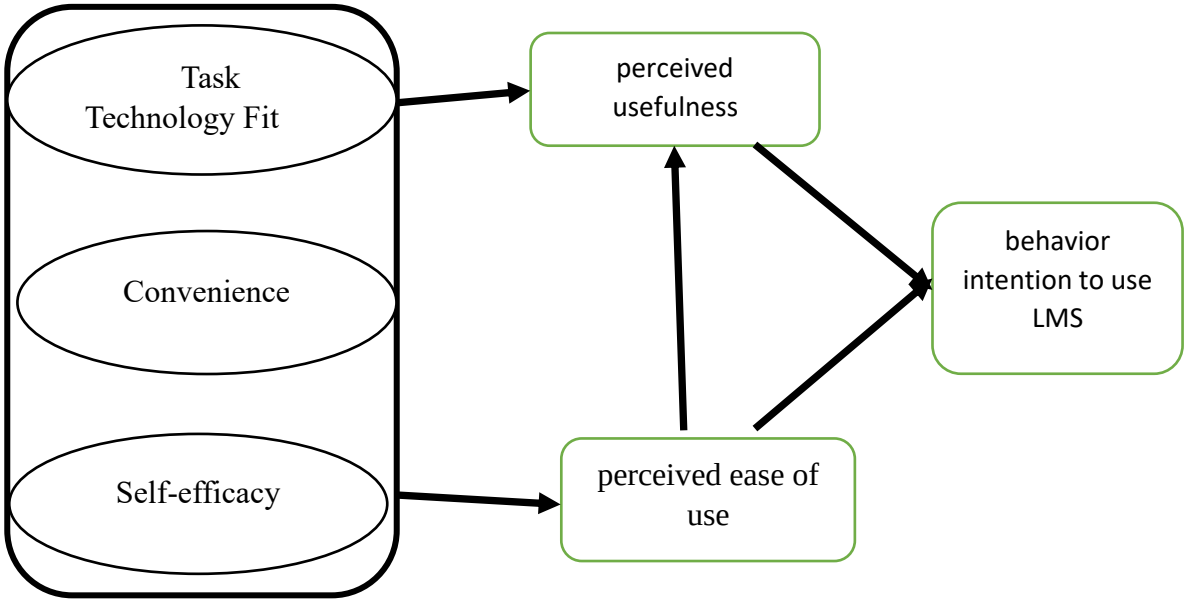


Fig. no. 1 Conceptual framework of the study adapted from Rehman etal., (2018)

1.6.1 Task Technology Fit Model

Goodhue (1995) suggested the Task Technology Fit (TTF) framework for measuring the success of IS. TTF focuses on how well a system's attributes meet the user's needs for the task at hand. They claimed that performance would increase as the TTF value increased. In addition, they suggested that task qualities and technological characteristics are two crucial factors in determining TTF. TTF asserts that users will only employ the IS if it is the most appropriate for the given task. In various scenarios, including mobile commerce and mobile information systems, e-learning, and e-books, researchers have tested the TTF model in order to better understand how consumers adopt IS. Task Technology Fit (TTF) is concerned with how well the system's attributes meet the user's task requirements.

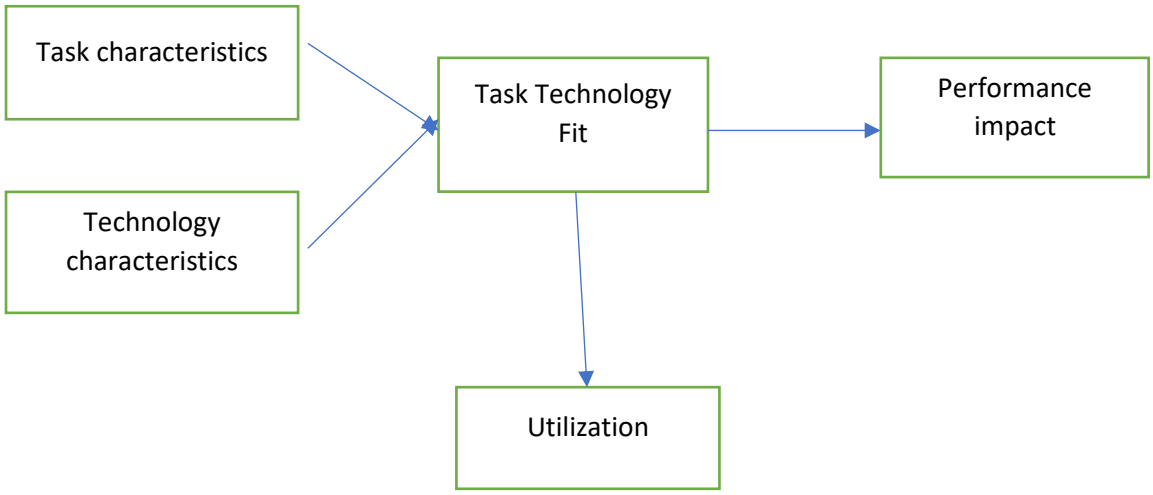


Fig no. 2 Task Technology Fit Marcolin, (2000)

1.6.2 Technology Acceptance Model

Davis utilized TAM model in 1989 to outline computer usage trends. Understanding user behavior across a range of end user computer systems and user demographics is essential. It is necessary to understand the general factors that determine how well computers are received by society. Perceived usefulness and perceived ease of use were two specific beliefs that were examined in the core of TAM model. In the core of TAM model, perceived usefulness (PU) and perceived ease of use (PEOU) were two particular beliefs that were investigated. Perceived utility is defined as a prospective users personal evaluation of how likely it is that using a particular system such as a single platform e learning system will enhance their efficiency and perceived Use ability relates to how simple they expect in the future finding it to be to use. A person's belief in a system may be affected by additional factors, also known as eternal variables.

TAM2 (Venkatesh & Davis, 2000) and the model of the elements of perceived ease of use were combined to create TAM3, an integrated model of technology adoption, by Venkatesh and Bala (2008).The four types of personality differences, system characteristics, societal impact, and facilitating conditions aspects of perceived usefulness and perceived

usability was used by the authors in the construction of the TAM3.Computer anxiety to perceived usability, perceived usability to behavioral intention, and perceived usability to perceived usefulness were all affected by experiences in the TAM3 research model. In actual IT implementation scenarios, the TAM3 research model was put to the test.

The conceptual framework used in this study by the researcher was based on the Davis technology acceptance model and was relevant to the objectives of the current investigation. It was adapted from the study of Rehman (2018). According to the Technology Acceptance Model, the operator's views of usefulness and ease of use influence user behavior when using an online tool. Conceptual framework of this study includes three TAM constructs and external factors including Technology factor (Task Technology Fit, convenience) and Personal factor (Self efficacy).

TAM claimed that behavioral intention (BI) influences technology acceptance by specifying how an IS system is really used. Usefulness and ease of use are two factors that can affect behavioral intention (BI). According to TAM, perceived ease of use directly influences perceived usefulness and indirectly influences behavior intention. However, behavior intention is directly impacted by perceived Usefulness. Figure no. 3 shows a model TAM with external factors.

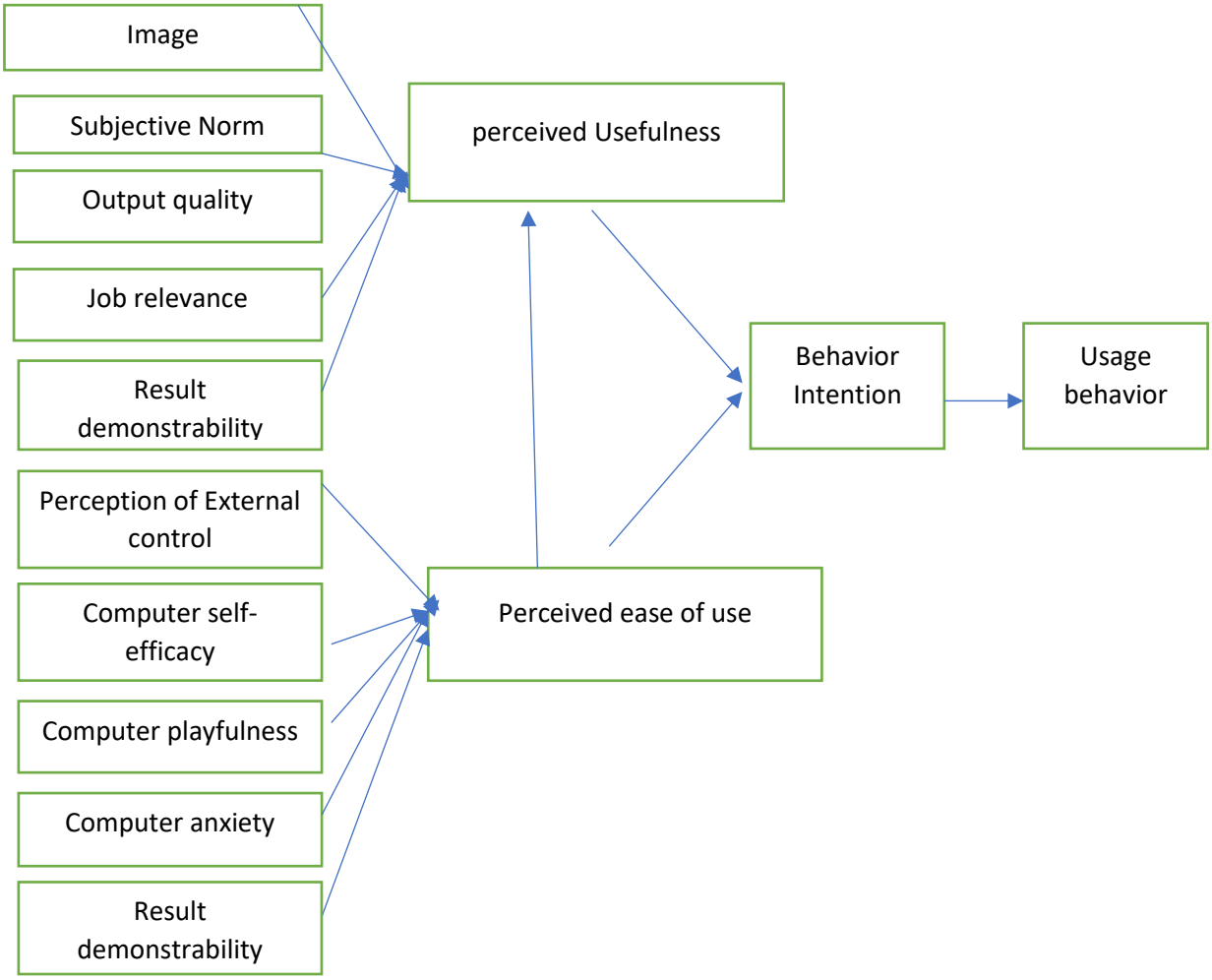


Fig no. 3 Technology acceptance model TAM3 presented by Venkatesh and Bala (2008)

1.6.2.1 Perceived Usefulness

The term "perceived usefulness" was coined by Davis, who described it as "The possibility of using a specific system would be valuable to a prospective user's work performance in an organization

1.6.2.2 Perceived Ease of Use

A degree that shows how simple a potential operator believes the target system is to operate is known a perceived ease of use.

1.6.2.3 Behavior Intention

Behavior intention is the amount to which a person has made intentional arrangements to do or not do a given behavior in the future.

1.6.2.4 Self Efficacy

The assessment of a person's capacity to plan and carry out activities in the manner necessary to produce a particular type of performance" is characterized as perceived self-efficacy (PSE). In the context of LMS usage, PSE denotes a student's assessment of his or her own capacity to operate, navigate, and work with the system.

1.6.2.5 Convenience

Convenience refers to how easy and convenient an e-service is to use in terms of effort and time savings.

1.7 Significance of the Study

Both male and female university students would benefit from the current research. The research mainly focused on relationship of extrinsic factor with latent variables of TAM model which would lead students to improve their learning style to better adapt to courses on Learning Management system and get desired results.

This research will help and inform individuals responsible for developing, implementing, and delivering learning management systems at universities. To develop these systems and so gain a better knowledge of student participation in online learning with this newfound knowledge, the respective teachers will be better able to modify their instructional design in order to encourage learners to study via Learning Management System. Furthermore, this would clarify if instructors should change their instructional

approaches or whether students should improve their learning styles to better adapt to courses.

The conclusions of this study will be valuable to scholars and Learning Management System administrators, giving the rising necessity for Learning Management System in university education. Scholars, decision makers, and software engineers who are increasing the application of e-learning technology by students in universities and colleges, mostly in places where adoption is still restricted, would find this study interesting. The attitudes of university teaching staff towards employing learning management systems as measured by the Technology Acceptance Model, should be directed to a variety of concepts and solutions for improving their odds of success in integrating technology into the learning process. As a result of the significance of learning management system, current study was beneficial to educational institutions like universities. Universities that aim to enhance the student learning management system (LMS) by doing research and developing new LMS features can produce students who are self-assured and increase their capacity to compete with other institutions. There aren't many studies that examine perceived usefulness and learning management system ease of use in the context of Pakistan, and none that show how external factors affect the latent variables of the TAM model. As a result, this research study will be a very valuable addition to the body of literature. As a result, the findings of this study had the potential to add to past research in a unique way. This research will be significant and useful in the Pakistani literature since it will spread awareness of the value and usability of learning management systems.

1.8 Methodology

1.8.1 Research Approach

Considering current study, a quantitative research approach was applied by researcher because the data for this study were gathered in a numerical format. Quantitative research mostly uses numerical data to understand the findings and draw conclusions. Researcher chose this approach because it can be used to enumerate the issue by producing numerical data or data that can be transformed into useful statistics.

The researcher was interested in gathering data in an organized format, and quantitative data collection methods provide a more structured approach, therefore that was the reason for selecting this quantitative study approach.

1.8.2 Research Design

For the current study, a descriptive research design was used. Gay (1996) defined "descriptive research" as the process of gathering information in order to test hypotheses or respond to questions regarding the current status of the study's objectives. Researcher personally visited the institutes and collected responses through questionnaire. The researcher was interested to assess student’s views about Perceived ease of use and Usefulness of Learning Management System. The effect of both perceived ease of use and usefulness on Behavior Intention to use LMS was also considered in this study. Furthermore, the effect of external factors on Perceived usefulness and ease of use were also assessed by researcher.

1.8.3 Population of the Study

The purpose of this study was to look into how well a learning management system is used at universities and how useful it is. The population of study was based on total 5250 undergraduate students enrolled in the social sciences department of three public universities in Islamabad (International Islamic University, National University of Modern Languages, and Air University) session 2021. Total number of male students was 2599 and female students were 2651. 11 public sector universities were offering social sciences departments according to Higher Education Commission (HEC) report (see appendix G). Researcher selected only three public sector universities that were offering online teaching and learning through learning management system (LMS). The number of students enrolled in three public sector universities (IIUI, NUML, Air university) at undergraduate level was taken from their respective administrative authorities.

1.8.4 Sampling Technique

A sample of the population is a subset of the whole. The sampling technique is a means of selecting a group of research participants in a manner that the people picked represent the larger population from which they were chosen.

Researcher selected proportionate stratified sampling technique for this study. A proportionate stratified sampling technique was used in order to get responses from those students who used learning management system. Only those students were the part of this study who used Learning Management System. The same percentage of sample was taken by researcher from each university to get the best possible results.

1.8.5 Sample Size

This study's sample was made up of undergraduate students from the National University of Modern Languages, the International Islamic University and Air university Islamabad's social sciences departments who used a learning management system for teaching and learning (session 2021). Gay, Mills, and Airasians (2012) claim that a sample size of 500 would be adequate for populations of up to 5000 people. Which make up 10% of the total population. In light of the aforementioned source, 10% of each university's population served as the research sample for the current study. There were total 5250 undergraduate students. Male students were 2599 and its 10% sample size was 260 whereas total number of female students were 2651 and its 10% sample size was 265 students. Researcher visited selected universities of current study and distributed questionnaires among those undergraduate students of social sciences department who used LMS for attending lectures online. Researcher waited over there for each and every respondent to fill the questionnaire. It was making sure by researcher that each and every respondent must answer each and every question asked by researcher in written form of questionnaire. Total 525 students selected as sample were given the questionnaire by the researcher, and the rate of return was 96% who completely filled the questionnaire and returned it back .

Table No.1.1

Population and sample size for the study

Group	**Population**	**Sample (10%)**
Male	2599	260
Female	2651	265
Total	5250	525

1.8.6 Research Instrument

Questionnaire tool was used by the researcher to gather data regarding the evaluation of learning management systems. The tool was adapted from Rehman (2018) (see Appendix C). The questionnaire contains six dimensions such as Perceived ease of use, Perceived usefulness, Technology factor, Convenience, Self-efficacy and Behavior intention. A 5-point Likert scale questionnaire was used by the researcher with closed-ended responses ranging from Strongly Disagree (SDA)=1, Disagree (DA)=2, Undecided (UD)=3, Agree (A)=4, and Strongly Agree (SA)=5.

Table No 1.2

Descriptive of Learning Management Assessment Scale (LMSAS)

Scale	**Sub-Section**	**Items**
Learning Management System Assessment Scale (LMSAS)		
	perceived ease of use	05
	perceived usefulness	08
	Self-efficacy	04
	Task technology Fit	06
	Convenience	04
	Behavior intention	05
Total items		32

1.8.7 Validity of Instrument

The word "validity" means, the test is valid if it measures what it is supposed to be measured. To check and validate the tools used in this study, research experts in the area of education were consulted by the researcher. The researcher visited five research experts for the face to face validity of tool and get their comments in response. The researcher made some improvements to the instrument with the guidance of valuable suggestions from experts and modified some items in the questionnaire. (see Appendix C).

1.8.8 Pilot Testing

Pilot testing was used by researcher to assess the reliability of instrument. There were six dimensions of scale with total 32 items. Data was collected from 50 students. The statistical package for social sciences (SPSS) 22nd was applied by the researcher to code and analyze the data for the pilot study.

1.8.9 Reliability of Tool

Researcher collected data from 50 undergraduate students of social sciences of National university of Modern Languages for pilot trial. Reliability was tested on those 50 responses. Researcher calculated Cronbach alpha and correlation related to items. Result shows that items were significantly correlated with each other.

1.8.10 Data Collection

Considering current study, a closed ended questionnaire tool was used to collect responses. The researcher personally visited selected institutes in order to conduct real and authentic research.

1.8.11 Data Analysis

A statistical product and service solution version 22 was used to examine the information gathered through close ended questionnaire. The mean score was used to assess perceived usefulness and perceived ease of use for learning management system among students. AMOS was used to assess model fit. Application of structural equation modelling was used to determine how external factors affected latent variables. Furthermore, hypotheses test was done by Structural Equation Model.

1.9 Operational Definition

1.9.1 Learning Management System

An online application used by teachers to create and deliver academic content, lectures, feedback on projects etc. and enable students to learn online without considering time and place.

1.9.2 Perceived Usefulness

The degree to which prospective user believe that using a specific technology would improve a user's productivity or performance.

1.9.3 Perceived Ease of Use

The degree to which prospective users believe the technology is simple and straightforward to use is known as PEOU.

1.9.4 Behavior Intention

The degree to which a person has made deliberate plans to engage in or refrain from a specific activity in the future is referred to as behavior intention.

1.9.5 Task Technology Fit

Task-Technology Fit describes how well a particular information system or piece of technology helps the current task. If the technology supports the user's tasks and workflow, he will utilize it to complete them. If the technology clashes with the user's tasks and workflow, he won't use it or will at least try to avoid doing so.

1.9.6 Convenience

Convenience refers to how easy and convenient an e-service is to use in terms of effort and time savings.

1.9.7 Self Efficacy

An individual's belief in his or her ability to carry out actions required to accomplish particular performance attainments is referred to as self-efficacy.

1.10 Delimitations of the Study

This study was delimited to:

1. Three public sector universities, National University of Modern Languages, International Islamic University and Air university were the main subject of the study.

2. The study included students from the department of social sciences at the undergraduate level.

3. The social sciences subjects were limited to those on HEC's list (see appendix I).

CHAPTER 2

LITERATURE REVIEW

Information communication technology enabled easier content utilization and management, as well as quick and efficient output-based learning. When it comes to controlling and organizing course teaching activities, higher education can profit from the use of ICT and techniques to bring about greater changes and save time and energy. Due to the simplicity to use and management of online courses, learning management systems must be a priority. Many authors have focused on this field in the recent decade, with various new trends and methodologies. Researchers are focusing their efforts on these technologies in order to increase and enhance the participants' integrity and speed of communication. Up to researcher knowledge there were only a few studies that focus on a specific topic.

2.1 Learning Management System (LMS)

An application for computer software which permit users or Stake holders to circulate data in an organized way via accepting suitable academic approach is known as Learning management system. It permits operators to share data and work together digitally. Teachers and stake holders can monitor and assess student's participation through LMS. A tool that allows students to accomplish tasks efficiently and upload many files in one place is known as LMS. Furthermore, LMS enable users to access the information without considering location, time, and permitting operators to pass on to other students and teacher electronically (Al-Khalifa, 2010).

Learning management system plays a vital role in time saving for both teacher and students along with easy access to content and to regulate self-learning among students (Gudanescu, 2012). Theoretically, students can adopt Learning Management System to use collaborative qualities for example; threaded conversation and dialog boards, receive comments on their presentation, send their projects, get additional lectures resources, conveniently connect with their lecture, and aid them in the organization of their lesson materials. On the other hand, many Learning Management System platforms have numerous drawbacks. For example; deficiency of economic resources, software and hardware compatibility, procedural requirements and so forth.

An online gateway that links professors and students in higher education is a Learning Management System. It gives a mechanism for sharing educational resources or activities in a simple manner. It's also a tool that lets teachers and students to interact without needing to be in the same room. In current age of information technology, the internet is readily available and accessible in urban regions, which are home to most institutions.

The suggested Technology Acceptance Model borrows ideas from a well-known TAM that Davis developed in 1986. Understanding the implications of using a web-based education environment is critical for assessing the system's success, planning for future improvements, and obtaining improved educational results to increase efficacy of learning. It's also regarded to be as a source of information for future Learning Management System deployment projects.

According to Azharuddin and Ling (2013) Learning Management System is an elementary tool for university students where they can get abrupt reports related to their daily projects and they remain informed about their coursework. Furthermore, educators

can easily interact with their students beyond classroom hours and can immediately notify them on issues related to their project over the Learning Management System. Additionally, it was mentioned that institutions of higher education use learning management systems to make it simpler for teachers to exchange classroom activities and resources with students. It is also a gateway that permits teachers and students to connect and discuss with each other even outside the classroom using discussion forums that might otherwise take a lot of time and resources that should be spent in institute or in a classroom for learning.

LMS adoption is widely recognized in higher schooling institutes. Fidani and Idrizi (2012) suggested that while these systems facilitate students to get access to their course contents without delimiting place and time and use communication tools in their learning and study activities. This improve their educational productivity and performance. However, this cannot be granted on its own, students will learn how to use these systems. So, it is important to find the factors which motivate the students in accepting and constantly using such systems (LMS) so it will increase the use of these system (Ma and Yuen, 2011).

So far studies have focused on the benefits of Learning Management System, but there were very few studies empirical studies in Pakistan concerning student’s attitudes and motivations to use Learning Management System. It's important to remember that different institutions have different customs and cultures, so a thorough understanding of students' attitudes toward Learning Management Systems can help broaden concern about the elements that affect learners' attitudes toward constant application of LMS. Therefore, it is crucial to evaluate various factors that can stimulate student’s perspectives on the utilization of a Learning Management System understanding the elements that influence

students' opinions of LMS can support academy’s and concerns to produce effective tools for more fascinating learners to accept this online learning platform (Grandon, 2005). Hence, it is important to make such research that investigates more thoroughly with attitude of students towards using Learning Management System. However, there have been few empirical researches in Pakistan that have looked at the relationship between university students' opinions toward Individual performance and the usage of Learning Management Systems. Other characteristics to consider are perceived utility, perceived capacity to utilize the system, system quality, facilitation circumstances, self-efficacy, and support for the faculty being examined.

2.2 Perceived ease of use

Perceived ease of use is the degree to which a person thinks a system is simple to understand. The system's ease of use may depend on how frequently it is used and how people interact with it (Zuniarti et al., 2021). According to Bassiouni et al. (2019), perceived ease of use refers to how much effort people put into using technology, such as entertainment in video games. The perceived ease of use of LMS refers to how simple they are to understand and operate it (Zhang et al., 2014). LMS's perceived ease of use measures how straightforward it is to comprehend, use, and navigate (Rauniar et al., 2014). The perceived ease of use of smart home technology can be defined as the degree of assurance a person has in the system's simplicity of user interaction and ease of understanding (Hubert et al., 2019).

2.3 Perceived Usefulness

The extent to which a user thinks that adopting a specific technology might increase their productivity and professional performance is known as perceived usefulness (Kowalczuk,

2018). According to Rauniar et al. (2014), perceived usefulness is the extent to which social media users think that using particular social media platforms can help meet the demands of people who are goal driven. Each social media platform provides a distinct primary service as well as a variety of tools and apps to benefit its users. According to the TAM paradigm, PU is thought to be a direct predictor of behavioral intention to use (BI) of the relevant technology (Park et al., 2014).

2.5 Technology Acceptance Model and Theories

In this section, we'll take a closer look at five of the most well-liked and frequently applied technology acceptance theories and models. A number of different features will be emphasized as a result of the critical study. These variables will serve as a firm foundation for the chapter's conceptual model.

2.5.1 Diffusion of Innovation Theory (DOI)

The foundation for formalising technological adoption behaviour is Rogers (2003) theory of the diffusion of innovations. This foundation can be used to build other TAM models. The S-shaped diffusion curve hypothesis proposed by Gabriel Tarde in 1903 served as the foundation for the DOI's methodology. The DOI was able to provide detailed definitions for the terms of "diffusion," "innovations," and the "communications" process by utilising this methodology.

Diffusion refers to the mechanism that enables a number of innovations to communicate with one another over the course of some amount of time within a variety of social systems.

An individual is required to acknowledge and discuss a collection of novel concepts, ways of thinking, or applications that are known as innovations.

2.5.2 Theory of Reasoned Action

Ajzen and Fishbein (1975) were the ones who initially conceptualized TRA, and it was one of the earliest theories concerning how people embrace new technologies. The foundation of TRA was used to construct a great number of other theories that were established later, including UTAUT, TAM2, and TAM. From a social psychological point of view, it largely explains the behavior of individuals in terms of their acceptance of technology advancements. According to the TRA model, an individual's behavior to adopt any technology is affected by their behavior, which is also affected by two-main factors: subjective norms and attitude toward behavior. According to TRA, people are rational decision-makers who regularly compute and examine their appropriate behavioral statements as part of their attitude development towards behavior. According to Lai (2017), an individual's attitude is made up of both positive and negative feelings that they have when performing desired behaviors. Subjective norm is an additional crucial component of the TRA paradigm. Individuals' perceptions of key persons in their lives determine whether or not they must engage in the required behavior (Fishbein and Ajzen,1975).

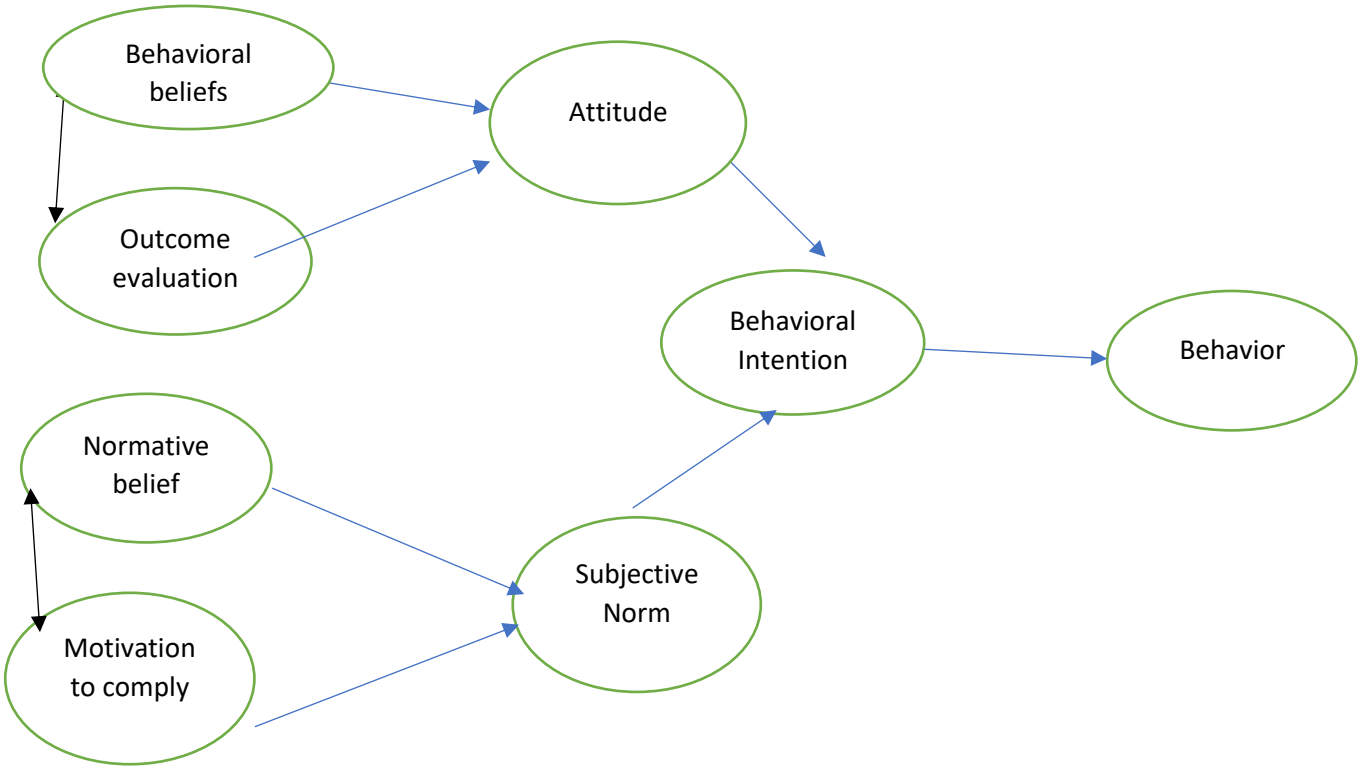


Fig 2.1: Theory of Reasoned Action model (Fishbein and Ajzen,1975)

2.5.3 Technology Acceptance Model (TAM)

In 1989, Davis created the technology acceptance model, it was a theory of ICT that explains and displays how a user adopts and uses technology. Technology acceptance Model explains theoretical and economic perspectives and clarifies the technical determinants acceptance, which can explain a user's behavior from a variety of emerging end user computer technologies as well as the user population (Davis, 1989). TAM also explains the user population. Actual use (AU), behavioral intention (BI), perceived usefulness, perceived ease of use and attitude towards use (ATT) are five components that make up TAM. These constructs have a big impact on how users accept applications and technologies. Davis (1989) claimed that, the perception of the degree to which a person

believes something is simple to use (PEOU), that making use of a specific technology will require less effort. The extent to which a person believes that utilizing a certain piece of technology would increase their performance at work is referred to as their "PU" (Davis, 1989). The attitude of a person towards carrying out the planned behavior in the implementation of a particular system is referred to as their attitude towards use(ATT). An individual's ATT can either be negative or positive. Behavior intention (BI) is a measure of how much a certain technology user has thought about how they plan to use or not use a certain technology in the future (Davis, 1989). Attitude toward use assesses both the frequency and volume of a technology's usage by consumers. Frequency refers to how often a technology is used, while volume refers to how much. TAM suggests that there is a connection between PEOU and PU. People are more inclined to believe that a technology is beneficial if they believe that it can be utilized easily and with little effort. According to TAM, people's perspectives on how they should use technology are influenced not just by PEOU but also by PU. When users perceive a specific technology to be easy to use and helpful, it increases the likelihood that they will adopt a positive attitude toward its implementation. Davis made the discovery that ATT and PU had an effect on the users' BI to use technology. When people believe a technology to be valuable, they have the ability to influence the users' BI to use it. The favorable BI that users have toward a technology is characterized by the actual use of that technology, also known as AU. Finally, the actual utilization of a technology is determined by the favorable BI of people toward it. Users are more likely to use technology in their daily lives if they have a positive attitude towards it.

2.5.4 Extended TAM Model

TAM2 was initially developed by Venkatesh and Davis in the year 2000. PEOU and PU, the two primary drivers of the initial TAM, are carried over to the TAM2 model. It also takes into account how social factors affect subjective norms and images, as well as the cognitive instrumental process, which includes output quality, work relevance, and outcome demonstrability. In a variety of organizational settings, both TAM2 and TAM have been used to demonstrate how different kinds of technology are received by different kinds of settings. TAM2 says that people use mental representation to figure out how important work goals and the effects of using a certain system affect each other. This is mainly used to make decisions about performance contingencies like PU. According to theories about the matching mental process, potential users usually use a compatibility test to decide if a job is relevant to them (Venkatesh and Davis, 2000). As a result, job relevance is essentially defined as a personal assessment of how closely the system aim applies to one's job. This is because job relevance is mostly based on the perception of the individual. According to TAM2, a good effect on PU can be attributed to job relevance. The quality of the output has an impact on PU as well. According to Venkatesh and Davis (2000), quality output judgement adopts a typical profitability test form. This test form is characterized by a provided set of judgments that includes a variety of systems that are relevant to an individual when selecting the system that produces the highest quality output. According to TAM2, the output quality has a beneficial effect on the production unit. As a consequence of this, the demonstrability of the results is regarded as the third PU determinant. The term "result demonstrability" refers to the tangible outcomes that can be achieved via the application of a certain innovation (Moore and Benbasat, 1991).

2.5.5 Unified Theory of Acceptance and Use of Technology

Venkatesh and colleagues created UTAUT (2003) in an attempt to correct inadequacies in previous theories. The theory includes eight of the most popular prior hypotheses. As a result, it is founded on a number of essential ideas from the eight models and theories. Venkatesh (2003) have proposed the unified theory of acceptance and use of technology, which states that three constructs represent the key intention in using information technology (IT) determination: effort expectancy, performance expectancy, and social impact. The most popular constructs of the eight theories and models encompass these three items. Users' expectations of how well a system will help them improve their job performance are measured by their performance expectancy. Extrinsic motivation (from the motivational model), relative advantage (from division innovation theory), expectation/outcome, and PU are some of the additional construct roots (from social cognitive theory). The level of difficulty that is associated with the application of a particular system is referred to as the effort expectancy, and the degree to which people perceive that it is imperative that they use the suggested alternative method is referred to as the level of social influence. The effect of facilitating conditions on the implementation of a system is mostly controlled by an individual's experience and age, according to Venkatesh (2003). Venkatesh describe the level at which a user affirms that a technological and organizational infrastructure typically exists to support the use of a specific system.

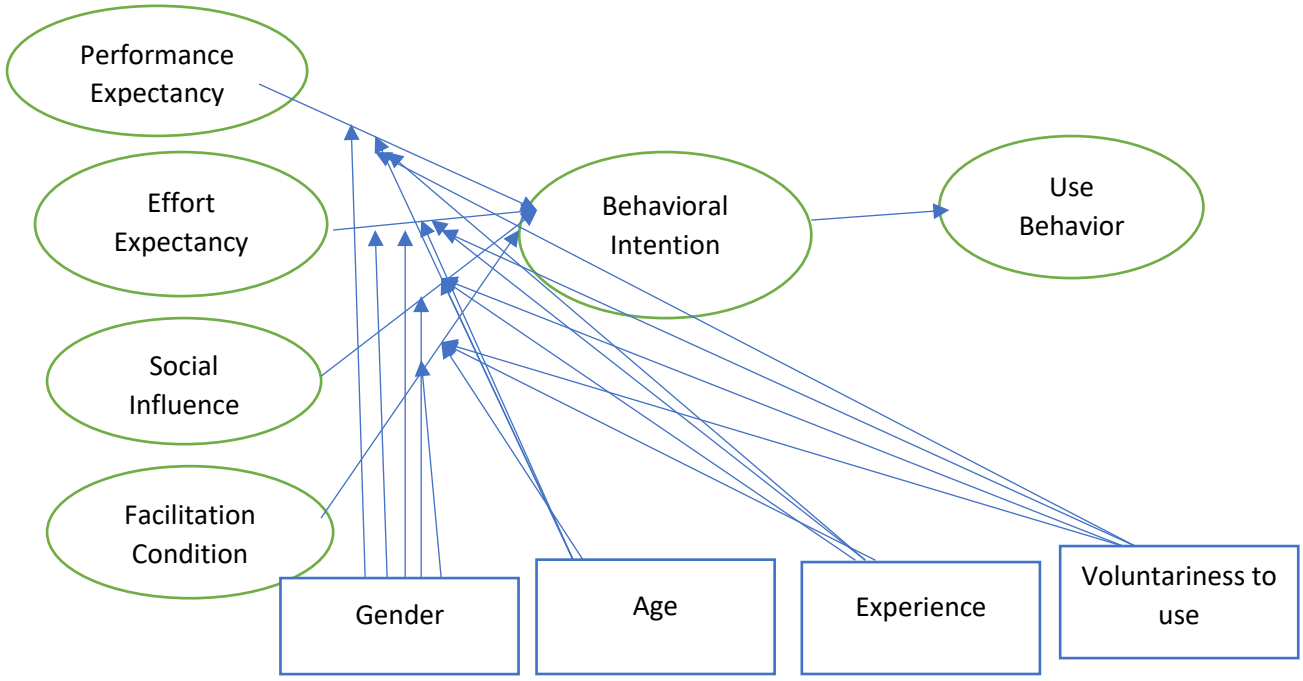


Fig 2.2: UTAUT model by Venkatesh, Morris, Davis (2003).

2.6 External Factors

2.6.1Task Technology Fit

Goodhue introduced Task Technology Fit (TTF) (1995) as a user evaluation concept for IS success. TTF is concerned with how well the system's attributes meet the user's task requirements. They claimed that the higher the TTF value, the better the performance. They went on to say that task and technological factors are both major predictors of TTF. According to TTF, users will utilize the IS if it is the best fit for the task at hand. Researchers have tried TTF in several contexts such as mobile commerce, mobile information systems, e-learning, and e-books to see if it can better explain users' adoption of IS. TTF has been combined with other models by researchers because TTF ignores user perceptions, yet user participation is a key component of knowledge management systems.

prior investigation has said that the task-fit of an IS has a direct effect on how well users do their jobs. The PEOU and PU of users can only be used to judge how well a certain technology works in a certain situation. There is proof that TTF has had big effects on PEOU and PU. If the users find a good match between the technology and the task they want to do, they will find it more useful and easier to use, which will change their plans to use the technology. Therefore, it is anticipated that TTF will have an impact on behavior intentions both directly and indirectly.

2.6.2 Convenience

Yoon and Kim (2007) said that online computing technologies are more convenient than smart communications. This means that how convenient people think IT is a big part of why they use it. Convenience is the degree to which people find an e-service to be easy and save them time and effort. When people use LMS, they find it easy because the technology has many built-in features that make it easy to work with other students, get academic information, and keep track of what students are doing. In terms of e-textbook applications, since students see e-textbook applications as service providers, convenience can be thought of as e-service comfortability rather than behavioral convenience. Cheng (2015) looked at how technological features affect how people accept m-learning.it was discovered that PU and PEOU are both significantly impacted by convenience. Results also showed that there are strong links between perceived convenience and PU and PEOU. The features of e textbook apps that make them easy to use can affect how easy students think e textbook apps are to use, which would in turn affects PU and PEOU. This study looks at simplicity of use as a technological issue and assumes that simplicity to use is a major issue in how

learner feel about using LMS. Also, we made the assumption that who think LMS is convenient will find it more useful and easier to use.

2.6.4 Self-Efficacy

Self-efficacy is how capable a person thinks he or she is of doing something. Many researchers have confirmed the important roles that SE plays in IS adoption. IS is used more when self-efficacy levels are higher. Previous research has confirmed that SE has positive effects on both PEOU and PU. When it comes to how university instructors use LMS, we assume that instructors with higher levels of SE will use LMS more often and find it easier to use.

2.7 Related Researches Based on Research Variables

The key to Learning Management System success in any educational institution appears to be students' acceptance, which in turn begins and supports students' usage of Learning Management Systems in classes. As a result, it's critical to identify the major roadblocks to students adopting an electronic-learning system like a Learning Management System, because user acceptability is often the deciding element in whether a project succeeds or fails (Davis, 1993).

A study of Moodle, an online learning management system, was published by Limongelli (2016). The author offered a module in their work that focuses on a few traditional learning object practicality and functions as a recommendation system. It is based on a keyword-based search strategy for teachers that may be applied to the specified sources. Hung and Chou (2015) conducted another study on E-learning learning management tools and information management. Authors emphasized the role of

information communication technology and learning management tools in their study, as well as a critical analysis of learning management tools. The author reviewed a variety of online learning management systems, including their functions and features. The goal of this research was to concentrate on these internet services; however, it is not focused in Pakistan.

There are various learning management applications that are offered for free. According to Siddiquah and Saleem (2017), students are proficient in Microsoft Office, Internet surfing, social networking, email, and computer gaming, among other things. However, they lack proficiency in other equally important skills such as browsing various online resources, participating in discussion forums, and writing blogs. This is because the amount of time students spends using technology for enjoyment vastly outnumbers the amount of time, they spend using it for academic reasons. Simultaneously, they believe that adopting information communication technology will help them learn more effectively. Students frequently experience problems with virus threats, slow internet connections, power outages, and limited internet access, as well as poor computer working conditions. Universities can increase infrastructure spending to solve ICT-related issues, at least at the university level. Horvat (2015) conducted a study wherein the author concentrated on a learning management system. The research centered on learners and teachers comfort with a certain level of knowledge, that was reported by both students and instructors in equal amounts. This study focused on Learning Management System tool parameters which make it distinct from other studies.

Hung and Chou (2015) conducted a study on the Learning Management System in which the author established a platform for the Learning Management System. The authors'

work included an online recording of the teacher's behavior using a behavior scale measurement.

Students' involvement and behavior are recorded in accordance with the teacher's unique online conduct as well as the learning process of the students. Gonzalez (2015) claims that those who are "digital natives" are adapted to the use of emerging ICT. Conclusion of these two researches is that information communication technology has become an increasingly important part of our daily lives, and that digital natives may benefit from training and exposure to learn how to utilize these tools properly and ethically. In a nutshell, if we are to keep up with the times, we must master the use of these technologies (Memon, 2019)

Since electronic-learning has altered traditional teaching and learning methods in a variety of sectors, a significant amount of research has been conducted in the field of electronic-learning. Many educational institutions have adopted the use of online learning. Electronic learning is utilized for a variety of purposes, including distant learning and supplementing classroom teaching. Several learning management systems (LMSs) have been created and are in use to support the electronic-learning process. Continuous advancement in information communication technology helps students attain their goals. Due to the coronavirus breakdown, the current situation throughout the world has raised the need for information communication technology in terms of student education. Prior to the covid-19 Pakistan had a significant information communication technology usage. As a result, during COVID-19, the use of digitalization has become an integral aspect of every institution in Pakistan. This division has severed physical connections between educational institutions and students, raising the demand for information communication technology in student learning around the world.

In January 2021 Mailizar investigated factors which effect the behavioral intention of students on eLearning during covid-19. Researchers used Technology Acceptance Model to test effect of six factors including system quality, eLearning experience, performance expectancy of use, utility, mindset toward usage, and behavioral intention to use are all factors to consider. utilize eLearning are all factors to consider. In addition, Fallah (June 2020) did another study to investigate students' intentions to adopt mobile learning at Jordan's university. The researchers used the Technology Acceptance Model,
which studies subjective norms, self-efficacy, access to the system, perceived utility, Attitude, perceived usability and intent to use mobile learning are all factors to consider. According to the findings, subjective norms and system accessibility have a substantial impact on perceived utility, intent to use online learning, attitude, and perceived usability. Furthermore, Fearnley (2020) looked at the elements that impact learning management system adoption. The Acceptance Model for Technology was utilized by the researchers, this takes into account three external factors: technology readiness, assumed consciousness, perceived competence. and enabling condition. The findings demonstrated that Quality of the system and assumed consciousness had a significant impact on perceived utility, which influenced opinions toward advanced technologies and intentions to employ it.

Furthermore, system performance directly affect attitude towards technology use as well as perceived simplicity of usage. Teachers who are confident in their ability to use the LMS will find it to be both beneficial and straightforward to use, as perceived self-efficacy has a significant impact on perceived utility and simplicity. Facilitating conditions, on the other side, had insignificant impact on attitudes or perceived usability. In addition, Dumpit and Fernandez (2017) used the technological acceptance model to analyze social media in higher education establishments. To explore the intricate relationships between drivers of

various technologies, data was collected from 500 public and private higher education students in the Philippines. Principal component analysis and structural equation model is employed by researchers to come up with their findings. According to the research, perceived utility, perceived usability, behavioral intention, and perceived playability are all major forecasters of student practice actions. Yet, only few public Higher Education Institutes had significant Internet reliability and speed.

Fathema, Shannon, and Ross (June 2015) performed a research in higher education institution to see at faculty use of learning management system. Using a modified version of Davis's Technology Acceptance Model (TAM) from 1989, the study explores how faculty members' beliefs and actions affect their intention to use and actual usage of learning management systems at higher education. The data from 560 faculty members was analyzed using structural equation modelling (SEM) from two colleges. According to the findings, Faculty attitude was significantly predicted by the three hypothesized external factors of system quality, perceived self-efficacy, and facilitation situations towards LMS. The study's findings confirmed the expanded Technology Acceptance Model's accuracy in predicting consumers' adoption of new technologies, this is in accordance with previous research findings. The recommendations of the findings for researchers and practitioners were also addressed in the study. In addition, Moakofhi (2017) investigated lecturers' acceptance of Moodle using technology acceptance model. It was a case study of Botswana University of Agriculture and Natural Resources. It was a quantitative study; the researcher used a questionnaire to collect information from 50 university professors in Botswana. Findings naked that participants believe Moodle to be simple to use and that they find Moodle to be useful in their job. The Technology Acceptance Model was found to be a

helpful theoretical model for understanding and expressing behavioral intents to utilize Moodle in this study.

Hwa, Hwei and Peck (2016) investigated acceptance of LMS by pupils by means of the proposed technology acceptance model. Learning management system considered in the study was web base learning environment. The goal of the study was to find out how users' demographic information, such as gender, academic level, and course of study, affected how useful and easy they thought web-based learning was. Another study's goal was to look at the link between the perceived usefulness of users along with simplicity of usage and behavioral intention towards the employment of web-based education. Data was collected from 445 students of Malaysian university. Students' opinions based on how firmly individuals come to an agreement or disagreement with each research's reports gathered using survey method. The data was analyzed using the Statistical Package for the Social Sciences (SPSS). According to data, Perceived Utility and Perceived Ease of Application remain important predictors of learners' behavioral desire to use web-based learning. Demography of students, however, have no bearing on perceived user-friendliness Perceived utility. Similarly, in 2020, Al-Hamad investigated the acceptance of eLearning among university students at UAE using technology acceptance model. Study's conclusion was to discover variables which effect the university student's acknowledgment of eLearning. Data was collected from the sample of 366 university students using a questionnaire who are using eLearning system, according to the study's findings Subjective standards, presumed utility, presumed simple to use , satisfaction and availability " seem to be crucial influencers of students' motives to utilize e-learning systems.

Angela assessed eLearning technology adoption using the revised TAM technique. The study's major goal was to see how self-efficacy, subjective norms, and experience

influenced endogenous criteria like reported ease of use and perceived utility. The results of 354 active students who completed questionnaires were analyzed using AMOS 24 and structural equation modelling (SEM). According to the findings of this study, self-efficacy, subjective norm, and experience all had a substantial positive influence on perceived ease of use. The perceived ease of use has a considerable positive impact on the perceived value of a product. The perceived usefulness of anything has a big influence on whether or not it gets used, whereas perceived ease of use has a less influence.

A study on Babylonian university students' use of the E-learning system was released by Abboodi (2018). In this study, the TAM model was utilized to explain why University of Babylonian professors adopted the e-learning system. Perceived usefulness (PU), perceived ease of use (PEOU), perceived fun, supporting conditions, and IT skill were all independent criteria in this study. To gather information, questions were sent out. The survey was completed by 59 persons in total. PEOU, PU, perceived playfulness, and IT knowledge, according to the study, all have a significant impact on how university of Babylonian professors feel about their professions.

Koh (2020) studied male and female students' perceptions of the quality, satisfaction, and use of learning management systems. The pedagogical components of instructional quality, learning quality, and interaction quality are examined in this study, as well as how students' perceptions of how good something is influenced by how often they use it. This study confirmed a five-factor quality structure for evaluating learning management systems based on how students in the arts perceive them, using a sample of 376 students in higher education. There were differences in the quality attributes that

predicted satisfaction for arts students who said they used it occasionally, on average, and frequently, according to regression studies. Despite the fact that learning experiences were a substantial predictor of satisfaction across all student groups, the quality of material was only a significant predictor of satisfaction for users who used it on a regular basis. For ordinary and frequent users, the system's quality was merely a minor predictor of enjoyment. Only a small percentage of frequent users believed that the quality of their learning results was a strong predictor of their happiness.

Similarly, Yakubu (2019) looked into how students at Nigeria's National Open University used learning management systems. The primary aspects that influence students' acceptance of learning management systems are investigated in this study at Nigeria's National Open University (LMS). In order to accomplish so, a conceptual model based on past research on how individuals respond to eLearning was created. Structured equation modelling was used to examine data from 384 students who used the model (SEM). The findings revealed that the instructor's quality has an effect on the learning's perceived utility and worth. The perceived ease of use and utility of a system are influenced by its quality. Perceived ease of use, supportive surroundings, learning value, and perceived utility all influence behavioral intention. Both the settings that benefited the students and their plans for how they would act were strong predictors of LMS usage. In contrast to expectations, the relationship between course quality and perceived learning value and utility, as well as the relationship between social impact and behavioral intentions, were not found to be significant. The conceptual model used in this study is a good fit for 67 percent of the students and explains the differences.

Haddad (2018) published a study that looked into the relationship between the parameters in question and satisfaction. It has been proven that perceived usefulness has a major impact on student satisfaction. The second most important component, perceived utility, has a composite reliability score of 7.23. Students will be happier if the LMS improves at what it does. Service quality is the third essential component, with a C.R. of 5.05, indicating that if an LMS provides high-quality service (for example, 24/7 assistance), ready-to-use services, and a high degree of training, student satisfaction will rise. Furthermore, data suggests that information quality has the same impact on student satisfaction as service quality. According to the data, student happiness has a significant impact on the outcomes or net benefit of utilizing an LMS. To put it another way, if students enjoy using their LMS, they will get more out of it.

In Chengdu, China, Gao (September,2022) identified characteristics that influence university students' attitudes and behavior intentions regarding online learning. The goal of this study was to see what factors influence university students in Chengdu, China's views and actions regarding online learning platforms. Researchers looked into ease of use, perceived utility, attitude, social influence, enabling variables, and behavioral goals. The conceptual framework and its components were built using TAM and UTAUT, as well as previous empirical investigations. Students from Chengdu's Top 5 institutions who had been using online learning platforms for more than a year were given 450 questionnaires. Confirmatory factor analysis (CFA) and structural equation modelling (SEM) were employed to examine the reliability and validity of constructs, establish model fit, and test the proposed study hypotheses. Every component in the conceptual model had a considerable impact on behavioral intention, with the exception of perceived ease of use, which had no direct influence on attitude, and enabling conditions, which has no direct

effect on behavioral intention. As a result, four of the six hypotheses were proven to be correct. Social influence was the most crucial component in human behavior intention toward online learning systems, followed by attitude. Finally, university students' perceptions were influenced by perceived value and, to a lesser extent, perceived ease of use (Gao, 2022).

PEOU has been found to have a large and beneficial impact on PU since the easier a technology is to use, the more valuable it is viewed by potential users (Davis, 1986, Wang et al., 2003. The simplicity of use of a system is usually assumed to encourage users to use it more frequently, hence increasing its perceived value (Davis, 1989; Thong et al. 2002; Venkatesh & Davis, 2000). According to Gu, 2009; Venkatesh & Davis 2000; Wang, 2006), the perceived ease-of-use of a new technology has a significant impact on its adoption.

A study of Binyamin and Smith (n.d) expand the model of technology acceptance in Saudi higher education, examine how educators use learning management systems. The study was quantitative in nature, the aim of the study was to examine the elements that impact students' adoption of learning management systems, researchers used a technology acceptance model including eight external factors.2000 pupils were notified through email enrolled in three Saudi Arabian universities that are publicly funded using the Cluster sampling with a probability of more than one stage . Participants provided 851 replies, of which 833 were considered when analyzing the data. Partial Least Squares Structural Equations Modeling (PLS-SEM) showed that system navigation, ease of access, system interaction, instructional assessment, and system learnability all had an impact on perceived ease of use. With reference to findings, the appearance of utility is determined by five

criteria's (content quality, learning support, network participation, educational evaluation, and user satisfaction of use).

Another study conducted by same researchers was the Acceptance of Learning Management Systems by Saudi Arabian Students: A Case Study of King Abdelaziz University (Binyamin, 2017). From the standpoint of Saudi students, this quantitative study examines the adoption of Learning Management Systems (Blackboard) at King Abdelaziz University using the Technology Acceptance Model. All of participants were KAU students from various fields and colleges during the 2016 Fall semester. The questionnaire was supplied to students both online and in person to ensure an adequate sample size. For data analysis, 142 responses from 150 survey participants were used. The results back up the basic Technology Acceptance Model theories. The behavioral intention of students remains determined through their attitude and supposed utility, which in turn influences their actual use. The pupils' attitude and perceived usefulness are both influenced by perceived ease of usage.

Eltahir (2019) did a case study on the efficiency and usefulness of e-learning courses from the perspective of students and faculty members at Ajman university. The majority of respondents agreed in the study, indicating that they have a favorable attitude regarding the usage of eLearning. However, the perspectives of students differed by gender and educational level. The researcher questioned faculty members from all of Ajman University's colleges. According to findings the majority of faculty members were happy with the use of the Moodle system.

The role of learning management systems in distant learning was investigated by Ahmad, Parveen, and Dahar (2021). It was a case study of a Pakistani virtual university. This research specifies dual aspects that is, pedagogy and assessment out of the eight

dimensions that are currently in use. The major determination of the study was to investigate the importance of educational and evaluative components at a distance programmes given by way of the learning administration system. There were 150 male and female students enrolled in the two-year master's programmes in Rawalpindi and Islamabad in the spring and fall semesters of 2019 were chosen for the study using a stratified selection methodology. In order to acquire data, the investigator created a survey form and It was put to the test for validity and reliability. The questionnaire was analyzed using numerical examines such as mean and standard deviations, as reported by research findings, the current Learning Management systems is working successfully and correctly, as determined by respondents in their positive and enthusiastic reactions to the functionality of the university's learning management system in distant learning programmes.

Munabi (2020) conducted a study to assess the factors that affect the undergraduates distance learner behavioral intention to use LMS at Makerere university. The study relied on a TAM model. The researcher collected data using a questionnaire he created himself. Perceived utility, simplicity of use, behavior intention, and enjoyment were the determinants. Partial least square structural equation modelling was used to analyze the data.it was revealed from results that perceived usefulness and enjoyment influence students continued use of LMS. Result showed that enjoyment and perceived usefulness are significant factors that affect student’s behavior intention to use LMS, its mean that once the distance learner perceived that LMS is useful they are more likely to increase their use of LMS. The study showed a direct effect of PEOU on PU which mean that when a student finds LMS easy to use at the same time they are more likely to feel that it is useful to them. According to Munabi (2020) enjoyment significantly influence behavior intention.

Its mean that when a student enjoys and have fun through their experience using LMS. They are more likely to keep using LMS.

Buana (2021) conducted a study to measure factors that affect use of LMS at Ahmad Dahlen university. Data was collected using the proportionate stratified sampling technique and analyzed using SPSS 20. Perceived usefulness is influenced by habit characteristics, computer self-efficacy, system quality, as well as perceived ease of usage, according to the findings. Self-efficacy, according to Buana (2021), is the ability to feel confident and comfortable in one's own clothing. The usage of technology is influenced by computer self-efficacy, according to the findings.

Fenerley (2020) did a study to look into the elements that influence students use of LMS at higher education. Researcher used TAM model with three external factors including system quality, perceived self-efficacy and facilitation condition. Data was collected through online survey from 127 respondents, Structural Equation Model was used to test model and hypothesis. Results revealed that self-efficacy and system quality strongly effect perceived usefulness. Self-efficacy and system quality had an indirect effect on the intention to use LMS. The perceived ease of use is directly related to system quality. This means that when an LMS's quality is high, it will be perceived as both useful and easy to use. A significant positive effect of self-efficacy on perceived ease of use and perceived usefulness revealed that teachers with a high level of self-efficacy will have a high level of comfort and confidence, which will aid them in achieving their objectives.

Rehman (2018) conducted research to determine the external variables' influence such as self-efficacy, convenience compatibility, technology factor, subjective norm, perceived ease of use, perceived utility, and behavior intention on behavior intention. There

were 247 people that took part in the survey. To test the model and hypothesis, the PLS-SEM technique was used. The findings revealed that three factors influence behavior intention to use LMS: PEOU, PU, and task technology fit. The findings revealed that technology should be appropriate for the task at hand. It was discovered that self-efficacy, convenience, compatibility, and subjective norm have a beneficial impact on PEOU and PU. It means that if a technology is appropriate for the task at hand, is readily available, and compatible, the instructor will find it more useful and easier to use, and so the intention will be positively influenced.

Saroia (2018) conducted a study to explore university student's intention to use LMS in Sweden. TAM model was used by researcher. Results revealed that there are some intrinsic and extrinsic factors that affect the use of mobile learning management system. Results showed that PU have significant direct effect on BI. While there is no influence of PEOU on PU. This might be the students did not consider PEOU as a critical factor, they improved their academic performance for using mobile LMS. Another reason declared by researcher was that Sweden university students were already familiar the use of mobile LMS.

Siregar (October 2017) conducted research to determine the elements that influence the TAM model when Knowledge Management is applied to small and medium-sized creative economy businesses. The goal of this research was to investigate the impact of PE (perceived ease of use), as well as VU (voluntary use), PEV (perceived entertainment value), PU (perceived usefulness, and Web usage attitude (WU), on the of knowledge management in small and medium sized business on basis of TAM model. An explanation study tries to figure out how one thing affects another. The survey method, data extraction,

processing of data, and data analysis were all discussed in this study, which used a semantically differential scale questionnaire to collect the data. Inferential analysis was used to investigate the volume and distribution of data on sample characteristics (respondents) and endogenous indicator variables, as well as to explain their mean, standard deviations, variation, average, limit, skewness, and kurtosis. Statistical inference based on the structural equations model (SEM). The study's findings include a model of how usability effects small and medium-sized businesses' acceptance of new technologies.

Aristovnik (2016) investigated the factors that influence people's perceptions of usefulness. Students enrolled in the University of Ljubljana's Department of Public Administration's public administration programme were polled. Students rated thirteen different aspects of their e-courses. These factors were assessed on a seven-point scale. The results of the poll were connected to demographic questions, middle school level, study year, and program enrolled in, among other factors. In a linear regression model, perceived usefulness was utilized in result of response (dependent) variable, whereas rest of 12 online courses attributes were employed as forecast (independent) variables. Furthermore, based on demographic information, many groups of students were exposed to the very same regression analysis to see if the impacts differed from the overall results. Students' perceptions of the value of e-courses were heavily influenced by their overall feeling of them, their coherence with facial expression training, and the teacher's responsiveness, according to the empirical data. The design of an e-course, on the other hand, has no bearing on its perceived usefulness. Additional study population revealed a number of noteworthy subgroups of the population whose evaluations of usefulness were driven by variables that were completely different from the general sample. It was recommended that findings could

help instructors control the content and structure of an e-course, as well as increase the perceived value of collaborative learning among various student groups.

Shah studied the impact of numerous factors on students' attitudes toward using a learning management system in Pakistan (LMS). The impact of two TAM'S features, perceived usefulness and ease of use, as well as a number of external factors such facilitation condition, system quality, self-efficacy, and faculty support, was investigated. The findings revealed that perceived utility and simplicity of use, as well as external influences have a substantial impact on students' attitudes toward using a learning management system. Researchers used PSS version-21 to analyze the data collected via questionnaire. Researchers employed regression analysis to test their hypotheses.

Similarly, Shah (sep 2021) presented study regarding students learning management system adoption in virtual university. This study uncovered the issues faced by students to adopt the learning management system. The population of this study was three campuses of virtual university of Sahiwal. Data was analyzed through SPSS. Descriptive statistics such as frequency, percentage were utilized. The findings of study revealed that students are less comfortable with newest learning management system of virtual university as compared to the old one.it was examined that students were facing issues with newest learning management system.

Yousaf (2021) conducted a study on learning management system in order to examine the perspective of teachers. This study was a phenomenological case study approach. Convenient and purposeful sampling technique was used to collect data from teachers. There were six teachers who gave interview while 12 teachers filled the open-

ended questionnaire. Thematic analysis was used, the data indicated the four main categories of teacher's perception towards using LMS. Advantages, disadvantages, features and problems faced by teachers using LMS.it was recommended that proper training should be given to teachers and students for employment of LMS.

Haleem (2021) used the TAM model to investigate student satisfaction at Pakistani universities as a result of online education compatibility. Researchers carried out a quantitative investigation and delivered a well-structured questionnaire to students at the University of Karachi. The SMART PLS3 software was used to evaluate the data. The results of the AVE (average of variation explained) test revealed that the study's model was of high quality. and the hypothesis was tested using the path co-efficient. The study's findings revealed that technology compatibility and online learning have a good impact. Self-efficacy was found to be the most important component in improving online learning compatibility.

Navarro (sep,2021) conducted a study to determine the elements that positively affect engineering students' satisfaction with LMS during Covid-19 in the Philippines. TAM and TTF models were integrated by the researchers. Researchers employed a technique for data collection called as convenience sampling. The influence of many factors on student satisfaction with the LMS was investigated using a SEM. Perceived usefulness and perceived simplicity of use were found to have a beneficial impact on behavior intention to utilize LMS. Furthermore, TTF's beneficial impact on behavior intention leads to students' perceived satisfaction. A role of virtual reality in improving students LMS experience: structural equation modeling based study was conducted by Pasha (2021) researchers adopted a cross sectional design and analyzed the gathered data

by using survey questionnaire. The results showed a strong significant relationship of behavior intention and experience to use LMS. Results directed that it is important to incorporate virtual and augmented reality in education to improve learning management system.

A study was undertaken by AL-Nuaimi et al., (2022) to assess the real use of LMS during Covid-19. The researcher combined three theories, including IS success mode, TAM, and theory of planned behavior, to create an integrated theoretical model. The study included 373 Omani undergraduate students as a sample. The data was collected using a web-based survey, and the cause and effect between paths was examined using the PLS-SEM technique. The data revealed that the quality factor had a favorable, substantial effect on perceived ease of use. Technical system quality, on the other hand, has been shown to have a favorable impact on perceived utility. Similarly, subjective norm, as well as perceived usefulness and convenience of use, all had a favorable significant effect on intention to use LMS.

CHAPTER 3

METHODS AND PROCEDURES

3.1Research Approach

Research approach applied to current study was quantitative analysis approach. According to Creswell 2014, a research approach is a method that moves beyond generalizations to meticulous information-gathering techniques. This method was used to collect data by assessing people's opinions, views, and attitudes, which were then statistically examined. The quantitative research approach was used to evaluate hypotheses by measuring variables and analyzing their correlations. The researcher chose this approach because it identifies the issue by producing numerical data or data that may be transformed into useful statistics. The researcher utilized a quantitative approach in which all respondents received the same things, ensuring that the data could be realistically analyzed.

The research objectives and hypotheses were both well stated. Every part of the study was carefully planned before data collection. The information was gathered in the form of statistics and numbers, which were then organized into tables and figures. The researcher was interested in gathering data in an organized form, and the quantitative data collection technique adopts a more structured approach, that is why this approach was chosen for the current study.

The researcher collected responses through a closed-ended statement-based questionnaire in which each participant chose an answer from a predetermined range of options. The items were based on 5-point Likert scale that were coded from 1 to 5 i.e. strongly disagree to strongly agree and data was analyzed through statistical tests and conclusion were drawn. Furthermore, the effect of external factors such as technology factor and personal factor on perceived ease of use and usefulness and effect of perceived ease of use and usefulness on behavior intention to use LMS was analyzed using structural equation modeling (SEM) through analysis of moment structure (AMOS).

3.2 Research Design

A research design is described as a guide or plan for organizing, carrying out, and conducting data analysis. Utilized as an outline procedure, research design aids the researcher in finding potential remedies for the study difficulties (Kothari,2004). The researcher used a descriptive research design for the current investigation. Present study had a descriptive quantitative research design. Descriptive research, also known as survey research, gathers numerical data to address inquiries regarding the accurate status of the study's subject. Gay (2012) said that descriptive research is a type of survey research (p. 183). This research involves gathering information to test hypotheses or to respond to inquiries about public opinion on a particular subject or problem. Researcher used descriptive research design to get the opinion and views of undergraduate’s student in relation to the learning management system's perceived usefulness and ease of use at university level.

3.3 Population

The entire number of participants or people who match the list of requirements is referred to as the "population". This study's objective was to ascertain how a learning management system at the university level was perceived in terms of utility and ease of use. This study included all undergraduate students in three public universities' social sciences departments, who employed a learning management system (LMS) for teaching and learning. Researcher selected only three public sector universities that were offering online teaching and learning through learning management system (LMS). The number of students enrolled in three public sector universities (IIUI, NUML, Air university) at undergraduate level was taken from their respective administrative authorities. There were 2599 male students and 2651 female students in the most recent session 2021 data, for a total of 5250 students.

Table No. 3.1

Total population

S. r	Institutions	Male	Female	Total
1.	uni1	280	220	500
2.	Uni2	1194	1006	2200
3.	Uni3	1125	1425	2550
	Total	2599	2651	5250

The total number of students using learning management system (LMS) throughout the three public institutions in Islamabad's department of social sciences is shown in Table 3.1. Total enrollment was 5250 students in Social Sciences programmes at three public sectors

higher institutions of Islamabad using Learning Management System for learning process, including IIUI, NUML and AU university. Among these 2599 were male students and 2651 were female students.

3.4 Sampling Technique

Proportionate stratified sampling was utilized by the researcher in this study. It is a sampling technique of research when a specific field of information is needed from an expert or from those who are concerned. Proportionate stratified sampling was utilized for current study to acquire data from a desired sample. The main reason for using this sampling technique was that it focuses on certain features of the participants that are interesting, which can help the researcher to get authentic data from respondents. Research must be well-prepared and locate accurate information and efficient knowledge in order to undertake proportionate stratified sampling techniques.

3.5 Sample Size

Three of Islamabad's public sector universities make use of a learning management system. Proportionate stratified sampling has been used to pick the participants from Air University, NUML, and IIUI. For a population of 5250 or more, Gay, Mills, and Airasians (2012) recommend a sample size of 500. Which makes up 10% of the population's total. There were total 5250 undergraduate students. Male students were 2599 and its 10% sample size was 260 whereas total number of female students were 2651 and its 10% sample size was 265 students. Researcher visited selected universities of current study and distributed questionnaires among those undergraduate students of social sciences department who used LMS for attending lectures online. Researcher waited over there for each and every respondent to fill the questionnaire. It was making sure by researcher that each and every

respondent must answer each and every question asked by researcher in written form of questionnaire. Total 525 students selected as sample were given the questionnaire by the researcher, and all of them returned it back.

Table No.3.2

Sample of the study

Universities	**Male**	**Female**	**Total**	**Sample Size**
Uni 1	280	220	500	50
Uni 2	1194	1006	2200	220
Uni 3	1125	1425	2550	255
TOTAL	2599	2651	5250	525

3.6 Research Instrument

A modified closed-ended tool was used to gather the information for current study. Using TAM3 conceptual framework, the instrument was selected, which was adapted from (Rehman, August 2018)**.**

The questionnaire was based on six dimensions, including the perceived usefulness, the perceived ease of use, behavior intention, self-efficacy, convenience and Task technology fit. Three components made up the research tool: a section with demographic data, a section with research variables, and a section with a five-point Likert scale.

3.6.1 Demographic Data

This section was assumed of as the fundamental component of the research tool to capture the respondents' demographic replies. Information about demographics was provided as;

1. Gender
2. Age
3. Institution
4. program
5. Semester

3.6.2 Learning Management System Assessment Scale

This part was related to Learning Management System Assessment Scale (LMSAS). There were 32 closed ended items in this scale and total six dimensions including Task Technology fit, Convenience, Self-Efficacy, Perceived ease of Use, Perceived Usefulness and Behavior intention. The table provides dimension and item information (Table 3.3).

Table 3.3 presented a scale with number of items. There were total 32 items. Task Technology Fit contained 06 items, Convenience contained 04, Self-efficacy consist of 04, Perceived ease of use contained 05 items, Perceived usefulness had 08 items and Behavior intention had 05 items.

Table No. 3.3

List of items Learning Management System Assessment Scale (LMSAS).

Scale	**Sections**	**Items**	**No. of Items**
Learning Management System Assessment (LMSAS)			32
	Perceived Usefulness	PU1,PU2,PU3,PU4,PU5,PU6,PU7 ,PU8	08
	Perceived ease of Use	PEOU1, PEOU2, PEOU3, PEOU4, PEOU5	05
	Task technology factor	TTF1,TTF2,TTF3,COM1,COM2, COM3	06
	Convenience	CON1,CON2,CON3,CON4	04
	Self-Efficacy	SE1, SE2, SE3, SE4	04
	Behavior Intention	BI1, BI2, BI3, BI4, BI5	05

3.6.2 Likert Scale's Description

An ordinal form of variable most often used in questionnaires was the Liker scale (Kumar,1999). Likert scales, which provide predetermined possibilities for responses, were developed to gauge people's perspectives. There were five points in this section, ranging from 1 to 5 such as; strongly disagree (1), disagree (2), neutral (3), Agree (4), Strongly agree (5).

3.7 Validation of the Research Instrument

The research instrument went through the validation process. To validate the research instrument, the learning management system scale was customized and referred to five specialists from the education department faculty at the National University of Modern Languages (NUML) and the International Islamic University (IIUI). The researcher gave those five specialists copies of the survey, together with a cover letter and validity certificates. Those experts evaluated the research instrument in light of the study objectives and conceptual framework and provided valuable feedback and suggestions for refinement. Following the advice of the experts, the researcher made several changes. The validation certifications of the research instrument were then certified by professionals (see appendix E). A valid questionnaire was provided (see appendix C).

3.8 Pilot Testing

A pilot study was used to evaluate the research instrument's reliability. Participants in the pilot study could comprehend the questions and providing the required information. Pilot testing gives participants a chance to fill out the questionnaire to make sure that the questions were clear and to figure out which ones were too complicated for them to

understand. A small sample was selected from a public university, the National University of Modern Languages, for the aim of performing pilot testing for this research project. The participants were social science department undergraduate students. The researcher handed out a total of 60 questionnaires to students in the social sciences departments; however, only 50 of those questionnaires were filled out by respondents, and the remaining 10 were not returned by respondents.

3.9 Reliability of the Tool

Reliability refers to the consistency of test. Pilot testing was used to ensure that the research instrument was reliable for this study. Researcher test the reliability of instrument through intersection and item total correlation. correlation is a degree to measure association between two variables. Pearson correlation coefficient was used for this purpose. In pilot testing the Cronbach Alpha reliability of learning management system assessment scale was (.95**). After pilot testing the tool was revised by researcher for final data collection. Item with weak reliability value was modified.

The table 3.4 shows that Cronbach Alpha reliability of learning management system scale was (.95**) with a total of 32 items. The "learning management system assessment scale" based on six dimensions. The Cronbach Alpha reliability for six sections was as follows:, perceived ease of use was (.95**), perceived usefulness was (.92**), behavior intention was (.89**), task technology fit was (.85**), convenience was (.88**) and self-efficacy was (.88**). Researcher modified this item in order to make it understandable for final data collection. The item PU8 was modified to “LMS is useful in off campus classes. “initially the item was stated as “LMS is beneficial in offline classes”.

Table No. 3.4

Cronbach Alpha Reliability of the Pilot Test (n=50).

Scale	Sub-Section	Items	Cronbach's Alpha Reliability
Learning Management System Assessment Scale (LMSAS)		32	.952
	Perceived ease of use	05	.950
	Perceived usefulness	08	.923
	Self-efficacy	04	.882
	Task technology fit	06	.852
	Convenience	04	.880
	Behavior Intention	05	.893

Table item total correlation show a significant strong relation among items. However, the item named as PU8 scored .178 which is less than .30 that indicated a weak correlation. Researcher modified this item in order to make it understandable for final data collection. The item PU8 was modified to "LMS is useful in off campus classes. "initially the item was stated as "LMS is beneficial in offline classes". The strongest correlation value was (.88**) and the weakest value was .178.

Table No. 3.5

Item Total Correlation - Pilot Testing of Learning Management System Assessment Scale (LMSAS)(n=50)

Item no.	Correlation	Item no.	Correlation
PE1	.747**	TTF2	.721**
PE2	.805**	TTF3	.713**
PE3	.768**	TTF4	.687**
PE4	.801**	TTF5	.705**
PE5	.787**	TTF6	.757**
PU1	**.885****	CON1	.719**
PU2	.814**	CON2	.696**
PU3	.756**	CON3	.749**
PU4	.850**	CON4	.834**
PU8	**.178**	BI1	.742**
SE1	.755**	BI2	.700**
SE2	.728**	BI3	.665**
SE3	.686**	BI4	.758**
SE4	.729**	BI5	.733**
TTF1	.705		

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

Table No. 3.6

Inter section correlation pilot testing "Learning Management System Scale (LMS)" (n=50)

	PEOU	PU	TTF	CON	SE	BI	LMS
PEOU	1						
PU	**.846****	1					
TTF	.598**	.677**	1				
CON	.738**	.768**	.641**	1			
SE	**.590****	.796**	.679**	.690**	1		
BI	.642**	.716**	.652**	.772**	.660**	1	
LMS	.866**	.940**	.816**	.875**	.840**	.845**	1

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

Note: Perceived ease of use (PEOU), perceived usefulness (PU), Technology factor (TTF), convenience (CON), self-efficacy (SE), behavior intention (BI).

The above intersection correlation table show a strong association between perceived usefulness and perceived ease of use that was (.84**) was discovered to exist between perceived usefulness and perceived ease of use, whereas the lowest correlation was found between Self efficacy and Perceived ease of use that was (.59**).

3.10 Final Instrument Tool

In this study, a research tool called the Learning Management System Assessment Scale (LMSAS) was employed. The Davis Technology Acceptance Model served as the basis for

this scale (TAM), which includes three external elements and three Davis model characteristics. A detailed overview of the Learning Management System tool followed as;

3.10.1 Section A Demographic information

This section of the survey was constructed using information about the respondents' backgrounds. Gender, age, department, university, and semester were among the possibilities. Basic background information about the respondents was provided in this section.

3.10.2 Section B Learning Management System assessment tool

The researcher changed this scale and called section B "Learning Management System Assessment Scale."

There was a total of 32 items. Perceived Ease of Use, Perceived Usefulness, Task Technology Fit, Convenience, Self-efficacy, and Behavioral Intention were the six subsections of this scale. A 5-point Likert scale was used to grade the responses, with 5 denoting "strongly agree," 4 "agree," 3 "Undecided," 2 "disagree," and 1 denoting "strongly disagree" (see appendix).

Table No. 3.7

List of items Learning Management System Assessment Scale (LMSAS).

Section	Items	No. of Items
Learning Management System Assessment (LMSAS)		32
Perceived Ease of Use	PEOU1,PEOU2,PEOU3,PEOU4,PEOU5	05
Perceived Usefulness	PUF1,PUF2,PUF3,PUF4,PUF5,PUF6,PUF7,PUF8	08
Task technology factor	TTF1,TTF2,TTF3,TTF4,TTF5,TTF6	06
Convenience	CON1,CON2,CON3,CON4	04
Self-Efficacy	SE1, SE2, SE3, SE4	04
Behavior Intention	BI1, BI2, BI3, BI4, BI5	05

3.11 Data Collection

Data collection from the target region is an important part of every research project. The final data was acquired from public universities in Islamabad that included social sciences departments and used a learning management system in the teaching-learning process. A learning management system was only utilized by three universities (Air University, International Islamic University, and National University of Modern Languages Islamabad). Samples for the pilot study came from National University of Modern Languages, while the final data was collected from remaining students of National university of Modern Languages Islamabad, Air University and International Islamic University.

The researcher personally visited those campuses and gathered data from social sciences undergraduates' students. The researcher first received a letter of recommendation from the Education Department of the National University of Modern Languages. This letter of recommendation was presented to public universities and authorities in order to obtain permission to gather data. The researcher was given permission to collect information from students at these universities. The researcher distributed 525 questionnaires to respondents, who made up 10% of the population sample, and asked them to fill them out. Respondents were given instructions by the researcher, and each one had two days to fill out the questionnaire. These responders were social science department undergraduate students. The respondents returned 500 surveys, with 96 percent response rate. In one month, the researcher finished the data collecting process. Male students accounted for 249 out of 260 samples, while female students accounted for 251 out of 265 samples, for a total of 525 responses.

Table No. 3.8

Data collection

Sr no.	Gender	Population	Sample size	Return rate%
1.	Male	2599	260	
2.	Female	2651	265	
3.	Total	5250	525	96%

3.12 Data Analysis

The study's data was gathered from the specified area using LMSAS. Data was collected and coded before being placed into a "statistical package of social sciences “to use statistical tools to evaluate the data in order to answer the study's objectives and hypotheses." For this study, reliability, correlation, and mean were employed, as well as Amos software for structural equation modelling and path analysis.

The fourth objective was to see how perceived ease of use affected perceived usefulness, as a result, in order to study the direct paths and effect of one variable on other, a structure equation model was employed using AMOS software to examine the effect of one variable on other. The SEM approach was used to examine and investigate the stated link between variables inside a conceptual model. Covariance structure analysis, path analysis and simultaneous equation model were some of the term used to describe structural equation model. Factor analysis and regression are not the same as structural equation model. SEM is a statistical method used to test how multiple independent and dependent variables are related (Gefen,2000). The objectives were listed in the table below, along with the statistical approaches used to achieve them.

Table 3.9

Objectives, hypothesis, instruments and statistical test description

Objectives	Hypotheses	Instrument	Statistical test used
1. To determine perceived usefulness for learning management system among university students.		Questionnaire	Mean
2. To assess perceived ease of use for learning management system among university students.		Questionnaire	Mean
3. To determine effect of perceived ease of use on perceived usefulness.	There is statistically no significant effect of perceived ease of use on perceived usefulness.	Questionnaire	Structural equation mode (SEM)
4. To determine the effect of perceived ease of use on behavior intention to use learning management system at university level.	There is statistically no significant effect of perceived ease of use on behavior intention to use learning management system at university level.	Questionnaire	Structural equation model (SEM)
5.To determine the effect of perceived usefulness on behavior intention to use learning management system at university level.	There is statistically no significant effect of perceived usefulness on behavior intention to use learning management system at university level.	Questionnaire	Structural equation model (SEM)

6.To examine the effect of external factors on perceived ease of use for LMS among university students.	there is statistically no significant effect of external factors on perceived ease of use for learning management system at university level.	Questionnaire	Structural equation model (SEM)
6a. To examine the effect of technology factor on Perceived ease of use for learning management system at university level.	There is statistically no significant effect of technology factor on perceived ease of use among university students.	Questionnaire	Structural equation model (SEM)
6b. To examine the effect of convenience on perceived ease of use for learning management system among university students.	There is statistically no significant effect of convenience on Perceived ease of use for learning management system at university level.	Questionnaire	Structural equation model (SEM)
6c. To examine the effect of self-efficacy on perceived ease of use for learning management system among university students.	There is statistically no significant effect of self-efficacy on perceived ease of use for learning management system at university level.	Questionnaire	Structural equation model (SEM)
7.To determine the effect of external factors on perceived usefulness for learning management system among university students.	There is statistically no significant effect of external factors on perceived usefulness for learning management system at university level.	Questionnaire	Structural equation model (SEM)
7a. To determine the effect of technology factor on perceived usefulness for learning management system at university level.	There is no significant effect of technology factor on perceived usefulness for learning management system at university level.	Questionnaire	Structural equation model (SEM)

7b. To determine the effect of convenience on perceived usefulness for learning management system at university level.	There is statistically no significant effect of convenience on perceived usefulness for learning management system at university level.	Questionnaire	Structural equation model (SEM)
7c. To determine the effect of self-efficacy on perceived usefulness for learning management system at university level.	There is statistically no significant effect of self-efficacy on perceived usefulness for learning management system at university level	Questionnaire	Structural equation model (SEM)

Table 3.9 shows that data was examined using several statistical approaches. The study's research objectives were addressed utilizing statistical methodologies because it utilized a quantitative approach.

The first objective was" to analyze perceived usefulness for Learning Management System among university students. Mean percentage was analyzed using SPSS to assess students perceived usefulness for learning management system. Second objective was to determine perceived ease of use for learning management system at university level. A mean percentage was employed to assess students perceived ease of use for learning management system.

Third objective was to examine the effect of perceived ease of use on perceived usefulness for learning management system at university level. This objective was analyzed through AMOS software. To determine the effect of perceived ease of use and usefulness on behavior intention to use learning management system at university level, a direct path was analyzed through AMOS structural equation model (SEM).

To examine the effect of external factors such as technology factor, Convenience and self-efficacy on perceived ease of use and perceived usefulness for learning management system

at university level. A structural equation model was used to assess the link between external factors and perceived ease of use and usefulness.

3.13 Ethical Consideration

When using the public and their data, best research procedures demand ethical consideration. Aside from maintaining academic integrity, researchers are required to collect data in an ethically responsible and trustworthy manner, as well as with honesty and respect so as to not hurt study participants. According to the American Association for Public Opinion Research, the current study followed the following ethical standards for survey research.

1. The anonymity and privacy of the respondents, as well as those of the university that authorized the collecting of participant data, were maintained throughout the course of the study.

2. The university administration was informed before to distributing the questionnaire during university round.

3. In the cover letter, during in-person interactions, and while using respondents' data, transparency regarding the research objectives was emphasized.

4. The study was completely voluntary, with no participants receiving payment or incentives.

5. The study's participants did not get anything in return for doing the survey.

6. The information in this survey was not made up or faked; it was based on respondents' self-reports.

7. All sources, including papers and books, were cited in the reference list.

3.14 Delimitations

This research study was delimited to:

1. Three public sector universities including international Islamic university, national university of modern languages and air university Islamabad.

2. Delimited to social science department undergraduate students. Due to a lack of time, researcher was unable to collect data from all the departments at universities employing learning management system. Researcher was restricted to only social sciences subjects.

CHAPTER 4

ANALYSIS AND INTERPRETATION OF DATA

Data gathered by using research instrument was the focus of the current chapter. Current study looked at perceptions of learning management system usefulness and ease of use at the university level. Quantitative research methods and a descriptive research design were employed to test hypotheses of the study. An evaluation scale for learning management systems served as the research tool. Scale was modified in accordance with the framework of study. Three components made up the research tool: a section for demographic data, a section for a five-point Likert scale, and a section for research variables. For data collection, the researcher adapted a questionnaire from Rehman (2018)'s study. This scale was based on technology acceptance model of Venkatesh and Bala (2008). There were 32 items total, divided into six subsections. The six section was perceived ease of use, perceived usefulness, external variables (technology factor, convenience, and self-efficacy), and behavior intention. This scale was used by the researcher to evaluate the perceived usefulness and ease of use of the learning management system at the university level.

Five professionals in the relevant subject validated the research instrument. The researcher changed the questionnaire considering their observations and the insightful comments from the experts. After validation of instrument, the researcher applied a pilot test to see if it was reliable. 50 undergraduates' students of social science departments provided the data for the pilot testing. Data was analyzed through SPSS version 22. The

questionnaire was once more improved by the researcher after the reliability test. following parts conducted data analysis and interpretation:

4.1 Section I Exploratory Factor Analysis

In this section, an exploratory factor analysis was done to determine which items were clustered under a common factor and to test the scale's factorial structure. The goal of this research analysis was to narrow the scope of the variables and concentrate on those that were interconnected. The construct validity of a scale was determined using exploratory factor analysis.

4.2 Section II Confirmatory Factor Analysis

In the second section, the measurements' validity and reliability as well as the constructs' validity and reliability will be explored. The data analysis has two components. The components' validity and model fit were initially assessed using confirmatory factor analysis (CFA). In the structural model, only survey constructs with adequate measurements (validity and reliability) will be included (Hair et al., 2010).

4.3 Section III Structural Equation Model

The third part is about analyzing the structural equation model. The hypothesized links between the independent and dependent variables were investigated using the structural equation modelling (SEM) technique.

4.4 Section IV Perceived Ease of Use for LMS

The fourth section is based on data analysis for the first objective, which was to measure how easy university students think it is to use the LMS. Mean, percentage of respondents for each item on basis of rating scale were determined in this part. As a result, the tables were created, and the findings were drawn.

4.5 Section V Perceived Usefulness for LMS

The fifth part is based on the analysis of data for objective no. 2, which was to measure how useful university students think LMS is. Mean, percentage of respondents for each item on basis of rating scale were determined in this part. As a result, the tables were created, and the findings were drawn.

4.6 Section VI Effect of perceived Ease of Use on Perceived Usefulness

The sixth section is based on data analysis for objective no. 3. The purpose of the study was to determine how university students viewed the usefulness of a learning management system in relation to perceived ease of use. In AMOS, SEM was used to analyze this goal. As a result, the table was created, and the findings were drawn.

4.7 Section IX Effect of perceived Ease of Use on Behavior Intention

This section focused on the data analysis for Objective No. 4, which examined the influence of perceived ease of use on university students' behavioral intentions to utilize learning management systems (LMS). In AMOS, SEM was used to analyze this goal. As a result, the table is created, and the findings were drawn.

4.8 Section X Effect of Perceived Usefulness on Behavior Intention

This section was based on an analysis of data pertaining to objective no. 5, which was determine how perceived usefulness affects university students' behavioral intent to use LMS. Through Amos, this goal was investigated using SEM. As a result, the table is created, and the findings were drawn.

4.9 Section VII Effect of External factors on Perceived Ease of use

This section focuses on data analysis to investigate the effect of external elements like technology, self-efficacy, and convenience on perceptions of how simple a learning management system is to use by university students. SEM was utilized in Amos to analyze this goal. As a result, a table is made, and conclusions were reached.

4.10 Section VIII Effect of External Factors on Perceived Usefulness

This section concentrated on analysis of data for the purpose of assessing the impact of external factors such as technology, self-efficacy, and convenience on university students' perceptions of LMS utility. SEM was utilized in Amos to analyze this objective. As a result, a table is made, and conclusions were drawn.

Section 4.1 Exploratory factor analysis (EFA)

Initially a relevant assumption was tested by researcher. According to young & pearce,2013 the accepted KMO value must be at least 0.60. The KMO value for this study was 0.93; this showed that number of samples was enough. Furthermore, the result of Bartlett's sphericity test was 0.00. The data was considered as fit multivariate normality because of significant sphericity result (Yong et al., 2013). The exploratory factor analysis (EFA)

resulted 6 overlapping items from the scale, that were removed. At first, there were 32 items in total, however the results revealed a 6-factor structure with 26 items. Items with factor loading <0.5 was extracted from scale. Researcher reviewed the items coming under common factor and named those factors accordingly. Thus

(1) The items TTF1, TTF2, TTF3 COM1, recom2 and COM3 were coming under one common factor and was known as “Tech Factor”

(2) "Convenience (CONLMS)" was the second factor, which included elements CON1, CON2, CON3, and CON4.

(3) The third factor, which included items reSE1, reSE2, SE3, and SE4, was named as "self-efficacy (SELMS)".

(4) The fourth factor, which included items PU4, PU6, and PU8, was named as "perceived usefulness (PULMS)”.

(5) The fifth factor, which included items PE1, PE2, PE3, PE4, and PE5, was named as ‘Perceived ease of use (PEOU)".

(6) " The sixth component, behavioral intention (BILMS) was described., which included items BI1, BI2, BI3, BI4, and BI5.

The factor loadings for the items of the first factor ranged from 0.597 to 0.820; items of second factors ranged from .668 to .792; items of third factors, from .624 to .792;items of fourth factor, from .606 to .830;items of fifth factor, from .875 to .88; and items of sixth factor, from .515 to .801 (Shown in Table 4.1).

Table 4.1

Rotated matrix of Exploratory factor Analysis (EFA)

Items	**Components**					
	1	**2**	**3**	**4**	**5**	**6**
PEOU1	0.8					
PEOU2	0.8					
PEOU3	0.8					
PEOU4	0.7					
PEOU5	0.7					
PU4					.87	
PU6					.87	
PU8					.88	
SE1				.606		
SE2				.778		
SE3				.830		
SE4				.780		
TTF1			.685			
TTF2			.750			
TTF3			.792			
TTF4			.723			
TTF5			.62			
CON1						.515
CON2						.761
CON3						.801
CON4						.688
BI1		.668				
BI2		.792				
BI3		.770				
BI4		.765				
BI5		.726				

Section II

Section 4.2 Confirmatory Factor Analysis

Confirmatory factor analysis was used in the study to assess the construct validity of the instrument. To develop the measurement model, the researcher employed confirmatory factor analysis (CFA). Structural equation model was used to look at the casual relationships between the various parts of the suggested structural model. The CFA and SEM were carried out using the statistical package for social sciences (SPSS) and analysis of moment structures (AMOS) software.

Measurement Model Analysis:

The relationship between the various constructs within the conceptual model were investigated using CFA. The researcher first examined the measurement model fit before examining the measurement model validity in order to evaluate the CFA measurement model. Distinguishing between endogenous and exogenous constructs was not essential in the CFA, but it was required during the model testing stage. All of the variables were linked in Figure 4.1, and rectangular shapes were used to represent the construct's items (measured variables). A one-headed arrow represents a causal relationship between a construct and an indicator, whereas two-headed arrows represent covariance. In the current study, a total of 26 items obtained from the EFA were used in the CFA.

Results of measurement model was presented in Figure 4.1.

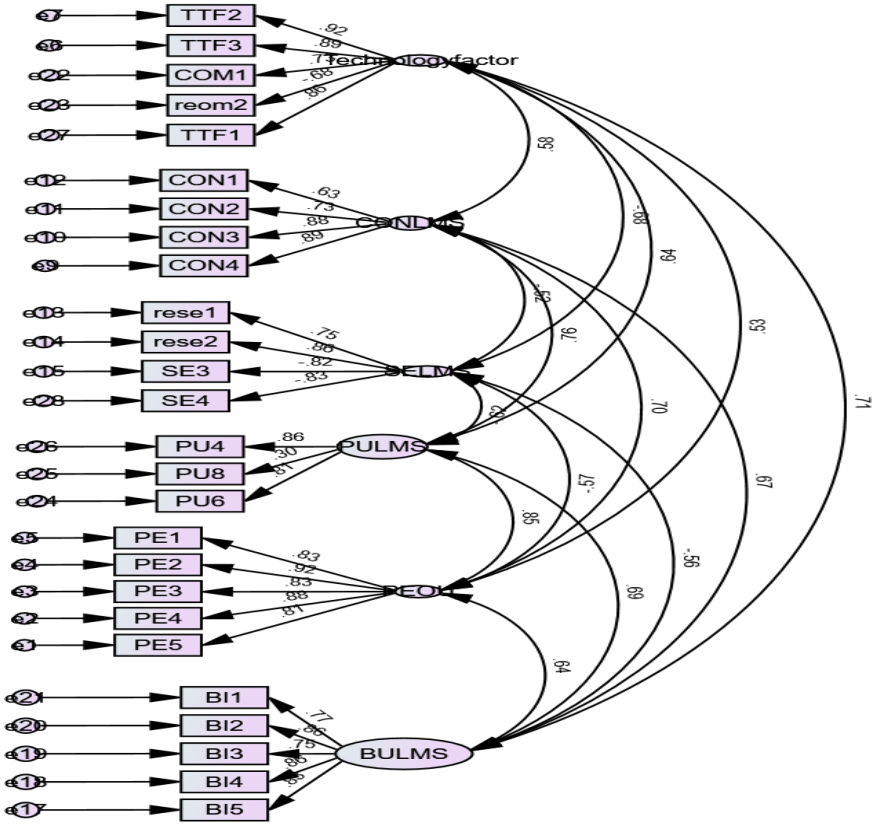


Figure 4.1: Standardized CFA model based on preliminary analysis.

4.2.1 Goodness of Fit Indices:

Some fit indices should be considered while evaluating the goodness-of-fit of the model (Kline, 2016; Hair, 2010) Root Mean Square Residuals (RMSR); Adjusted Goodness-of-Fit Index (AGFI); the Root Mean Square Error of Approximation (RMSEA),Comparative fit index(CFI)" Goodness of Fit Index (GFI); Normed Fit Index (NFI); Parsimony Normed Fit Index (PNFI); Root Mean Square Residuals (RMSR); Comparative Fit Index (CFI); Adjusted Goodness-of-Fit Index," according to Hair (2010) were indices to indicate acceptable fit model results.

From the first run of model we got (χ^2 = 1726.455, df= 263, p <.001, CMIN/DF= 6.564, CFI= .858, GFI=.783, IFI= .858, NFI= .837, TLI= .838, RMSEA =.106, AIC= 1850.455).The results indicate that there were a room of improvement to get the appropriate results and a well-fitting data measurement model . Table 4.2 show the results of model fit.

Table 4.2

level of CFA model fit derived from preliminary survey data.

Fit indices	**Critical limit**	**Results**	**Explanation**	**References**
Absolute fit measure				
Chi-Squares x2	<x2 α; df	1726.455		Hair (2010)
CMIN/DF	<= 5.0	6.564	Good	Hair (2010)
GFI	> 0.90	.783	Marginal	Miles and Shevlin 1998
RMSEA	< 0.10	.106	Marginal	(MacCallum, 1996)
Incremental Fit Measures				
AGFI	>0.90	.768	Marginal	Hooper
TLI	>0.99	.838	Marginal	Marsh, Hue and Wen,2004
NFI	>0.90	.837	Marginal	Hu and Bentler ,1999
CFI	>0.90	.858	Marginal	Hu and Bentler, 1999
Parsimonious Fit Measures				
PNFI	>0.50	.727	Good	Mulaik ,1989
PGFI	>0.50	.745	Good	Mulaik ,1989

The modification indices in AMOS indicate, the degree to which the model matches the data. To identify a better fit of the model, the researcher used the following criteria.

• The ideal standardized regression weight (factor loading) is above 0.7 and should be more than 0.5. (Byrne, 2006).

• Factor loadings that are less than 0.5 sought to be deleted (Byrne, 2006; Hair 2010).

Result revealed that, items recom2, SE3 and SE4 had a low factor loading. For improvement of model fit results these three indicators were deleted. The process was to delete indicator one by one and then run model again.

Components (recom2, SE3, and SE4) were eliminated from the initial measurement model in order to obtain the excellent fit model.

Table 4.3

Results derived from an improved CFA model fit.

Fit indices	**Critical limit**	**Results**	**Explanation**	**References**
Absolute fit measure				
Chi-Squares x2	<x2 α; df	1263.234		Hair (2010)
CMIN/DF	<= 5.0	5.876	Good	Hair (2010)
Probability	> 0.05	.000		Hair (2010)
GFI	>0.90	.983	Good	Miles and Shevlin,1998
RMSEA	< 0.10	.099	Good	(MacCallum et al, 1996)

Incremental Fit Measures				
AGFI	>0.90	.976	Good	Hooper et al.,
TLI	>0.99	.967	Good	Marsh, Hau, & Wen, 2004
NFI	>0.90	.958	Good	(Hu and Bentler, 1999
CFI	>0.9	.977	Good	Hu and Bentler, 1999
Parsimonious Fit Measures				
PNFI	>0.50	.737	Good	Mulaik,1989)
PGFI	>0.50	.754	Good	Mulaik,1989)

The above-mentioned table show the result of improved confirmatory model analysis. The value of RMSEA (0.99 less than 0.10) shows the model was good fit to proceed for further analysis. After achieving an acceptable measurement model, researcher proceeds to assess the validity of model

4.2.2 Validity of Model:

Two crucial measures for assessing validity and reliability are the Average Variance Extract (AVE) and Composite Reliability (CR). The AVE was calculated to see if there was any convergent validity. As stated in Table 4.4, AVE for entire components should be more than 0.5 (Anderson, 2010). The AVE's square root was investigated (on

the diagonal in the table 4.4) to all inter factor correlation to see if it had discriminant validity. All components indicated sufficient discriminant validity because the correlations were smaller than the diagonal values. The composite reliability for each factor was also calculated by the researcher. The composite reliability was over the minimum criterion of 0.70 in all situations, showing that our factors were reliable.

Table 4.4

4.4: *Overall validity results*.

	CR	**AVE**	**MSV**	**Max (H)**	**SE**	**CON**	**TF**	**BI**	**PE**	**PU**
PEOU	0.931	0.729	0.726	0.938	**0.854**					
TF	0.911	0.722	0.487	0.934	0.505	**0.850**				
CON	0.865	0.621	0.582	0.898	0.701	0.553	**0.788**			
SE	0.818	0.693	0.452	0.825	-0.630	-0.646	-0.535	**0.832**		
BI	0.908	0.664	0.487	0.913	0.637	0.698	0.674	-0.563	**0.815**	
PU	0.719	0.726	0.494	0.827	0.852	0.619	0.763	-0.672	0.686	**0.803**

In the table 4.4 the variable had composite reliability greater than 0.70, which mean that all the variable had achieved composite reliability.

Discriminant validity:

If the correlation between the constructs is less than the square root of AVE, its mean model has achieved discriminant validity in table 4.4 the top first value in each column was considered as square root of AVE. Other values except square root of AVE were known as inter-construct correlation. All of the AVE square roots were larger than the inter-construct

correlation values, as seen in table 4.4, which means the model has achieved discriminant validity.

Convergent validity

For convergent validity in table 4.4 all variable had AVE greater than 0.50, which means that model had achieved convergent validity. In addition to the requirement of AVE our standardized factor loading should also be more than 0.50. Ideally it should be greater than 0.70 but if it is greater than 0.50 than in this case it was also acceptable. Table 4.5 showed a standardized factor loading AVE and CR for all item. The table 4.5 show the factor loading AVE and CR of all variable. The factor loading in table 4.5 and AVE values were >0.50, so its mean that model had achieved convergent validity

Table 4.5

AVE, CR and factor loadings to measure convergent validity.

Constructs	**Items**	**Factor loadings**	**CR**	**AVE**
TF	TTF1	.846	.911	.722
	TTF2	.929		
	TTF3	.885		
	TTF4	.703		
	TTF5	.651		
CON	CON1	0625	.865	.621
	CON2	.734		
	CON3	.875		
	CON4	.887		
SE	SE1	.773		

	SE2	.890	.818	.693
PEOU	PEOU1	.850	.931	.729
	PEOU2	.931		
	PEOU3	.828		
	PEOU4	.855		
	PE0U5	.771		
PU	PU4	.862	.719	.726
	PU6	.601		
	PU8	.806		
BI	BI1	.771	.908	.664
	BI2	.856		
	BI3	.750		
	BI4	.859		
	BI5	.831		

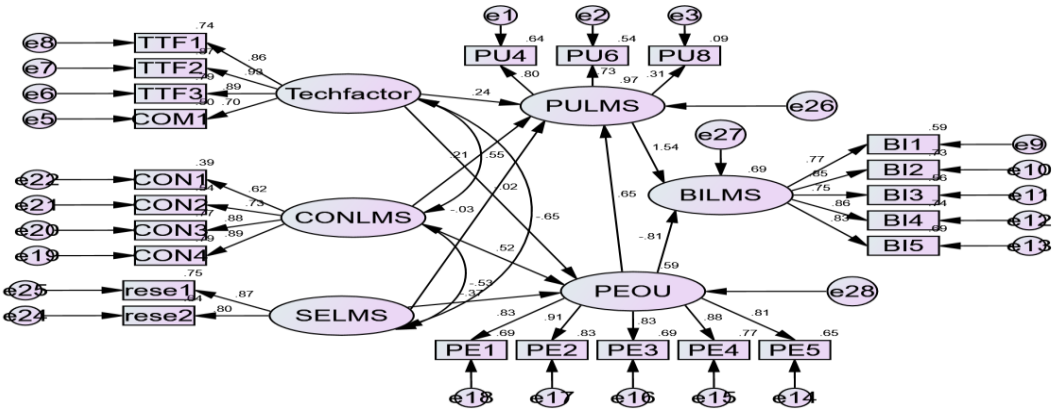
Section III 4.3 Structure Equation Model

For data analysis, two-step SEM (structural equation model) technique was used, as advised by Anderson and Garbing (1988). The SEM method was adopted for path analysis and model goodness of fit. Evaluation of the structural and measurement components of the proposed model's fit was done using AMOS graphics and SEM techniques.

Route analysis was another name used for structure equation model, simultaneous equation models, and covariance structure analysis, was a method for evaluating and examining postulated relationships among variables inside a conceptual model. A collection of associations that have been postulated can be tested and estimated statistically using SEM between multiple concurrent independent and dependent factors. It's an example of second-generation multivariate analysis, as opposed to first-generation techniques like factor

analysis or regression (Gefen et al., 2000). SEM is a multidimensional method that provides features of regression analysis and component analysis to simultaneously investigate a large number of networking links, according to Hair et al. (2010). As a result, SEM enables a researcher to evaluate a group of connected hypotheses in a single analysis, methodical study. SEM is mostly used to generate hypotheses and concepts (Fidell,2007). According to Yuan, (2005) SEM can also tell you if the model 'fits' the data you've collected. It's also capable of working with complicated mathematical models. Figure 4.2 show the standardized model results.

Figure 4.2 SEM model result



The fit indices (χ^2 = 1311.964, df= 218, p <.001, CMIN/DF= 6.018, CFI= .882, GFI=.813, IFI= .883, NFI= .863, TLI= .863, RMSEA =.100, AIC= 1427.964)

The chi-square CMIN / DF value of the model is 1311.964 with 218 degrees of freedom (DF), as shown in Figure 4.2. The model chi-square probability was sig (p <.001). The GFI value achieved was 0.813. As a result, it follows that the marginal model provides the best match. The AGFI value attained by 0.763 represents a marginal value, the recommended value was 0.90. The model's CMIN / DF value was 6.018. The model's CFI value was 0.882.

representing that the marginal model fit, CFI > 0.95 owing to fit CFI Value. The model's TLI rating was 0.863, which indicates that it was marginal. The model's RMSEA value was 0.100, the marginality of the model was indicated by RMSEA, when the fit value is higher than 0.01. The researcher made several changes based on the regression weights and estimation results the model was changed by adding a covariances between the items with the greatest MI values.

Table 4.6

Table 4.6 Modification Indices

	MI	Par change	Note
e1 <--> e2	44.857	.202	Correlation between measurement error of same variable.
e9 <--> e10	50.135	.193	Correlation between measurement error of same variable.
e14<-->e15	50.952	.179	Correlation between measurement error of same variable.
e17<-->e18	55.452	.155	Correlation between measurement error of same variable.

Table 4.6 shows the corelated pair between e1<-->e2, e9 <--> e10, e14 <--> e15 and e17 <--> e18 were selected, and the modification to the structure model is made as shown in figure 4.3

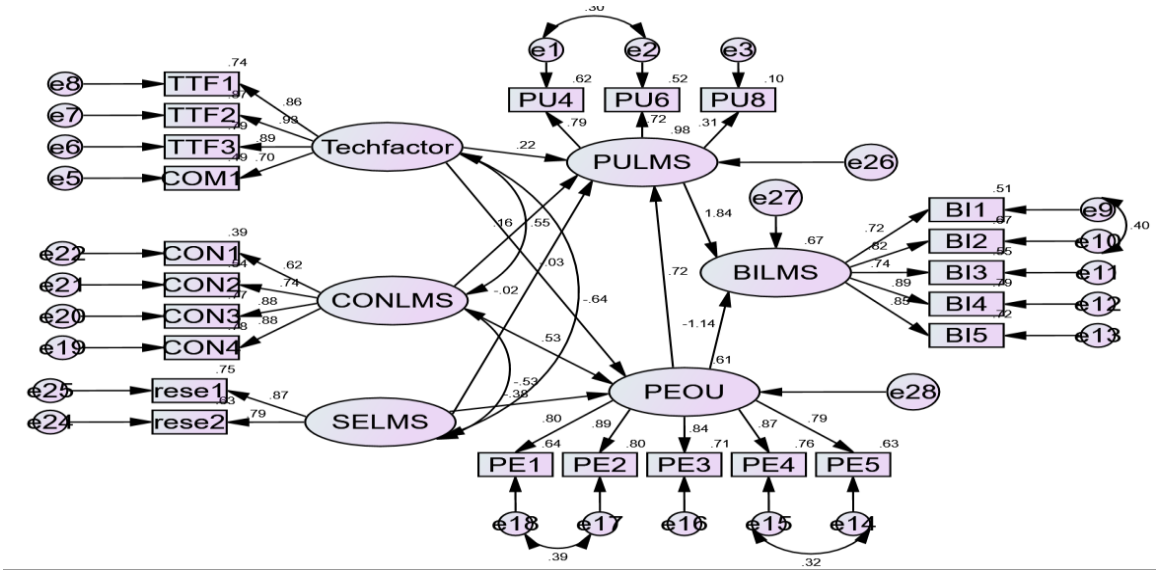


Figure 4.3: *The modification is based on the MI shown in table 4.5*

The fit indices (χ^2 = 1102.392, df= 214, p <.001, CMIN/DF= 5.151, CFI= .904, GFI=.989, IFI= .905, NFI= .975, TLI= .977, RMSEA =.091, AIC= 1226.392)

Figure 4.3 depicts the situation. Seven of the eight parameters in the goodness of fit index value were good, indicating that the SEM model as a whole was fit (The model and the data were appropriate for each other).

Table 4.7

Final SEM fit results:

Fit indices	Critical limit	Model results	Explanation	References
Absolute fit measure				
Chi-Squares x2	<x2 α; df	1102.392		Hair et al., (2010)
CMIN/DF	<= 5.0	5.151	Good	Hair et al., (2010)
Probability	> 0.05	.000	Good	Hair et al., (2010)
GFI	> 0.90	.989	Good	(Miles and Shevlin, 1998
RMSEA	< 0.10	.091	Good	(MacCallum et al, 1996)
Incremental Fit Measures				
AGFI	>0.90	.978	Good	Hooper
TLI	>0.90	.977	Good	Marsh, Hue and Wen,2004
NFI	>0.90	.975	Good	Hu and Bentler,1999
CFI	>0.90	.904	Good	Hu and Bentler, 1999
Parsimonious Fit Measures				
PNFI	>0.50	.743	Good	Mulaik ,1989
PGFI	>0.50	.760	Good	Mulaik,1989

4.3.1 Path analysis

AMOS was used to evaluate the structured model's regression. In figure 4.3 the p-value denotes the degree of significance with which the estimate depicts the effect on each path,

with *** indicating that the effect on the path is significant in terms of p-values less than 0.01.

The model in figure 4.3 showed the direct and indirect paths effect. The paths having significant value less than 0.01 were significant while more than 0.01 values were considered as insignificant. Values of direct path were shown in table below:

Table 4.8

Standardized direct path analysis.

Paths			**Estimate**	**SE**	**C.R**	**P**	**Hypotheses**
PEOU	<-	Tec factor	-.026	.059	-.493	***	Rejected
PEOU	<-	CONLMS	.528	.047	10.438	***	Rejected
PEOU	<-	SELMS	-.378	.054	-6.474	***	Rejected
PULMS	<-	Tec factor	.221	.041	5.894	***	Rejected
PULMS	<-	CONLMS	.160	.031	4.711	***	Rejected
PULMS	<-	SELMS	-.024	.027	-.822	.411	Accepted
PULMS	<-	PEOU	.715	.057	12.091	***	Rejected
BILMS	<-	PULMS	1.842	.252	6.451	***	Rejected
BILMS	<-	PEOU	-1.138	.240	-4.040	***	Rejected

Note: perceived ease of use (PEOU), perceived usefulness (PU), Task technology Fit (TTF), Self-efficacy (SE), Convenience (CON), Behavior intention (BI)

The p value in table shows all components were significant. The path between Self efficacy and PEOU were examined as insignificant.

4.3.2 Indirect paths

The standardized direct, indirect and total effect of all variables were shown in table 4.9

Table 4.9

Standardized direct, indirect and total effect

Variables	Direct Effect	Indirect Effect	Total Effect
Tec factor	-	.403	.403
CONLMS	-	.390	.390
SELMS	-	-.113	-.113
PEOU	-1.138	1.318	.180
PULMS	1.842	-	1.842

Section IV 4.4 Perceived Usefulness of the LMS

Objective no.1: To assess perceived Usefulness for learning management system at university level.

Table 4.10

"Perceived LMS usefulness (PULMS)" among university students (n=500)

Section	N	Mean	Remarks
Perceived usefulness (PU)	500	3.115	Undecided

Using a five-point Likert scale with responses ranging from strongly disagree to strongly agree on a scale of 1 to 5, the mean values for elements of perceived usefulness of LMS were shown in Table 4.10. The table analyzed objective no.1 that was related to examine students' opinions regarding usefulness of learning management system. The table show the mean value for section containing items regarding perceived usefulness. The mean value for perceived usefulness of learning management system was 3.11 indicates that students were unable to decide whether learning management system was helpful to them. They think that learning management system didn't facilitate them in work completion and was not much productive for their course work. Overall mean of perceived usefulness item was 3, which showed that students were unable to decide whether the system was useful to them or not.

Section V 4.5 Perceived Ease of Use for LMS

Objective no. 2: To assess perceived ease of use for LMS at university level.

Table 4.11

"Perceived Ease of Use for LMS(PEOU)" among university students (n=500)

Section	N	Mean	Remarks
Perceived ease of use (PEOU)	500	2.999	Disagree

According to the five-point Likert scale, which ranges from disagree to strongly agree on a scale of 1 to 5, Table 4.11 shows the mean values for the items of perceived ease of use of LMS on this scale. The table analyzed objective no.2 that was related to examine students' opinions regarding Learning management system ease of use.

The mean value for perceived ease of use for learning management system was 2.99 indicates that students were in undecided situation about LMS ease of use. Findings indicated that Majority of students using LMS were unable to decide whether LMS was user friendly or complicated.

Section VI 4.6 Effect of Perceived Ease of use on Perceived Usefulness

Objective no. 3: To examine the effect of perceived ease of use on perceived usefulness for learning management system at university level.

Ho1: There is statistically no significant effect of perceived ease of use on perceived usefulness for learning management system at university level.

Table 4.12

PEOU effect on PULMS(n=500)

			Estimate	SE	Cr.	P value	Results
PULMS	<-	PEOU	.715	.057	12.091	***	Significant

Table 4.12 shows a significant direct impact of PEOU on PULMS. P value was significant $p<0.01$ which means that there was a direct effect of PEOU on PULMS. Further, it was claimed that if the level of perceived ease of use goes up, the level of perceived usefulness will also go up.

As a result, the hypothesis no Ho1 that “There is no significant effect of perceived ease of use on perceived usefulness for learning management system at university level” was failed to accept.

Section VII 4.7 Effect of Perceived Ease of Use on Behavior Intention

Objective no.4: To measure the effect of perceived ease of use on behavior intention to use LMS at university level.

Ho2: There is statistically no significant effect of perceive ease of use on behavior intention to use LMS at university level.

Table 4.13

Influence of PEOU on BILMS (n=500)

			Estimate	SE	CR	P	LABEL
BILMS	<-	PEOU	-1.138	.240	-4.040	***	Significant

Table 4.13 show a significant direct impact of PEOU on BILMS. P value was significant $p<0.01$ which means that there was a direct effect of PEOU on BILMS. In addition, it appears that when the system is easy to use, the behavior intention to utilize a learning management system rises. As a result, hypothesis no Ho2, “There is no significant effect of perceived ease of use on behavior intention to use a learning management system at university level” was failed to accept.

Section VIII 4.8 Effect of PULMS on BILMS

Objective no. 5: To measure the effect of perceived usefulness on behavior intention to use Learning management system at university level.

Ho3: There is statistically no significant effect of perceived usefulness on behavior intention to use learning management system at university level.

Table 4.14

Influence of PULMS on BILMS

			Estimate	SE	CR	P	LABEL
BILMS	<-	PULMS	1.842	.252	6.451	***	Significant

Table 4.14 show a significant direct impact of PULMS on BILMS. P value was significant $p<0.01$ which means that there was a direct effect of PULMS on BILMS. Also, it seems that if the level of perceived usefulness goes up, the behavior intention to use the LMS will also go up. As a result, hypothesis no. Ho3, "There is no significant effect of PU on BI to use a learning management system among university students" was failed to accept.

Section IX 4.9 Effect of External Factors on PEOU

Objective no. 6: To examine the effect of external factors on perceived ease of use for LMS among university students.

6a: To examine the effect of Technology factor on perceived ease of use for learning management system among university students.

Ho4a: There is statistically no significant effect of Technology factor on Perceived ease of use for leaning management system.

Table 4.15

Influence of TTF on PEOU(n=500)

Path			Estimate	SE	C.R	P	LABEL
PEOU	<--	Tec factor	-.026	.059	-.493	***	Significant

Table 4.15 shows the direct path between technology factor<>perceived ease of use. The finding shows the perceived ease of usage was influenced by the technology component. The P value for the technology element and perceived ease of use was less than 0.01, Which mean there was a significant direct effect of technology factor on PEOU. The Ho4a hypothesis that "There is statistically no significant effect of technology on perceived ease of use" was failed to accept.

6b: To examine the effect of convenience on perceived ease of use for learning management system among university students.

Ho4b: There is statistically no significant effect of convenience on Perceived ease of use for leaning management system.

Table 4.16

Influence of CON on PEOU(n=500)

			Estimate	SE	CR	P	LABEL
PEOU	<-	CONLMS	.528	.047	10.438	***	Significant

Table 4.16 shows a direct path between convenience <>perceived ease of use. The table revealed that perceived ease of use was significantly influenced by convenience. 0.01 was the P value for perceived ease of use and convenience. The Ho4b that "There is no significant effect of convenience on perceived ease of use" was failed to accept.

Objective 6c: To examine the effect of self-efficacy on perceived ease of use for learning management system among university students.

Ho4c: There is statistically no significant effect of self-efficacy on Perceived ease of use for leaning management system.

Table 4.17

Influence of SE on PEOU(n=500)

			Estimate	SE	CR	P	LABEL
PEOU	<-	SELMS	-.378	.054	-6.474	***	Significant

Table 4.17 shows the direct path between self-efficacy <>perceived ease of use. Table demonstrate a significant relationship between self-efficacy and perceived ease of use. P value for perceived ease of use and self-efficacy was less than 0.01. The Ho4c “There is statistically no significant effect of self-efficacy on perceived ease of use” was failed to accept.

Section X 4.10 Effect of External Factors on PULMS

Objective no. 7: To find out the effect of external on perceived usefulness for LMS among university students.

Objective 7a: To find out the effect of Technology factor on perceived usefulness for learning management system among university students.

Ho5a: There is statistically no significant effect of Technology factor on Perceived usefulness for leaning management system.

Table 4.18

Influence of TTF on PU(n=500)

			Estimate	SE	CR	P	Label
PULMS	<-	Tec factor	.221	.041	5.894	***	Significant

Table 4.18 shows the direct path between technology factor<>perceived usefulness. Results indicate a significant relationship between the technological element and perceived usefulness. P value was less than 0.01 for the technological component and perceived Usefulness. The Ho5a “There is statistically no significant effect of technology factor on perceived usefulness” was failed to accept.

Objective 7b: To find out the effect of convenience on perceived usefulness for learning management system among university students.

Ho5b: There is statistically no significant effect of convenience on Perceived usefulness for leaning management system.

Table 4.19

Influence of CON on PU(n=500)

			Estimate	SE	CR	P	LABEL
PULMS	<-	CONLMS	.160	.031	4.711	***	Significant

Table 4.19 shows a direct path between convenience <>perceived usefulness. Table demonstrates a significant relationship between perceived usefulness and convenience. P score was less than 0.01 for perceived usefulness and convenience. The Ho5b “There is statistically no significant effect of convenience on perceived usefulness” was failed to accept.

Objective 7c: To find out the effect of self-efficacy on perceived usefulness for learning management system among university students.

Ho5c: There is statistically no significant effect of self-efficacy on Perceived usefulness for leaning management system.

Table 4.20

Influence of SE on PU(n=500)

			Estimate	SE	CR	P	LABEL
PULMS	<-	SELMS	-.024	.027	-.822	.411	Insignificant

Table 4.20 shows the direct path between self-efficacy <>perceived usefulness. Table shows that there was an insignificant effect of self-efficacy on perceived usefulness. For perceived usefulness and self-efficacy, the P value was .411 which was >0.01. The Ho5c "There is statistically no significant effect of self-efficacy on perceived usefulness" was accepted.

CHAPTER 5

SUMMARY, FINDINGS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This chapter includes summary, findings, conclusion, discussion, recommendations for future research studies and limitations of current study. Moreover, the details of this chapter were defined as follows;

5.1 Summary

Purpose of the study was to see how useful and simple LMS were at the university level. The study was carried out for this purpose based on seven primary objectives. The following objectives were attained:

1. To assess perceived usefulness for learning management system at university level.

2. To assess perceived ease of use for learning management system at university level.

3. To examine the effect of perceived ease of use on perceived usefulness for learning management system.

4. To measure out the effect of perceived ease of use on behavior intention to use learning management system at university level.

5. To measure the effect of perceived usefulness on behavior intention to use learning management system at university level.

6. To examine the effect of external factors on perceived ese of use for learning management system at university level.

7. To determine the effect of external factor on perceived usefulness for learning management system at university level.

For the present study Null hypotheses were designed. The Task Technology Fit model and Technology Acceptance model served as a foundation for the study conceptual framework. It was Goodhue who created Task technology fit model (1995). The two sub sections were task technology fit and Convenience. The TAM model was presented by Venkatesh and Bala (2008) that involved two main dimensions and external factors (Personal factor and social factor). Perceived ease of use, perceived Usefulness and behavior intention to use were the three main components of technology adoption model. The current study used a descriptive research design and quantitative research approach. Total population of current study was 5250 undergraduate students of social sciences department enrolled in session (2021) at three public sector universities of Islamabad conducting online learning through learning management system. Researcher used proportionate stratified sampling technique to collect data from the respondents who used the learning management system for online classes. Data were gathered via a questionnaire tool. Research instrument was modified according to conceptual framework of the study. The research instrument was divided into three sections: a five-point Likert scale, a section on demographic data and a section on research variable items.

The five experts in relevant field validated research tool. Some considerable suggestions were given by those experts. Researcher accommodated those suggestions and improved in light of given suggestions. Pilot testing was used to check reliability of the

instrument. The researcher gathered information from 50 respondents for the pilot testing. Researcher visited target institutions to collect data by face to face interaction. After that, data was analyzed through statistical Package for social sciences (SPSS) version 22nd. The reliability of tool was (.95**). After pilot testing the tool was revised and prepared for final data collection. one item was modified that was PU8 because of its low reliability score that was. 187.Before going to actual data collection, Exploratory factor analysis was done in order to determine which items were clustered under a common factor and to test the scales factorial structure. After Exploratory factor analysis 25 items were left including 6 dimensions. In Exploratory factor analysis, item having a factor loading less than 0.5 were eliminated.

525 undergraduate students were given the questionnaire. The return rate was 96%. The data was then examined using Analysis of Moment structure (AMOS). The reliability of tool constructs was evaluated using confirmatory factor analysis. Root means square residuals (RMSEA) were.099, which is less than.01. The model yields a satisfactory fit result, and the mean scale is legitimate and dependable. The statistical programme for social science (SPSS) version 22 was used for data analysis of first two objectives, and Structural Equation Modeling was used through Analysis of Moment Structure (AMOS) software for the direct paths among each variable. The statistical test was mean frequency Cronbach alpha reliability, confirmatory factor analysis and structure equation modelling.

5.2 Findings

Objective 1 "To assess perceived Usefulness for learning management system among university students".

1. The average scores on a five-point Likert scale ranging from strongly disagree to strongly agree for questions about how useful users think it was to use a learning management system. Mean value for perceived usefulness was 3.11. Findings showed, students were in undecided situation about usefulness of LMS. Students were unable to decide whether system is productive to them or not (Table 4.10).

Objective 2 "To assess perceived Ease of Use for learning management system among university students".

2. The results show that majority students were unable to decide whether LMS was easy to use or not. The overall mean for perceived ease of was 3.0 that show undecided response by respondents. Results showed that majority students were unable to decide whether system was user friendly or not (Table 4.11).

Objective 3 "To examine effect of perceived Ease of use on perceived usefulness for learning management system among university students".

3. The results indicated a noticeable positive effect of perceived ease of use on perceived usefulness and observed significant at 0.01. It means a user's perceiving a technology easy to use had strong believe that the technology will be helpful and productive to everyone who utilizes it.

Therefore, the null hypothesis Ho1 "There is no significant effect of perceived ease of use on perceived usefulness for learning management system" was failed to accept (4.12).

Objective 4 "To measure the effect of perceived ease of use on behavior intention of LMS among university students".

4.The results showed a noticeable effect of perceived ease of use on behavior intention. It was positive significant effect of perceived ease of use on behavior intention and significant value was 0.01. Findings shows that student perceiving LMS user friendly and simple to use had a strong desire to use it in future.

As a result, hypothesis Ho2" There is no significant effect of perceived ease of use on behavior intention of learning management system" was failed to accept (4.13).

Objective 5 "To measure the effect of perceived usefulness on behavior intention of LMS among university students".

5. After interpreting table, the findings show that there was a significant effect of perceived usefulness on behavior intention. The p value was significant at 0.01, which shows a direct effect of perceived usefulness on behavior intention. Its mean that student perceiving learning management system valuable and effective for studies were willing to utilize it.

As a result, hypothesis Ho3 "There is no significant effect of perceived usefulness on behavior intention "was failed to accept (4.14).

Objective 6 "To examine the effect of external factors on perceived ease of use for learning management system".

6. The results from Table 4.8 revealed that there was a significant path exist between external factors and perceived ease of use.

Findings of table 4.15 show a positive direct effect between technology factor and perceived ease of use and significant value was 0.01. Findings shows that high performing Learning Management system in term of system quality was perceived easy to use by user. The null hypothesis H04a "There is no significant effect of technology factor on perceived ease of use "was failed to accept (Table 4.15).

8. Results show that there was a positive effect of convenience on perceived ease of use. Findings indicate that students think a technology is easy to use and beneficial when it is readily available to them and more conducive to attaining their objectives. So null hypothesis Ho4b "There is no significant effect of convenience on perceived ease of use" was failed to accept (Table 4.16).

9.It was found that that self-efficacy had a favorable effect on PEOU, which was statistically significant at 0.01. Results show that there was a significant positive effect of self-efficacy on perceived ease of use. Respondents having high level of self-efficacy have high level of comfort and confidence to use LMS to achieve goals. Therefore, null hypothesis Ho4c "There is no significant effect of self-efficacy on perceived ease of use" was failed to accept (Table 4.17)

Objective 7"To find out the effect of external factors on perceived usefulness for learning management system".

10.Table 4.8 presented a path analysis. Results showed that there was a significant effect of external factors on perceived usefulness of learning management system.

Table 4.18 shows that there was a significant positive effect of technology factor on perceived usefulness. Results shows that high quality performance of LMS will be more

productive. Therefore, null hypothesis Ho5a “There is no significant effect of technology factor on perceived usefulness “was failed to accept.

12. The Interpretation of table 4.19 shows that there was a statistically significant positive effect of convenience on perceived usefulness of learning management system among university students. Findings shows that when a technology is more conveniently available and more compatible, the user feels more confident about the productivity of learning management system Thus, the null hypothesis Ho5b “There is no significant effect of convenience on perceived usefulness” was failed to accept.

13. Results showed that there was no effect of self-efficacy on perceived usefulness. Findings shows that student's belief in their own capacity to operate LMS had no impact on benefits of system as experienced by the student.

The results showed that the null hypothesis Ho5C “There is no significant effect of self-efficacy on perceived usefulness” was accepted (Table 4.20).

5.3 Discussion

The present study was conducted by researcher to analyze PEOU and PU for learning management system at university level and to assess the direct paths between variables both external and endogenous. In order to accomplish results, the researcher planned objectives and conducted an analysis through SPSS 22nd version and used AMOS in order to determine the effect of one variable on other. The achieved objectives were discussed below:

The first main objective focused on to assess perceived usefulness of LMS among university students. It was assessed that majority students were unable to decide whether

system was productive to them or not. Second objective was to assess PEOU for learning management system among university students. It was found that majority university students were unable to decide whether system was user-friendly or not. This finding was supported by Rehman (2018) and Fathema (2015). Previous studies found that students perceived LMS easy to use, studies revealed that when a student find LMS fit with academic activities, more compatible and more convenient, so they will be perceived it easy and useful.

Using the structural equation model, objective 3 was evaluated and accomplished, and was noticed from the study that PEOU had a significant direct effect on PU. The significant direct path from PEOU to PU was presented in table 4.8. Robinson (June 2019) uses the TAM to analyze the adoption of eLearning educational technologies. The results showed that perceived ease of use has a considerable positive impact on perceived usefulness, this finding was consistent with the TAM model. Its mean, when user perceived a technology easy to use so he or she will believe that the technology will be helpful to those who are utilizing it.

Fearnley (2020) found that PEOU was a good predictor of PU of an eLearning system. This implies that professors who find the LMS to be simple to use have a favorable impression of its utility. Similarly, Buana conducted a study in September 2021 utilizing the TAM model to investigate the uptake of online learning in higher institutions. According to the findings of that study, when a user believes a technology is clear and simple to use, he or she believes that it will help everyone who utilizes it. In addition, Students will be more likely to favor LMSs as effective if they believe it gives good learning support, according to Binyamin 2019. According to Gao, PEOU has a substantial effect on

PU, which indicates that if e learning platform is simple to use, clear and understandable, students will be more likely to engage with it and improve their work performance. Furthermore, when pupils understand and accept the value acquired, the system will be appropriate.This result was the same as what other studies had found, such as Escobar et al. (2011), Ndubisi (2003), Fathema (2015), Habibah (2019), Habibah (2021), and Ngai. (2007).

Finding out how perceived ease of use effect university student's behavior and intention to use LMS was the fourth major objective of the study. Perceived ease of use had a significant positive effect on behavior intention to use a learning management system. It was found that a student perceiving an LMS user friendly, they would similarly intend to utilize it. In the light of past researches, PEOU was an important predictor of interest in using n eLearning system (Premchaiswadi,2012). PEOU has a considerable impact on the desire to utilize a learning management system (LMS), according to Almarashdeh (2011) and Alatawi (June,2013)

According to Alatawi (June 2013) students are more likely to accept simpler systems as compared to complex and difficult systems so system must be user-friendly and exploration must be simple; otherwise, users will not accept or utilize the system, even if it is valuable, because it is human nature to prefer simpler systems

The assessment of how perceived usefulness affects behavior intention of LMS use among university students was the fifth major objective. A significant direct path was analyzed among perceived usefulness and behavior intention. Its mean that students perceiving learning management system valuable and effective for studies were willing to use it next time. Similar findings also found by Aulanie (July2012), Alharbi (2014),

Mokhtar (2018), Almarashdeh (2010), Theng (2012), Alatawi (june2013), Farahat (2012) and Sharma (2012). Furthermore, when academics perceive a learning management system (LMS) to be user-friendly, they develop a positive attitude toward using it, according to Alharbi S. et al. (2014). Like perceived utility, behavioral intention to use was positively influenced by perceived utility. According to Sharma and Chandel (2013) and Chang and Tung (2008) students who utilize learning management system for learning have a better perceived utility, which leads to a stronger behavioral intention to use online learning course through learning management system.

Objective six was analyzed through path analysis using Amos software. It was examined from the study that convenience and self-efficacy directly influence the ease of learning management system. It was discovered, Users that have a high degree of self-efficacy to be more capable of finding learning management system user friendly and understandable. A Learning management system ease of use was positively correlated with self-efficacy. The more students believe they can use an eLearning system, the easier it is to use. Prior researches like as (Fathema 2013, Park 2012, Alshare 2005) has reported that perceived ease of use of learning management system was positively affected by self-efficacy. In consistent with previous researches (Holden 2011, Panda,2007, Yuen,2008, Roca,2006,) declared self-efficacy as a positive predictor of PEOU. Findings indicated that respondents with higher self-efficacy find LMS easy and useful as compared to those who have low self-efficacy level. Respondents having high level of self-efficacy have high level of comfort and confidence to use LMS to achieve goals.

It was concluded from findings that convenience seemed to have a big impact on how easy an LMS was to use. Its mean majority of students believe that compatibility and easily access of certain technology perceived it simple to use and valuable. This finding was supported through research study conducted by Rehman (2018). It was concluded by Rehman, if user finds the LMS more appropriate for their academic activities, more compatible, and easier to use, they will find it more valuable and user-friendly, and the way they intend to use it, will be positively affected.

Align with the work of Fathema (2015) and Salloum (2019) this study findings concluded that technology factor is considerably positively correlated with perceived ease of use. Findings showed that high performing Learning Management system in term of system quality will perceived by user easy to use. From current study it was analyzed that technology influences how easily a learning management system is perceived to be used. Fathema (2015) conducted a study to analyze the variables that influence the LMS use by faculty. Finding showed that system quality had significant effect on PEOU and PU. This finding indicate that the respondents of this study placed emphasis on quality issues, such as (content, navigation speed, functions and interaction capability) to use LMS.

Bansah (2022) examine the relationship of convenience perceived ease of use and perceived usefulness and the extent to which they effect student's acceptance to use LMS. Findings revealed that, perceived convenience effect student's acceptance to use LMS.

The Seventh major objective assessed the influence of external factors such as Task Technology Fit, Convenience and self-efficacy on perceived usefulness (PU) among university students. Statistically significant effect of technology factor and convenience was found related to perceived usefulness. These findings were similar to the findings of

study Fathema (2013), Park (2012); Condie (2007), Bebell 2003 who concluded from their studies that a significant direct impact of system quality on perceived usefulness existed. Its mean, high quality performance of LMS will be more productive.

Rehman (2018) concluded from his study that TTF, convenience have direct significant impact on PU. Its mean when a user perceived technology fit for needed task, they will find it more effective and productive. Furthermore, researcher supported the current finding that was convenience significantly effect usefulness of Learning management System. Its mean that when a technology is more conveniently available and more compatible, the user will be more confident about the productivity of learning management system.

The perception of the usefulness of a learning management system was unaffected by self-efficacy. The student's belief in their own capacity to operate an e-learning system had no impact on benefits of system as experienced by the student. Current study shows an insignificant effect of self-efficacy on perceived usefulness. Current study concluded that it is supported with the study of cigdem (July 2012) concluded from his study that self-efficacy shows insignificant relation with PEOU and PU.

5.4 Conclusion

The current study's findings were used to derive the conclusion.

According to the findings of current study, the model was sufficient for analyzing and explaining perception of usefulness, Ease of use and behavior intention to use LMS. In relation to external factors such as technology, convenience and self-efficacy. The first objective was to measure the degree of PU among university students to build learning management system. Based on the data, it was determined that majority of were unable to

decide that Learning Management system was productive and effective for their teaching learning process. The second objective was to determine how easy Students believed that using a learning management system at a university. Most students were in undecided situation whether system was clear and understandable or not.

The third objective was to assess the impact of PEOU on PU of learning management system among university students. Researcher discovered a connection between perceived usefulness and perceived ease of use. Findings of third objective concluded that perceived ease of use has a direct impact on perceived usefulness. The fourth objective looked at how university student's behavior and intention to use a learning management system were affected by perceived ease of use. It was discovered that students who believe LMS is user-friendly had a strong desire to use it to attain their objectives. The fifth objective looked at how behavior intention to use a learning management system is influenced by perceived usefulness. The data revealed that students who believe LMS is useful have a strong desire to use it to complete their work. The study found that students' behavior intentions were positively predicted by perceived usefulness to use LMS.A significant direct and positive impact of perceived usefulness was found on behavior intention to use LMS.

Sixth objective was to investigate the impact of technology factor, convenience and self-efficacy on university students perceived ease of use for learning management system. Researcher found that external factors such as: technology factor, convenience and self-efficacy were a statistically significant positive predictor of perceived ease of use (PEOU) for learning management system. Based on results finding the study concluded that student's adoption of learning management system depends on functionality of system, if

the system is not providing needed functions, students will turn to use another system instead of learning management system. The seventh objective was to determine the impact of technology, convenience, and self-efficacy on university students' perceptions of the Usefulness of a learning management system. It was discovered that the technological element and convenience had a considerable favorable effect on perceived usefulness. However, perceived usefulness was not linked to self-efficacy. Results revealed that the self-efficacy had no impact on perceived usefulness.

5.5 Recommendations

The following recommendations are based on the findings and conclusion of the current study.

1.Universities may arrange seminars and proper online training tutorials in order to help students to cope up with difficulties and make aware them about its productive use.

2. Universities may hire software designers or web trainers to arrange onsite or online learning workshops for students in order to make them technically competent to use LMS.

3. Universities may provide online training courses on LMS Moodle canvas or Blackboard in collaboration with web designer to ensure successful integration of learning management system in Education.

4. Universities may provide interactive and collaborative learning with the use of electronic applications to boot up student’s self-efficacy.

5.6 Research implications

1. Data was collected from social sciences department; future studies may explore mode of collecting data from other departments as well.

2. Data was collected only from undergraduate students; future research may explore mode of collecting data from graduates and postgraduates as well.

3. Future research may use mixed study method to get more nuanced findings.

4. Future researchers may add other variables from existing theories such as perceived enjoyment, computer anxiety, system accessibility, experience job relevance and so on, to better understand student's acceptance behavior towards learning management system.

5. Current study focused on perception of learners regarding learning management system, however future studies may focus on perceptions of instructors regarding learning management system.

5.7 Study's Limitation

1. Researcher limited the study to three public sector universities of Islamabad (NUML, IIUI, and AU) that were using LMS. Other cities or regions were not accessible to the researcher.

2. Researcher collected data from only undergraduate students of social sciences of all three public sector universities. Due to lack of time and resources, the researcher could not collect data from the students of all social sciences programs of all three-public sector universities

3. Due to the nature of study, researcher was unable to cover entire public and private sector universities of Islamabad. The findings thus might not apply to all universities of Islamabad.

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Appendix A

Topic Approval Letter

NATIONAL UNIVERSITY OF MODERN LANGUAGES
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF EDUCATION

ML.1-4/2021/Edu Dated: 10th December 2021

To: Sumera
11 MPhil/Edu/S20

Subject: **APPROVAL OF MPHIL THESIS TITLE AND SUPERVISOR**

1. Reference to Letter No, ML.1-4/2021-Edu, dated 11-12-2021, the Competent Authority has approved the title and supervisor in 12th BASR meeting dtd 18th November 2021 on the recommendations of Faculty Board of Studies vide its meeting held on 9th September 2021.

   a. **Supervisor's Name & Designation**
      Dr Aisha Bibi (Supervisor)
      Assistant Professor
      Department of Education, NUML, Islamabad.
   b. **Thesis Title**

Perceived Usefulness and Ease of Use for Learning Management System at University Level: A Descriptive Survey

2. You may carry out research on the given topic under the guidance of your supervisor and submit the thesis for further evaluation within the stipulated time. It is to inform you that your thesis should be submit within described period **by 31st December 2022** positively for further necessary action please. (***Time line attached***)

3. As per policy of NUML, all MPhil/PhD thesis are to be run on Turnitin by QEC, NUML before being sent for evaluation. The university shall not take any responsibility for high similarity resulting due to thesis run from own sources.

4. Thesis is to be prepared strictly on NUML's format that can be taken from (Dr Saira Nudrat, Coordinator MPhil/PhD)

Telephone No: 051-9265100-110 Ext: 2094
E-mail: snudrat@numl.edu.pk

Dr. Wajeeha Shahid
Head
Department of Education

Distribution:

Sumera (MPhil Scholar)

Dr Aisha Bibi (Thesis Supervisor)

Appendix B

Data Collection Reference Letter

DEPARTMENT OF EDUCATION
FACULTY OF SOCIAL SCIENCES
National University of Modern Languages
Sector H-9, Islamabad
Tel.No: 051-9265100 Ext: 2090

ML.1-3/2021-Edu

Dated: 24-01-2022

WHOM SO EVER IT MAY CONCERN

Ms. Sumera D/O Khaki Shah, student of Mphil (Edu) Department of Education National University of Modern Languages Islamabad is engaged in project of Research Work.

She may please be allowed to visit your Institutions to obtain the required information for her Research Work.

This information shall not be divulged to any unauthorized person or agency. It shall be kept confidential.

For 24/1/22

Dr Wajeeha Shahid
Head,
Department of Education.

Appendix C

Instrument for Data Collection

Serial No: _____

PERCEIVED USEFULNESS AND EASE OF USE FOR LEARNING MANAGEMENT SYSTEM AT UNIVERSITY LEVEL: A DESCRIPTIVE SURVEY

Dear Respondent,

I am M. Phil. Scholar (Education) working on my research work on the above-mentioned topic. You are requested to fill the questionnaire. The first part of questionnaire consists of Demographic information. The second part of this questionnaire deals with the items measuring seven constructs of model under study. It is assured that your response will be kept confidential and will not be disclosed to any person or authority. The questionnaire is developed to collect data for my research work only.

Sumera (M. Phil Researcher)
Department of Education
National University of Modern Language, Islamabad

Demographic information:

a.	**Gender**	Male 1		Female 2				
b.	**Department**							
c.	**Age**	14-15 1	16-17 2	18-19 3	20-21 4	More than 2 5		
d.	**Semester**	1st 1	2nd 2	3rd 3	4th 4	5th 5	6th 6	7th 7	8th 8
e.	**University**	National University of Modern Languages 1	International Islamic University Islamabad 2	AIR university 3					

Read the items below and answer carefully by using the scale: **Strongly disagree SDA=1, Disagree DA=2, Undecided UD=3, Agree A=4, strongly Agree SA=5).**

(Abbreviations): (LMS)Learning Management System

Section1: Students' perceived ease of use about LMS							
S/N	**Codes**	**Items**	**(SDA)** 1	**(DA)** 2	**(N)** 3	**(A)** 4	**(SA)** 5
1.	PE1	I found LMS easy to use.	1	2	3	4	5
2.	PE2	I found that dealing with LMS would be clear and understandable	1	2	3	4	5
3.	PE3	I found LMS to be flexible to work.	1	2	3	4	5
4.	PE4	I found LMS to be simple to utilize for what I needed.	1	2	3	4	5
5.	PE5	I found LMS to be a quick way to obtain knowledge.	1	2	3	4	5
Section2: perceived Usefulness of LMS							
S/N	**Codes**	**Items**	**(SDA)** **1**	**(DA)** **2**	**(N)** **3**	**(A)** **4**	**(SA)** **5**
1.	PU1	LMS is useful in teaching learning process.	1	2	3	4	5
2.	PU2	LMS would improve my efficiency.	1	2	3	4	5
3.	PU3	LMS would improve my educational performance.	1	2	3	4	5
4.	PU4	By using LMS, i will be more productive in my course work.	1	2	3	4	5
5.	PU5	LMS allows me to obtain more precise data.	1	2	3	4	5

6.	PU6	LMS facilitates work completion.	1	2	3	4	5
7.	PU7	LMS is useful in on campus classes.	1	2	3	4	5
8.	PU8	LMS is useful in Off campus classes.	1	2	3	4	5
Section:3 Self-Efficacy of LMS							
1.	SE1	I do not need people's help to use LMS. (R)	1	2	3	4	5
2.	SE2	I do not feel difficulty to use LMS. (R)	1	2	3	4	5
3.	SE3	I am confident to use LMS.	1	2	3	4	5
4.	SE4	I have adequate ability to operate LMS.	1	2	3	4	5
Section:4 Task Technology Fit							
1.	TTF1	LMS feature is enough to help me in managing course lectures.	1	2	3	4	5
2.	TTF2	LMS features are suitable to help me in managing my assignments.	1	2	3	4	5
3.	TTF3	The functions of LMS fully meet my needs of Academic Work.	1	2	3	4	5
Section:5 Compatibility							
1.	COM1	LMS is appropriate for my Academic activities.	1	2	3	4	5
2.	COM2	LMS do not conflict with my Academic activities.	1	2	3	4	5

3.	COM3	Using LMS is more compatible with my Academic activities than doing academic activities manually.	1	2	3	4	5
Section:6 Convenience							
1.	CON1	LMS enables me to search for the academic information/content without time constraints.	1	2	3	4	5
2.	CON2	LMS saves my effort in performing academic activities.	1	2	3	4	5
3.	CON3	LMS allows me to improve learning outcomes.	1	2	3	4	5
4.	CON4	I can conveniently access and use LMS quickly.	1	2	3	4	5
Section :8 Behavioral intention to use LMS							
1.	BI1	I plan to use learning management system in the future.	1	2	3	4	5
2.	BI2	I will recommend others to use learning management system.	1	2	3	4	5
3.	BI3	I plan to use learning management system for online classes.	1	2	3	4	5
4.	BI4	I plan to use learning management system to complete assignment on time.	1	2	3	4	5
5.	BI5	I plan to use LMS for all courses.	1	2	3	4	5

Appendix D

Cover Letter for Tool Validation

Cover Letter for Validity Certificate

Perceived usefulness and ease of use for learning management system at university level:

A descriptive survey

Subject: **Request for validity certificate**

Respected Sir/Madam

I have attached my questionnaire adapted for the purpose of research titled as "Perceived usefulness and ease of use for learning management system at university level: A Descriptive survey. The Scale is based on Technology Acceptance Model TAM3 (2008) by Davis.it include the constructs of TAM model that is perceived usefulness, ease of use and behavior intention and external factors such as Task technology fit, compatibility, convenience, self-efficacy and subjective norm towards the use of learning management system.

Kindly check my questionnaires and provide your valuable suggestion for its improvement. Also certify its validity by filling the certificate attached at the end of the document.

Sumera

M. Phil Researcher, Department of Education,

National University of Modern Language,

Islamabad Pakistan

Appendix E

Certificate for Tool Validation

CERTIFICATE FOR TOOL VALIDATION

Learning management system tool

For the Research Entitled As

PERCEIVED USEFULNESS AND EASE OF USE FOR LEARNING MANAGEMENT SYSTEM AT UNIVERSITY LEVEL: A DESCRIPTIVE SURVEY

By

Miss. Sumera

M.Phil Scholar, Department of Education, Faculty of Social Sciences

National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certify that the questionnaire adapted by the scholar towards her thesis has been assessed by me and find it that has been designed adequately to assess the usefulness and ease of use of learning management system.

It is considered that the research instrument, adapted by researcher for the perceived usefulness and ease of use for learning management system at university level is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name Dr. Jameela Ashra

Designation Assistant Profes

Institute NUML, Isl

Signature

Date 26/01/22

CERTIFICATE FOR TOOL VALIDATION

Learning management system tool

For the Research Entitled As

PERCEIVED USEFULNESS AND EASE OF USE FOR LEARNING MANAGEMENT SYSTEM AT UNIVERSITY LEVEL: A DESCRIPTIVE SURVEY

By

Miss. Sumera

M.Phil Scholar, Department of Education, Faculty of Social Sciences

National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certify that the questionnaire adapted by the scholar towards her thesis has been assessed by me and find it that has been designed adequately to assess the usefulness and ease of use of learning management system.

It is considered that the research instrument, adapted by researcher for the perceived usefulness and ease of use for learning management system at university level is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name Dr. Sh Tq

Dr. Sheikh Tariq Mehmood
Assistant Professor
Department of Education
International Islamic University
Islamabad

Designation AP

Institute NUML

Signature

Date

CERTIFICATE FOR TOOL VALIDATION

Learning management system tool

For the Research Entitled As

PERCEIVED USEFULNESS AND EASE OF USE FOR LEARNING MANAGEMENT SYSTEM AT UNIVERSITY LEVEL: A DESCRIPTIVE SURVEY

By

Miss. Sumera

M.Phil Scholar, Department of Education, Faculty of Social Sciences

National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certify that the questionnaire adopted by the scholary towards her thesis has been assessed by me and find it that has been designed adequately to assess the usefulness and ease of use of learning management system.

It is considered that the research instrument, adopted by researcher for the perceived usefulness and ease of use for learning management system at university level: A descriptive survey is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name_____

Designation_____

Institute_____

Signature_____

Date 21-01-22

CERTIFICATE FOR TOOL VALIDATION

Learning management system tool

For the Research Entitled As

PERCEIVED USEFULNESS AND EASE OF USE FOR LEARNING MANAGEMENT SYSTEM AT UNIVERSITY LEVEL: A DESCRIPTIVE SURVEY

By

Miss. Sumera

M.Phil Scholar, Department of Education, Faculty of Social Sciences

National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certify that the questionnaire adapted by the scholar towards her thesis has been assessed by me and find it that has been designed adequately to assess the usefulness and ease of use of learning management system.

It is considered that the research instrument, adapted by researcher for the perceived usefulness and ease of use for learning management system at university level is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name Dr. Azhar Mehmood

Designation Associate Prof

Institute IIUI

Signature

Date

Dr. Azhar Mahmood
Chairman, Department of Education
International Islamic University
Islamabad

CERTIFICATE FOR TOOL VALIDATION

Learning management system tool

For the Research Entitled As

PERCEIVED USEFULNESS AND EASE OF USE FOR LEARNING MANAGEMENT SYSTEM AT UNIVERSITY LEVEL: A DESCRIPTIVE SURVEY

By

Miss. Sumera

M.Phil Scholar, Department of Education, Faculty of Social Sciences

National University of Modern Languages (NUML), H-9, Islamabad, Pakistan

This is to certify that the questionnaire adapted by the scholar towards her thesis has been assessed by me and find it that has been designed adequately to assess the usefulness and ease of use of learning management system.

It is considered that the research instrument, adapted by researcher for the perceived usefulness and ease of use for learning management system at university level is according to the objectives of the research; assures adequate face and content validity according to the purpose of research. It can be used for data collection by the researcher with fair amount of confidence.

Name Dr. M. Munir Kayani

Designation Associate Prof.

Institute NUML

Signature

Date 01/02/2022

Appendix F

Path Results Diagram