CRANFIELD UNIVERSITY

YOUSEF AHMED Y ALDURAYWISH

A FRAMEWORK FOR THE DEVELOPMENT OF LEARNING MANAGEMENT SYSTEMS FOR HIGHER EDUCATION INSTITUTIONS IN THE KINGDOM OF SAUDI ARABIA

SCHOOL OF AEROSPACE, TRANSPORT AND MANUFACTURING (SATM)

Doctor of Philosophy
Academic Year: 2016 - 2020

Supervisor: Prof Konstantinos Salonitis
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ABSTRACT

This study focuses on a framework for the development of the Learning Management System (LMS) in the Kingdom of Saudi Arabia (KSA) higher education institutes (HEIs) from information systems (IS) perspective, using the Technology Acceptance Model (TAM) and Design Reality Gap (ITPOSMO) model.

The research methodology consists of six stages which adopts the paradigm of pragmatism and the research design of mixed-methods. A case study design is used to investigate the implementation of LMS in the Al-Imam Mohamed bin Saud Islamic University. The quantitative part was designed to investigate the attitude of users towards the usefulness of the LMS and to assess the acceptance level of LMS among university users. The qualitative part was designed to explore the gap between the proposed implementation of the LMS and reality. The survey received valid responses from 129 academic and 1548 student. A semi-structured interviews with 21 participants. The sample was achieved via a purposive sampling technique. The quantitative data was analysed using descriptive statistical analysis and correlation coefficient. The qualitative data were analysed using a thematic analysis approach.

The study identifies the barriers influencing effective LMS in KSA HEIs as 1) technology barriers (lack of IT infrastructure, incomplete functionalities and lack of integration); 2) human barriers (lack of knowledge of the importance of e-learning, lack of expertise and competencies); and 3) organisation barriers (organisational preparedness, unclear of requirements, lack of training, resistance and financial constraints).

The contribution of this research includes a new model derived from the ITPOSMO model and TAM to investigate LMS in the context of real circumstances, and the physical environment that exists in KSA HEIs. The research focus is more on meso level while encompassing first and third levels as reference for better understanding (Richter et al., 2009). The results lead to developing a framework for the development of LMS in KSA HEIs.

Keywords:

Information Systems, Learning Management System, Critical success factor, Key barriers, Stakeholders requirements, Technology Acceptance Model (TAM), Design Reality Gap (ITPOSMO) model, Interpretive Structural Modelling (ISM), a framework for the development of LMS, Kingdom of Saudi Arabia (KSA).

LIST OF PUBLICATIONS

- Alduraywish, Y., Xu, Y., & Salonitis, K. (2017b). State of the Art of Information Systems Failure Managements,. In ICMR (2017) Advances in Transdisciplinary Engineering, 6, pp. 509-514. (pp. 509–514). https://doi.org/10.3233/978-1-61499-792-4-509
- Alduraywish, Y., Xu, Y., & Salonitis, K. (2017a). Evaluating state of information systems failure in developing countries using ITPOSMO model,. In ICAC 2017 - 2017 23rd IEEE International Conference on Automation and Computing: Addressing Global Challenges through Automation and Computing, https://doi.org/10.1177/095269510101400105
- Alduraywish, Y., Salonitis, K. & John P. Critical Success Factors for Improving Learning Management Systems Diffusion in KSA HEIs. submitted for publication.
- Alduraywish, Y., Salonitis, K. & John P. A framework for the development of Learning Management Systems in KSA HEIs. submitted for publication.

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LIST OF ABBREVIATIONS

LMS	Learning Management System
HEIs	Higher Education Institutes
KSA	Kingdom of Saudi Arabia
IS	Information System
IT	Information Technology
TAM	Technology Acceptance Model
ITPOSMO	Design-Reality Gap Model
KPIs	Key Performance Indecators
ISM	Interpretive Structural Modeling
NCeDL	National Centre for e-learning and Distance Education
EMES	E-learning Management Electronic System
SNS	Social Networking Sites
ICT	Information Communication Technology
SEM	Sequence Equation Modelling
PU	Perceived Usefulness
PEOU	Perceived Ease to use
ATU	Attitudes Towards Using
VLEs	Virtual learning environments

1 INTRODUCTION

1.1 Introduction

This research aims to a framework for the development of learning management system (LMS) for higher education institutions (HEIs) in the context of the Kingdom of Saudi Arabia (KSA) from information systems (IS) perspective. This chapter begins by discussing the background and motivation of this research, the research aim and objectives, the research questions, and the research methods employed. Furthermore, the contributions of this research are introduced in this chapter. Finally, an outline of the research steps and thesis organisation are presented, along with a brief description of the contents of the remaining chapters.

1.2 Research Background and Motivation

HEIs seek to provide a suitable educational environment, within the framework of a country's education policy, in order to achieve a high quality of education outcomes, raise levels of research efficacy, support innovation and creativity, and develop students' skills and capabilities (Pyla, 2012). To these ends, HEIs are implementing IS to manage all learning functions through what are collectively referred to as *learning management system* (LMS) (Klobas and McGill, 2010; UNESCO, 2011). LMS is a framework that is considered the backbone for online learning and which manages learning processes, classrooms, tests, and assignments (Radif, 2016). LMS not only support both instructors and students; they also ensure the most efficient and effective interaction between them in areas including course material downloading and uploading, submission of reports and assignments, student evaluations, and the publishing of students' grades. The role of LMS in educational environments has been studied by Jamal and Shanaah (2011), who concluded that using an LMS not only facilitates learning activities but also helps learners to learn from their peers. LMS, therefore, helps HEIs in organising their learning processes and managing learning records etc.

Alebaikan and Troudi (2010) pointed out the capacity of universities in KSA is limited compared with the rapid growth of students applying for higher education; which is considered significant challenges that HEIs in KSA face. Therefore, The Saudi Ministry of Education has supported the use of IT for education activities among instructors and learners (Al-Nefaie, 2016). According to (Alshammari, 2015), KSA has announced officially the application of e-learning and distance learning, and to achieve these goals, leading towards the future has launched initiatives to establish infrastructure for higher education and e-learning education. However, most of the courses in HEIs are primarily taught in the classroom. One of the significant benefits of adopting LMS is that they help Saudi universities to deliver education to as many students as possible (Alahmari and Kyei-Blankson, 2016). Alghamdi and Bayaga (2016), mentioned that several universities in KSA have implemented various LMS platforms, such as Tadarus, WebCT, and Blackboard to facilitate educational activates. Despite these successes, LMS implementation in HEIs faces many issues, for example, compatibility of the system with the organisational environment and user adaptability. Since these types of projects differ from other engineering projects in terms of their abstract constraints, hidden complexity, and the goal of changing existing business processes, their development and implementation remain threatened. Moreover, as yet, few academics use the LMS for most of their educational activities, whereas a great many do not use an LMS, irrespective of whether their institutions provide them with such services (Alharbi & Drew, 2014; Alghamdi and Bayaga, 2016). According to Richter et al. (2009), E-learning implementation can be classified into three levels includes the following:

I. Macro-level (system and theories of distance education, institutional cross-cultural aspects, transfer of knowledge etc.);
II. Meso level (management organisation and technology, Learner Support system etc.) and;
III. Micro-level (training and knowledge in distance education and tutorials plans and design etc.).

This study is focusing on IS perspective of LMS which is needed by HEIs, academics and students alike for better-facilitating education activities. These are

included as key success factors for the implementation of LMS and not specifically in micro-level activities (learning or teaching of a specific subject matter only) (Richter et al., 2009).

In developing countries in general, the ratio of successful IS projects is very noticeably low despite high levels of resource allocation (Al-Ahmad *et al.*, 2009; Alsaeed and Adams, 2016; Afolayan, 2016). According to several scholars (Hoque et al., 2015; Alharbi and Drew, 2014; Alshammari et al., 2016) a significant gap is apparent between the purpose of the implementation of LMS and the reality from the users' perspective, and this gap should be narrowed to improve and facilitate learning activities. However, it is also known that HEI users' perspectives vary according to different factors, such as level of education, knowledge, society, culture, age, and gender. It is no simple task to meet users' expectations through one single set of provisions aimed at suiting all types of users. Therefore, the implementation of these systems can be improved and enhanced to narrow the above-mentioned implementation gap and improve user attitudes towards LMS.

Furthermore, in situations where social distancing is required, such as in the spread of coronavirus (COVID-19) pandemic, the technological innovation of LMS has been implemented in higher education institutes (HEIs), which has replaced the traditional learning and teaching pedagogies (Aldiab *et al.*, 2019). Its successful implementation can benefit students by allowing them to easily view content, turn-in work, and interact and collaborate socially on online forums. Similarly, academics can easily share learning and teaching content, assign work to students and post grades, which in turn facilitates a continued flow of education (Alghamdi and Bayaga, 2016).

In light of the brief facts presented above (discussed at length in chapter 2) and the increasing number of learners at HEIs, the adoption and implementation of appropriate educational software has become essential in modern HEIs. Moreover, learners are currently more open than ever to technology and information resources (Al-Nefaie, 2016). Consequently, using LMS allows instructors and learners to manage their activities in an online environment.

Nevertheless, as revealed by the literature review, very few reports or publications have tried to focus on identifying LMS-related issues or tried to focus on facilitating the implementation of LMS in HEIs (Hoque et al., 2015; Bousbahi and Alrazgan, 2015; Alshardan et al., 2016).

Accordingly, the research reported in this thesis aims to a framework for the development of LMS in HEIs and stimulate more positive attitudes in users towards LMS in the KSA. The research focus is more on meso level while encompassing first and third levels as reference for better understanding (Richter et al., 2009). Also, it is focusing on information systems (IS) perspective of LMS which is needed by institutions, academics and students alike for better facilitating each stakeholder, as each stakeholder is attracted by acceptance of access to information, ease facilities and usefulness of functions in LMS. These are included as key success factors for the implementation of LMS and not specifically in micro-level activities (learning or teaching of a specific subject matter only).

1.3 Research Aim and objectives

This study aims to a framework for the development of learning management system for higher education institutions in the Kingdom of Saudi Arabia.
The specific objectives of this study are:

- To identify the requirements and needs for LMS in HEIs, focusing on defining and capturing the requirements and needs for LMS implementation in HEIs.
- To investigate the users' attitude towards the implementation of LMS using the Technology Acceptance Model (TAM). Analyse the factors that influence users' decision about how and how they will use LMS.
- To identify and analyse the critical barriers for the implementation of LMS using design-reality gap (ITPOSMO) model through Gathering and reviewing the literature and documents that covered causes and factors that responsible for failure in LMS.

- To identify the Critical Success Factors (CSFs) for facilitating the effective implementation of LMS in HEIs using interpretive structural modelling (ISM) approach.
- To develop a framework for the LMS, which help HEIs to bridge the implementation gap of LMS
- To evaluate the proposed framework for development of LMS.

1.4 Research Questions

The research question was formulated as "What are the main characteristics of a framework that can be included to improve LMS in KSA HEIs?"

The research question can be divided into the following sub-questions:

- What are the requirements for HEIs in KSA to implement LMS in their institutions?
- What is the gauge of technology acceptance exhibited by the HEIs in terms of attitude to the current use of LMS among institution users?
- How have the barriers in KSA impacted on the successful implementation of LMS in HEIs?

1.5 Contribution to Knowledge

The key source of the originality of this research results from an addressing clear knowledge gap. This research presented a framework for the development of learning management system for higher education institutions in the Kingdom of Saudi Arabia. The study would be useful to many institutions which have resources but do not know how to properly implement LMS, especially in the aftermath of COVID 19 pandemic as more institutions would convert to online education and can plan their success by using the framework developed and evaluated in this research study.

Contribution to the body of knowledge:

This research has presented a framework for the development of LMS as a central part of their online education strategy. A sizeable part of the work done has been on the identification of the stakeholders, their focus activities and

professional requirements. Without which, the implementation of LMS may not be successful or may cause implementation issues delaying the use of appropriate technologies or training. The implementation of LMS using the Technology Acceptance Model (TAM) to determine the extent of technology acceptance among users. The critical barriers and relationships among success/failure factors were also determined for the said focused area.

Furthermore, the use of the knowledge presented in previous research studies was made to derive a present framework to avoid known reasons why different LMS projects become successful or result in failure. The literature has a very few studies have been undertaken in the Kingdom of Saudi Arabia (KSA) on the subject of this study. The implementation gaps were scientifically explored in the context of; real circumstances, experiences shared in literature, sampling survey and the physical environment.

Contribution to practitioners:

LMS implementation practitioners in HEIs can benefit from the findings of this research. Implementation of the framework will contribute significantly to achieve a high quality of education outcomes, develop users skills and capabilities. Additionally, increased interaction of learners with instructors and institutional officials may provide in better learning and early identification of initial issues in implementation. The flexibility of time and place, as well as the ease of access to a huge amount of information, would be a great advantage, especially in the present situation of world pandemic. It will, therefore, better-facilitating education activities. More details will be presented in Sections 7.4 and 7.5.

1.6 Research Methods

The current study is using a combination of qualitative and quantitative research approaches for collecting and analysing empirical data that could lead to sound conclusions. The mixed methods are more relevant to the subject matter of the study, and the goal it seeks to reach. That because mixed methods are useful in understanding contradictions between quantitative results and qualitative

findings. Moreover, it makes the explanations reached deeper and closer to accuracy and adequacy.

There were two different questionnaires; the first questionnaire was for academics, whereas another questionnaire was for students. A semi-structured set of interview questions have been developed based on the research aim, objectives and questions. The researcher conducted several interviews with a selected sample of employees of Al-Imam Mohamed bin Saud Islamic University, who are responsible for LMS implementation in Colleges, Deanship of Information Technology and Deanship of E-Learning. Chapter three provides a detailed discussion of data collection and analysis.

1.7 Research Steps

As shown in Figure 1.1, in Step 1, practical measures were taken to confirm the research background, research aim and objectives, and research questions. The state of the art of information systems failure management was reported in the first publication (Alduraywish et al., 2017b). Step 2 involved defining and capturing the requirements for the proposed implementation of an LMS in HEIs via an extensive literature review. Then, in Step 3, several types of IS research frameworks were employed to assess the implementation of the LMS, which were reported on in the second publication (Alduraywish et al., 2017a). A semi-structured set of interview questions and questionnaires were developed based on the research aim, objectives, and questions. Data were collected and analysed using descriptive analysis, correlation coefficients, and thematic analysis. In Step 4, the initial framework was created. In Step 5, a university requirements matrix was established, which was reported together with the initial conceptual framework in the third publication. In addition, key barriers, success factors, and the relation among these success factors derived using an ISM approach were reported in the fourth publication. That led to the development of a framework to facilitate the implementation of an LMS in HEIs and to enhance positive attitudes towards using the LMS. The Delphi method was employed to evaluate the final framework. Finally, in Step 6, conclusions were drawn from the findings of this research and recommendations for future research proposed.

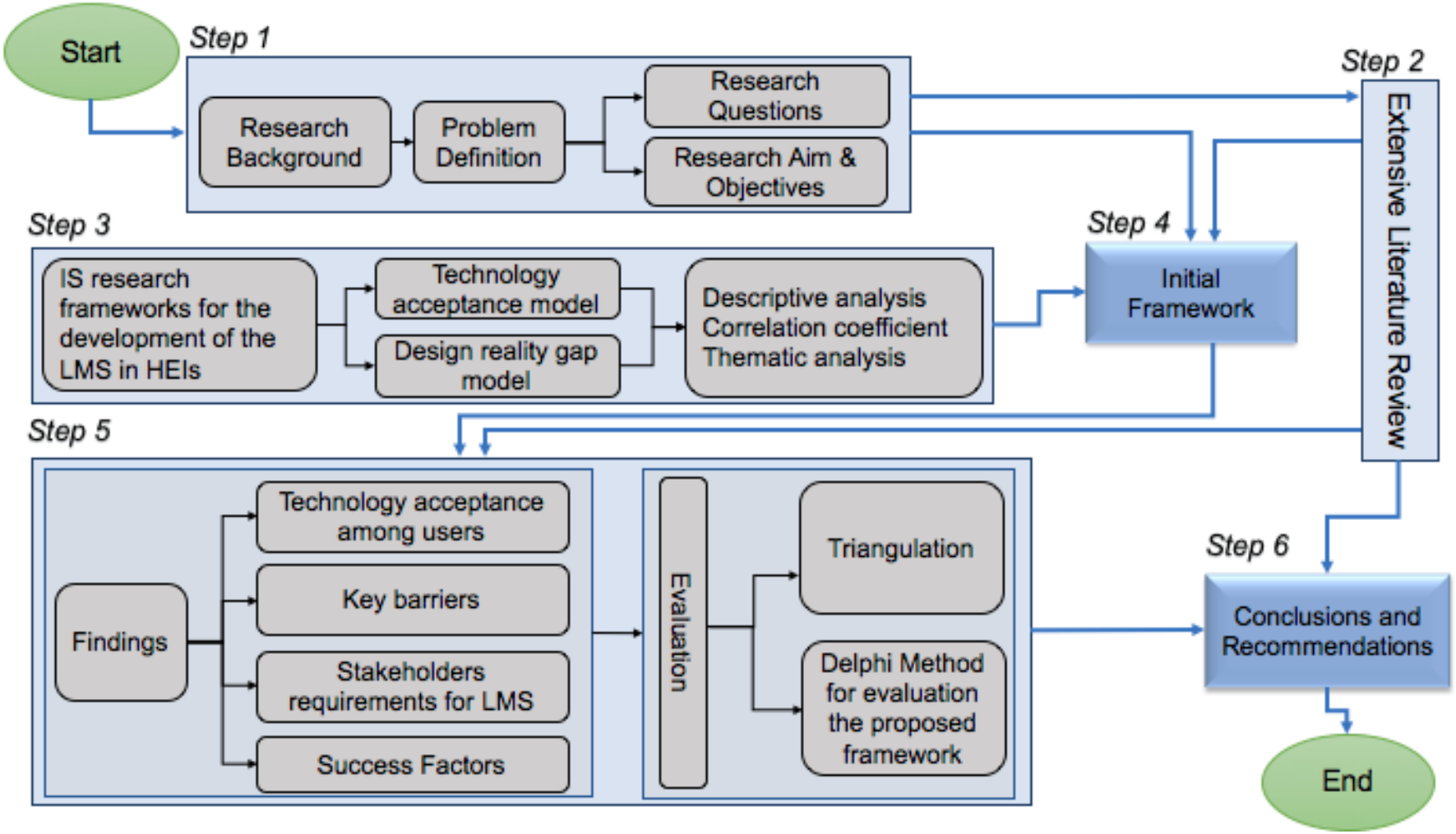

Figure 1.1: Research design steps (developed by author)

1.8 Thesis organisation

This thesis is comprised of seven chapters. The first chapter is the introduction, in which the research motivation, aim, objectives, and research questions are declared. Chapter 2 reviews and highlights aspects of the literature on LMS in HEIs. An overview of e-learning and the implementation of LMS in HEIs presented, focusing on defining needs and requirements. In addition, a survey of current technologies adopted to improve education activities is presented. The success factors responsible for increasing users' acceptance of LMS in HEIs are examined in depth, along with critical barriers to acceptance. Furthermore, an IS research framework is employed to assess LMS in HEIs, and a comparison between the most popular IS research frameworks is conducted. The TAM is adopted to investigate the attitudes of users towards LMS. The ITPOSMO model is used to investigate the purpose implementation and the reality of LMS. Further discussion of the conceptual framework development for LMS in HEIs is provided.

Chapter 3 highlights the research methodology and techniques used to collect empirical data to ensure the possibility of obtaining sound conclusions. This chapter also presents the research philosophy, research design, case study design, data collection instruments and data analysis techniques of this study.

The focus of Chapter 4 is a discussion of the initial framework development for LMS. Chapter 5 presents the field study and data analysis and includes the following sections: 1) analysis of the academic survey; 2) analysis of the student survey; 3) discussion of the survey data; 4) interview results, and 5) analysis and discussion of the interview data to directly answer the research questions.

Chapter 6 provides a detailed discussion of the final framework for the development of LMS for HEIs. The evaluation stage for the proposed framework is mentioned in detail as well, and aspects of LMS implementation are presented. Chapter 7 presents the overall findings and conclusions drawn based on the analysis. Finally, recommendations for further research are offered.

1.9 Summary

The research background and motivation is presented in this chapter, along with research aims and objectives. The study intends to fill the gaps explored in the implementation of LMS in the context of real circumstances, and physical environment exists in KSA. The research questions and methodological approach adopted in the current research was presented. A brief outline of the research steps and thesis organisation were also presented.

2 LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter is to present a comprehensive and critical review of the literature that informs the research questions. As explained in the introductory chapter, the aim of this study is to a framework development for LMS in HEIs in the context of the KSA. In order to help to clarify the aim of the thesis in relation to previous work in the area, a systematic literature review has been conducted in this chapter. The search methodology adopted is a replicable method of combining existing published works related to LMS implementation in HEIs. According to Creswell (2014), the researcher can conduct a critical assessment of information from a literature review vis-a-vis the research questions identified. The review begins with an overview of information systems in higher education and of e-learning; then, the focus shifts to specific details related to LMS. After that, LMS implementation specifically among KSA HEIs is investigated.

Two research objectives have been established to explore users' attitudes towards the implementation of LMS using the TAM. According to Davis et al. (1989), the TAM provides a useful theoretical basis to explain users' attitudes and behaviour towards using IT. For this reason, this study selected the TAM to investigate the users' attitude towards the implementation of LMS, to understand how users come to accept and use an LMS, and to analyse the factors that influence users' decisions regarding how and when to use an LMS.

Further, the third research objective is focused on identifying and analysing the key barriers that currently exist to the implementation of the LMS. The design-reality gap model (the ITPOSMO model) is considered useful for identifying and analysing the key barriers to the implementation of LMS that currently exist (Heeks, 2003). ITPOSMO model illustrates the gap between reality and design of LMS implementation in seven perspectives: information, technology, process, objectives and values, staff and skills, management system and structure, and other. The gap level depends on difference exist between the design process and

reality. This is a promising framework to help fill the current implementation gap of the LMS in HEIs.

2.2 Literature Search

This section presents the criteria of inclusion and exclusion of studies that were used in the current study. In the literature search, academic journals and online peer reviewed journals were included, most of which were recent; however, a few articles published earlier were considered. Most of the articles involved in this search were published between 2010 to 2020, whereas the earlier articles were published between 2000 to 2009. The reason for including early work on how to implement LMS in HEIs is to discuss older sources and then link them to the most current sources. The extensive literature search was carried out using the following sources: Science Direct, Google Scholar, Scopus and Proquest. The following keywords were used in the search: *information systems in the higher education sector, information systems failure, learning management systems, e-learning, barriers factors for LMS adoption, success factors for LMS adoption, information systems research frameworks, technology acceptance among higher education and design reality gap*. The literature search was limited to English and Arabic languages and information systems management subjects.

2.3 Defining of Information Systems

Bourgeois (2014) defined Information Systems as a combination between computer software, hardware and communication technology that developed, designed and implemented to handle organisation information related to core and supportive organisation processes and policies.

There are two different ways of describing information systems which are the components that make up an information system and the role that those components play in an organisation (Bourgeois, 2014).

The first component of information systems is Hardware, it is a tangible part of computer, which are input, output and storage devices. Software is intangible part of computer, includes operating systems and applications that have instructions which operate and control the hardware. The third component is Data, a collection

of facts and information as well as you cannot touch it, For instance, your business address, your home address and your mobile number (Bourgeois, 2014). Network component is to enable electronic communication by Connect computers and equipment (software and hardware). People who are the major element in computer-based information systems include technical support (the front-line help-desk), programmers, systems analysts and chief information officer (CIO). Process which includes methods, series of steps, policies, strategies and rules to achieve organisational goal and outcome. Nowadays, the integration between information systems and organisation processes appear to be more productive and best control. However, utilising technology to automate processes is not sufficient alone to improve the efficiency of information systems. To achieve the ultimate goal of organisations, all actors include staff, vendor and consumers should manage and improve processes by using technology (Pereira and e Sá, 2017).

In developing countries, an information system (IS) project management is a critical issue for several HEIs due to its high failure rate (Al-Ahmad et al., 2009; Afolayan, 2016). The projects which are completed on agreed time, within budget and according to organisational objectives are called success projects (Kaur et al., 2013). Abdelsalam et al., 2010 elaborate a number of failure types that can be summarised as:

- Project Failure: Information systems projects are abandoned or do not meet organisation requirements and goals.
- System failure: Information systems projects do not perform to stakeholders' expectations or abort in specific time during projects execution.
- User failure: Information systems projects do not meet user expectation, staff have shortage training, or some issues related to new systems complexity.

In the public sector, information systems use to improve people activities in the modern way with efficiency and effectiveness. Therefore, information systems play an essential role in the education sector, which make educational process

easier, increase operational efficiency and improving quality through all procedures and functions to create modern and dynamic ways in all education levels (Sarvi and Pillay, 2015). That involves not only e-portal and emails or publishing data via internet. That means a list of structures and functions mixed in dynamic and professional ways. Thus, information systems projects are implemented in different countries in order to facilities organisation services by using new technologies (Rugchatjaroen, 2015).

At present, the Kingdom of Saudi Arabia (KSA) has strong ICT facilities and applications (Muzafar and Jhanjhi, 2019). The plan for successful information systems (IS) delivery in educational environments is seen as a way to overcome this challenge through the promotion of ICT literacy amongst academics, learners, HEIs and personal of the Ministry of Education. Therefore, HEIs should improve their educational information systems (IS) in order to tap into all the benefits of new technology in their various colleges to avoid failure in their implementation.

2.4 Defining Learning Management System and E-Learning

In recent times, IT has been looked to as a solution to the cost and quality problems that are commonly faced by universities. Numerous educational processes are supported by the LMS, which is a full-scale learning platform (Kats, 2013). The LMS has proved to be one of the most prevalent components of e-learning environments (Elkaseh et al., 2015). LMS is an educational system based on the notion of e-learning. It is an online application that is intended to deal with learning content, academic appraisals and reports of learning progress, and study exercises (Srichanyachon, 2014). Sejzi and Aris (2013) noted that an LMS is "*software aimed at automating the administration of training events. It functions as a tool in managing the log-in of registered users, recording data, managing course catalogues, and providing reports.*" Different learning formats have been created to empower students to take online courses, sometimes as a major component of conventional educational programs and other times to meet other institutional requirements. To keep pace with such changes, LMS can assist students with accessing learning data by facilitating the transfer of assignments and downloading of notes, dynamic connections among students and teachers, cooperation between students, communications among students and learning instruments, sharing of information, and the administration of web tests and tests (Kasim and Khalid, 2016). The potential benefits of LMS are easy to understand: they are extremely simple to figure out how to work, possess different instructional and authoritative capacities, help students to finish assignments rapidly, facilitate the transfer of different sorts of documents, permit students who have committed an error when utilising the framework to recoup effectively and rapidly, support messages which propose how to address issues, empower client access to data and exercises at any time and place, and enable clients to communicate electronically with different students in the course and the facilitator (Alahmari and Kyei-Blankson, 2016).

The increased utilisation of e-learning has led to the diversification of the taxonomies, with the emergence of alternative software systems. Virtual learning environments (VLEs) have been introduced into the market to broaden the diversity of functions that can be deployed under the technology umbrella within

learning institutions (Becnel, 2019). VLEs are defined as virtual spaces that integrate technology and content to facilitate e-learning training. The primary difference between LMS and VLEs is dependent on how they are utilised within the learning environment (Brennan, 2020). Even though they have similar features (such as performance reporting systems, forums, quiz authoring modules) and can be used interchangeably, VLEs are designed under the constructivist philosophies (Alves et al., 2017). As a result, they are best suited for collaborative learning where extended discussions are carried out. Consequently, VLEs are designed to inform and involve learners to enable them to collaborate in the learning process.

On the contrary, LMS, which are established under behaviourist philosophies, are designed for administering, documenting, tracking, reporting and delivering educational and training courses, as well as development programs (Auer and Tsiatsos, 2019). As a precursor to VLE, LMS, which was introduced in the 1990s, are oriented to managing the learning from the perspective of the instructor (Boboc and Koç, 2019). This explains why their utility was achieved before the digitisation of mainstream learning. VLEs on the other hand are systems for delivering learning materials to learners, driven by the Web 2.0 platforms. The software enables the development, uploading and sharing of content between instructors and teachers (Brennan, 2020). In addition to the differences in chronology, VLEs and LMS differ in the fact that VLEs are more advanced and allow for interactive learning. The availability of facilities for real-time interaction and communication between instructors and teachers.

Features of the LMS can be mainly categorised into four separate systems, as delineated in Figure 2.1 below. They include course management systems, exam management systems, assessment management systems, and collaborative learning systems.

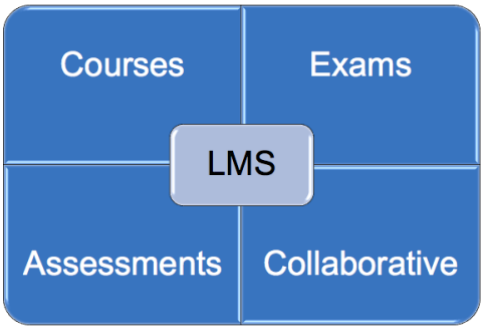

Figure 2.1: The main functionalities of the LMS (El-Ghareeb, 2009**)**

The LMS, therefore, is a combination of four sub-systems, and each system is comprised of specific functionalities via specific tools. Figure 2.2 depicts the foremost common options that ought to be offered in each of these four sub-systems.

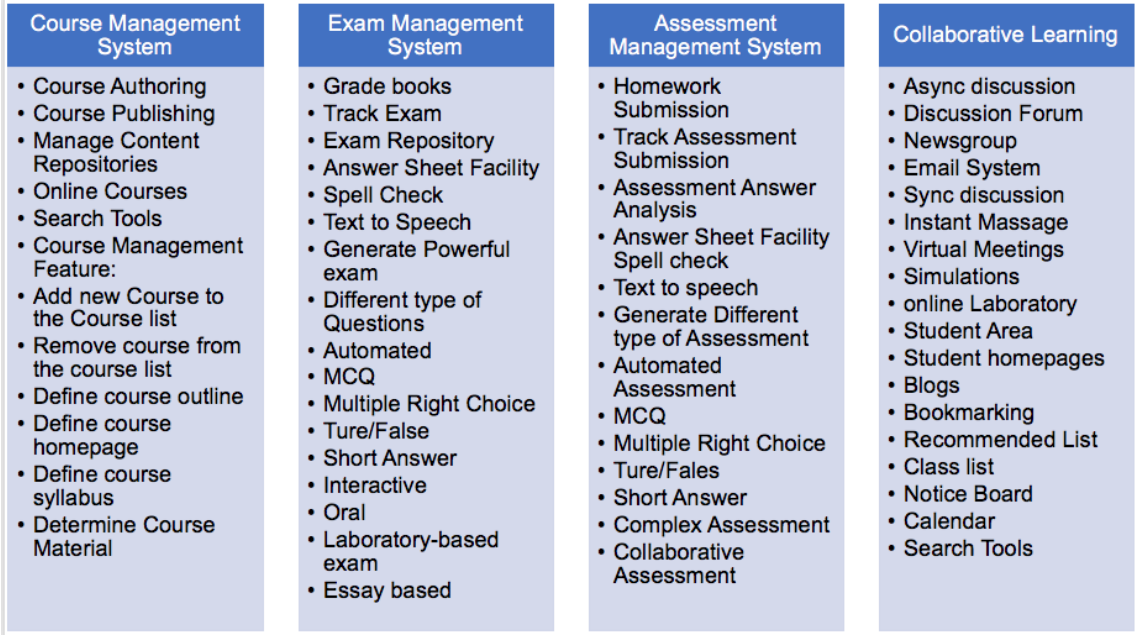

Figure 2.2: Feature of LMS sub-systems (El-Ghareeb, 2009**)**

Most of the studies relevant to LMS have focused upon factors affecting their use and implementation in developing countries. First and foremost, researchers found that using the LMS in blended learning had a highly positive effect on student satisfaction with the learning processes as most of them confirmed that learning activities were interesting because of the technology integration in a large class (Ali and Meilina, 2018). Similarly, the adoption of e-learning systems

garnered a high level of teacher satisfaction due to benefits such as easy delivery of content, facilitation of student learning, and encouragement of peer collaboration (Alahmari and Kyei-Blankson, 2016).

On the other hand, e-learning 'is a computer based educational tool or system that enables you to learn anywhere and at any time' (Sarvi and Pillay, 2015). Also, they argue, in the connected world, e-learning tools normally use internet applications to deliver all learning materials and manage their functions and processes. In one of the recent studies done by Sangrà et al. (2012), it was figured out that e-learning can be defined based on four categories: 1) technology-driven 2) delivery-system-oriented, 3) communication-oriented, and 4) educational-paradigm oriented. Technology driven definitions focuses upon the technological aspects of the learning with an emphasis on the use of technology for academic purposes. However, delivery-system based definitions focuses upon the accessibility and delivery of the academic services and on the other side communication-oriented definitions utilise communication, interaction and coordination as the key elements of e-learning. The paradigm under which the definition of the e-learning is relevant to the current study is the educational paradigm. It focuses on the use of e learning to bring improvement to the contemporary educational facilities. For example: (Alonso et al., 2005) defined e-learning using educational oriented paradigm.

> "*E-learning is the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services, as well as remote exchange and collaboration"*

This definition may be considered as an efficient and relevant definition as it not only considers the educational aspects but also on the technological, services and delivery aspects of the e learning. The core part of this definition is to use technology in order to improve the existing learning and academic environment.

There are several advantages to the use of e-learning within HEIs. E-learning motivates students to be in contact with others, which helps to increase interaction in their courses. Learning is maintained by the e-learning process and

communication is also made easy through the e-learning system. E-learning brings a broad scenario for interaction among instructors and learners during the delivery of the curriculum (Wagner et al., 2008). Flexibility of time and place has been provided by the adoption of the e-learning process in such higher education institutes. The effectiveness of knowledge and experience is being enhanced by e-learning with the ease of access to a huge amount of information (Smedley, 2010). The content and study sessions can be changed easily using the e-learning system. Once the materials are placed in the system, they are able to be used and can be changed easily whenever needed. Moreover, e-learning lets learners who do not understand the content with the first presentation review it as many times as needed in several different formats. It also enhances the ability of the learners to gain access to the latest updated content whenever they want (Guragain, 2016).

The challenges in the implementation of the e learning in developing countries has led to an increased number of research works. Many studies addressing the impact of e-learning has been carried out in United Arab Emirates, Kuwait and KSA. Majority of these studies concur with the notion that e-learning system had high level of academics satisfaction as well as including several benefits such as easy delivering of content, facilitating student learning, and encouraging peer collaboration (Alahmari and Kyei-Blankson, 2016). Studies have also addressed the technological aspects for example, in another study it was founded that the e-learning platforms HEIs were not supporting certain facilities such as audio learning, video learning, instant messaging and engaging quizzes which are very important features for successful e-learning (Kituyi and Tusubira, 2013). Conclusively, in implementation of e learning human, technological and organisational factors have been widely studied and understood.

2.5 Need for Learning Management System in Higher Education Institutes

As mentioned, HEIs seek to provide a suitable educational environment within the framework of each country's education policy in order to achieve high-quality education outcomes, enhance research efficacy, support innovation and

creativity, and develop students' skills and capabilities (Pyla, 2012). According to Ayas (2006), the new educational vision is to make learning accessible to all; however, this vision cannot be realised through the use of traditional methods of learning. Therefore, the adoption of new technology in teaching and learning methods has steadily increased (Ayas, 2006). Traditional methods of education are often not very interesting to contemporary students, especially when there is little cooperation, interaction and student-centred environment (Ayres et al., 2013). In the twentieth century, students prefer to have a more personalised environment for learning, as from the beginning students have a great deal of room and autonomy to learn, due to the availability of gadgets, video links, online articles and other media modes (Dabbagh and Kitsantas, 2012). Yuksel (2010), proposed that the characteristics of education and educational institutions of the third millennium require autonomy, collaboration, flexibility, inclusiveness, authenticity and relevance. Several changes have occurred in the 21st century that make e-learning a more viable and tenable learning environment, either on its own or as a complementary or supplementary platform to the traditional learning environment. First, the improvement in digital systems and the infrastructure have provided HEIs with a diversity of rationales to adopt LMS.

Second, the globalisation of HEI has led to increased mobility of learners and instructors. The increased mobility necessitates the use of digital communication systems to enable learners and instructors to remain connected, for academic and other purposes (Raza *et al.*, 2020). The LMS enable the learners and instructors to transform the education process into a continuous process, one that is not affected by time or distance (Gratz and Looney, 2020). However, LMS is still unviable supplements to all the dimensions of traditional teaching and learning process. This is evident from HEIs, where the specialised approach to teaching, coupled with the need for practical learning makes it necessary for instructors and learners to be in physical contact (Dash, 2019). Despite the multiplicity of measures to create teaching environments that are favourable for all the needs of the learners as well as the expectations of the instructors, LMS still rely on some elements of traditional learning environments. Third, the disruption caused by the Covid19 pandemic presented a perfect storm for the

rapid adoption of LMS as a complement and supplement to the traditional learning environments (Raza *et al.*, 2020). LMS offers learning institutions the ability to propagate learning even during national and regional lockdowns, which are part of the measures to control the spread of the virus (Basilaia, 2020). The adoption of LMS within the digital learning environments has enabled HEIs to carry out most of the learning activities that were ongoing before the pandemic, thus reducing the adverse effects of the lockdown (Kit Ng *et al.*, 2020). This is evident for both international and domestic students in HEIs, who face travel restrictions due to domestic and international lockdowns. The utility of the LMSs span across different functions, depending on the type of learning activities involved in the particular specialisation under HEI. In a study focusing on learning biochemistry, (Dash, 2020) indicated that better access to learning facilities is integral in the outcomes. However, learning is only restricted to the theoretical aspects of the learning, with the need for physical contact during practical skills. The utility of LMS is also found to differ across genders. Shahzad *et al.*, (2020) found that within HEIs, the satisfaction of the users from e-learning platforms (LMS) is dependent on the quality of information and the system, while among female learners the level of satisfaction is dependent on the quality of the e-services and the quality of information on the platform. The difference implies that instructors are faced with an increasing need to customise the LMS platforms to mirror the needs of the learners based on their gender. Essentially, this implied that most of the institutions that adopted LMS in the recent past have done so as a necessity, rather than as a strategy (Joshi et al., 2020).

Despite the challenges associated with HEIs, most institutions have found it imperative to adopt LMS. Emergent studies reveal that there are challenges that HEIs face in fully implementing the programs, and achieving optimal value to the users. Gratz and Looney found that faculty members displayed resistance to the new technologies because the technologies did not fit into their expectations (Gratz and Looney, 2020). The U.S. Department of Education developed a set of standards to help higher education institutions shift from traditional learning to e-learning (Olson *et al.*, 2011) (see Table 2.1). Another aspect of the new educational approach is to allow the learner to play a greater role in the education

process. In this approach, the learners use IT to search for information, prepare for lessons, and do their homework.

Table 2.1: Traditional and new learning environments (Olson et al., 2011**)**

Traditional Learning Environments	New Learning Environments
➢ Teacher centered instruction ➢ Single sense stimulation ➢ Single path progression ➢ Single media	➢ Student centered instruction ➢ Multisensory stimulation ➢ Multipath progression ➢ Multimedia
➢ Isolated work ➢ Information delivery ➢ Passive learning ➢ Factual, knowledge-based ➢ Reactive response ➢ Isolated, artificial context	➢ Collaborative work ➢ Information Exchange ➢ Active/exploratory/inquiry based learning ➢ Critical thinking and informed decisions ➢ Proactive / planned action ➢ Authentic, real-world context

Therefore, the utilisation of LMS has been widely reported across universities, with more than 90% reported as utilising LMS. For example, most colleges and schools in the United States have embraced LMS to facilitate educator training exercises and study learning forms. One of the most significant highlights of LMS is that they furnish a domain for teaching and learning without the limitations of time or resources (Epping, 2010). Since the expansion of Internet availability and use, the LMS idea has been extensively applied at different HEIs around the globe. LMS enables teachers and students to talk about the course content by presenting ideas and reflecting on them with one another, allows teachers to keep up with students' learning tracks, and facilitates the overseeing of learning exercises in the online domain (Falvo and Johnson, 2007).

LMS plays a diverse role in facilitating learning activities as they encourage collective learning and knowledge-sharing with a special focus on making course materials and ideas accessible to everyone (Kasim and Khalid, 2016). Similarly, they provide a single place for all course materials to help in organising the

learning process (Kulshrestha and Kant, 2013). Additionally, LMS facilitate online interaction and discussion activities, thereby assisting in the construction of new meaning. Studies have discovered that students in Arabian regions prefer such roles and dimensions of LMS where they allow for the sharing of ideas and course materials (Jamal and Shanaah, 2011).

2.6 Current Technologies in Learning Management System Integration

Contemporary web-based LMS primarily addresses the accessibility of education with an emphasis to increase the autonomy and flexibility inculcated in the learning environment. Many HEIs situated in developed and underdeveloped countries have integrated LMS in their learning environment. It provides a consolidated online learning environment that can be adapted and integrated into the higher education institutions with the aid of learners, teachers and institutions. However, in the current dynamics and changing world, the integration of novel technologies is required, to make it more user-friendly and flexible. Literature has suggested that innovations and technologies that promote interactive and cooperative environment are the key elements that have to be focused (Septiani et al., 2017). Some researchers have proposed that current integration in LMS requires the way forward from moving tradition of learning management towards social learning (Alsaif et al., 2019).

Social Networking Sites (SNS) are getting popularity day by day. The accessibility of the internet and SNS has been reached in remote and low resource areas as well. Therefore, the integration of social media tools where appropriate has been recommended by many people acquainted with e-learning. The primary function of the LMS is to deliver subject content to the students; students are mainly required to put their attention and cognitive resources on the subject matter. However, at the same time, the research suggests that social media usage can divert attention from study material to other things (Friedman and Friedman, 2011). However, it surely does not prove that the LMS has not the functionality or interaction element. As discussed previously, LMS need to be student-centred,

permitting the students to exercise more control over their learning to improve autonomy.

The best way of doing this is by integrating Web 2.0 tools and SNS with LMS. Most of the LMS has the provision of Web 2.0 applications. Web 2.0 technologies are often embedded into SNS sites as well. In this regard, educators are findings their way forward to utilise social media tools in learning, as they are an integral part of students' daily life. It will definitely help to create a more comfortable, more efficient and flexible learning environment for students. Of note, SNS and LMS have many other characteristics in common; for example, most of the time, users are producing their own solutions to eliminate the missing elements. It suggests a strong push towards developers and technologists to integrate SNS into LMS (Pilli, 2014). Studies have confirmed that using SNS like Facebook as an ancillary to course material can enhance the academic achievement among students due to their interaction on the social media site group with their peers, content and teacher (Jones and Bogle, 2017).

2.7 Learning Management System in KSA

Learning management system (LMS) is an ICT tool which was introduced among HEIs two decades ago. It is virtual learning approach that promotes learning technologically by providing quality higher education (Chaubey and Bhattacharya, 2015).

In Kingdom of Saudi Arabia (KSA), the Ministry of Higher Education established the National Centre for e-learning and Distance Education (NCeDL) in 2006. Its purpose was based on offering online learning development in higher education across the country by collaborating with Multimedia Technology Enhancement Operations (METEOR) and the Open University of Malaysia (Alshammari, 2015). Learning Management System (LMS), also termed as Jusur, emerged as a key project of NCeDL, which was designed in order to ensure better management of the online learning process across higher education institutes (HEIs) in KSA. LMS helps teachers in terms of scheduling courses, tracking progress of students, undertaking assessments, providing course-related materials, and communicating with students (Alsmadi, 2020). Despite the fact that academics in

higher education are supported and trained by NCeDL so they can better use LMS, there exists insufficient usage of LMS across HEIs in the country. Nonetheless, few HEIs have started to commercialise and use LMS independently by introducing Blackboard (Alenezi, 2018).

LMS was firstly introduced in 2007 in the King Abdulaziz University in KSA. LMS was applied in the university in the form an E-learning Management Electronic System (EMES). It aimed towards managing the online learning process so that the academic staff could interact more with students (Binyamin et al., 2017). Furthermore, an Arabic LMS known as Tadarus was introduced by Al-Imam Muhammad Ibn Saud Islamic University. The main purposes of the Tadarus LMS included offering support to other languages besides Arabic, and offering distance program to both non-Saudi and Saudi students. At present, distance learning programs are being used by both universities for offering the bachelor's degree (Algahtani, 2012). Besides these two universities which offer LMS on a commercial level, there are several other HEIs that use Open Source LMS such as Moodle. These universities include the Taibah University, the Arab Open University, and the University of Tabuk (Alharbi, 2013).

Furthermore, a study by Aldiab *et al.* (2019) showed that the most commonly used LMS in KSA HEIs is the Blackboard LMS. Its key functions range from managing course content, discussion board, conducting virtual classes, to using collaboration tools including email, wiki, blogs and podcasts. This can be supported with findings of Binyamin et al., (2017) who showed that Blackboard LMS is most commonly used in KSA since it first penetrated the market of online learning and teaching technology and is easily available. Another study by Alghamdi and Bayaga (2016) revealed that a rising trend has been observed related to the use of ICT innovations such as LMS among KSA HEIs. It also found that implementation of LMS depends on two main factors, including the rate of success of the program and university type. Furthermore, the study showed that LMS is adopted and applied fast in science courses in contrast to art and social science courses. Finally, it anticipated that in the near future, LMS will be widely

applied in doctoral and master degrees as compared to certifications, bachelor degrees and diplomas.

Online learning approach, such as LMS supports learners in two ways, namely synchronous and asynchronous learning (Chaubey and Bhattacharya, 2015). The synchronous learning is feedback friendly, collaborative, and takes place in real time. It is conducted through instant messaging, live webinars and online classrooms. On the other hand, asynchronous learning is a learner-based approach in which students can complete courses irrespective of location and time limits. It is conducted through email, pre-recorded videos, online courses, blogs, and discussion boards (Kasim and Khalid, 2016). The synchronous learning is favoured for its key features, such as rapid feedback, high interaction, and instant answering to learners' queries. Yet, it is criticised for the existence of a strict schedule, varying quality based on instructor, and lack of attention given to learners. On the other hand, asynchronous learning is beneficial in terms of being cost-effective and flexible. However, its main drawback includes limited contact between teacher and learner (Pyla, 2012).

Overall, the aforementioned literature review regarding the implementation of LMS in KSA has shown that various HEIs such as colleges and universities apply LMS in order to meet the rising demand of students on the national level. The implementation of various types of LMS in KSA HEIs reflect that universities and colleges in the country are already taking steps towards supporting higher education and learning, and improving learning abilities of students such as critical thinking, problem-solving and collaboration skills (Alenezi, 2018).

In short, it can be summarised that LMS has been implementing in KSA HEIs ever since 2006. Some commonly used LMS tools include Moodle, Blackboard, Tadarus and Jusur.

2.8 Barriers to Adopting Learning Management System in KSA HEIs

Various studies have been conducted to explore barriers related to adoption of LMS and its implementation in KSA HEIs (Abdullah and Ward, 2016; Alghamdi

and Bayaga, 2016; Alshammari et al., 2016). It has been documented that information and communications technology (ICT) and other technological skills can act as key barriers to the implementation of LMS in higher education in KSA (Abdullah and Ward, 2016; Alghamdi and Bayaga, 2016; Alshammari et al., 2016). This issue is particularly pertinent as adequate training and human resources are required to manage LMS technologies. Routine care and monitoring of technological tools associated with LMS is also an important aspect. In this regard, one study found that ICT skills and technological literacy are important to the successful implementation of LMS (Asiri et al., 2012).

It has been documented that Blackboard is the most commonly utilised LMS in the HEIs of the KSA (El Zawaidy, 2014). although it has also been noted that many of the universities utilising the LMS in the KSA are not aware of which LMS they are using. A study by Binyamin et al. (2017) showed that regardless of positive reviews of learners and teachers related to LMS, it is not a well-established activity in universities of KSA due to lack of training and developed of teachers for LMS. As a result, teachers use it as a secondary method only for supporting their face-to-face teaching. Consequently, LMS is reported to be less used within completely online courses in KSA. Additionally, the study by Alenezi (2018) found that there exist several major barriers to use of LMS, such as negative behaviour towards the technology, lack of support by the technical staff of universities, and lack of training related to using LMS. The study also highlighted minor barriers such as lack of access to internet and networking, inadequate software and hardware for running LMS, insufficient LMS infrastructure, and challenges posed to proficiency in the English language. Table 2.2 presents summary of barriers to adopting LMS in KSA.

Table 2.2: Summary of Barriers to Adopting LMS in KSA (developed by author)

Barriers \ Authors	(Asiri et al., 2012)	(Alharbi, 2013)	(Alshammari, 2015)	(Abdullah and Ward, 2016)	(Alghamdi and Bayaga, 2016)	(Alshammari et al., 2016)	(Binyamin et al., 2017)	(Alenezi, 2018)	(Aldiab et al., 2019)	(Alsmadi, 2020)
Lack of the required content for e-learning	X	X	X		X				X	
Lack of IT infrastructure	X	X	X	X	X	X		X	X	X
Lack of technical integration between e-learning system and other systems			X					X		
Lack of organisational preparedness during implementation		X	X		X	X	X	X	X	
Lack of technical support team	X	X	X		X	X		X	X	X
Lack of ICT skills	X	X	X	X	X		X	X	X	X
Lack of training and human resources	X	X	X	X	X	X	X	X	X	X
Lack of policies and procedures	X	X	X			X		X	X	X
Lack of users' involvement	X	X	X						X	
Users culture	X	X	X		X			X	X	X

Overall, it can be summarised that the key barriers posing challenges to adoption of LMS are related to various organisational (HEIs) factors, features related to instructors/teachers, and the technology (LMS). Besides these, LMS is also influenced by the lack of ICT knowledge among students.

2.9 Learning Management System Implementation in Higher Education Institutes

In this section, an overview of different IS frameworks will be present relevant to the successful implementation of LMS in the Kingdom of Saudi Arabia (KSA) HEIs, such as those of Davis (1989), Heeks (2003), DeLone and McLean (2003), Goodhue and Thompson (1995), as well as Tomatzky and Fleischer (1990). Selecting the appropriate framework, which is relevant to the research theme, is an important step to examine as well. Therefore, while selecting the theoretical frameworks for this research, special consideration has been given to the research aim and objectives by addressing a specific choice of research data collection methods and data analysis methods. The criteria for selecting the appreciated IS research framework in the current research include IS research framework aim, extent of being used, associated research methodology, and simplicity. Table 2.3 below presents comparison between IS research frameworks.

Table 2.3: Comparison between IS research frameworks (developed by author)

Framework	Aim	widely used	Associated Research Methodology	Simplicity
Technology Acceptance Model (TAM) Davis (1989)	To examine factors that affect acceptance of a technology by the user	Yes	Quantitative and Deductive approaches	Yes
Design Reality gap (ITPOSMO) Heeks (2003)	To understand the success or failure of a project/method/system by identifying design-reality gaps	Yes	Quantitative and qualitative	Yes
IS Success Mode DeLone and McLean (2003)	To measure the complex dependent variable in information system (IS) research based on six success factors	No	Quantitative and qualitative	Yes
Task Technology Fit Model (TTF) Goodhue and Thompson (1995)	To show the positive impact of technology on performance of an individual	No	Quantitative	No
Technology Organization Environment framework (TOE) Tomatzky and Fleischer (1990)	To study acceptance of technology by focusing on adoption by the end-user and its relation with the environment	Yes	Quantitative and qualitative	No

The aforementioned table (table 2.3) shows that among the five contrasted information system (IS) research frameworks, the most widely used are TAM, TOE and ITPOSMO. Furthermore, all are simple to understand and use, except TTF and TOE. Mixed-method (quantitative and qualitative) are associated with the majority of frameworks, except TAM and TTF which are associated with deductive and quantitative approaches only. Based on core aim, TAM and TOE share the same purpose of study acceptance of technology by the user. Yet, variables differ in both of these frameworks such that TAM studies acceptance based on perceived usefulness, perceived ease of use, and buying intention, whereas, TOE explores the relationship between environment and user adoption. On the other hand, TTF framework is different from other frameworks since it studies the impact of technology on performance of the user instead of his/her intention of usage. Besides these, IS Success model measures success only based on six features, whereas, ITPOSMO framework measures both failure or success based on the design-reality gaps.

This current study has selected TAM and ITPOSMO, because both will help in exploring and assessing the acceptance, adoption and implementation of LMS technology by academics and learners in KSA HEIs. The rationale for using ITPOSMO along with TAM is that the latter does not consider psychological and social features. Therefore, in order to enhance the ability of TAM to better explain and predict LMS acceptance, it will be used along with the ITPOSMO framework. In this way, additional constructs will be added along with TAM variables, technical (information, technology, process); human (objectives and values, staff and skills); and organisational (management system and structure, others). Most importantly, the use of TAM and ITPOSMO frameworks will help to attain the study aim and objectives by facilitating the implementation of the LMS in HEIs through defining needs and requirements for LMS application, investigating attitude of users towards its (TAM model), and recognising and examining the critical barriers ITPOSMO model. Overview of these frameworks are explained in detail in the upcoming section.

2.9.1 Technology Acceptance Model (TAM)

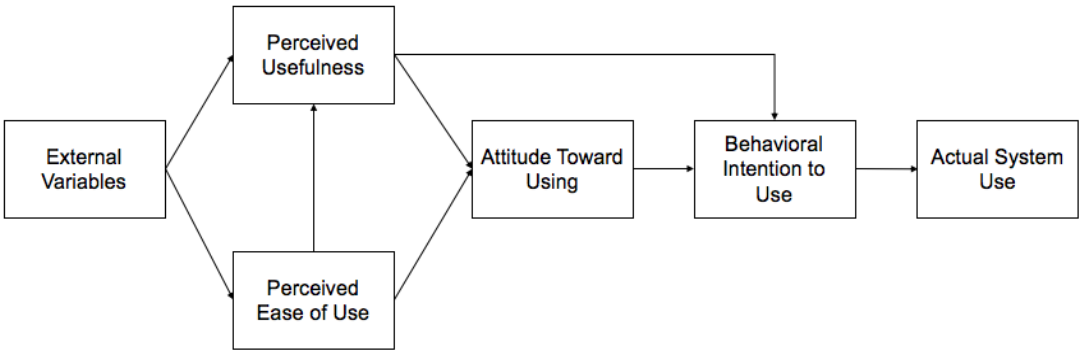

Figure 2.3: Technology Acceptance Model (Davis et al., 1989)

The technology acceptance model (TAM) is commonly used in IS literature to predict the use and acceptance by end-users of IS and technology (Davis et al., 1989). It is one of the most widely applied models in IS research for measuring the degree of technology acceptance by end-users. The TAM is simple and easy to understand (Abdullah and Ward, 2016). TAM emphasises not only how IS technology is accepted but also how the various aspects of it are received and then used by end-users. The TAM identifies two factors that determine attitudes, intentions, and, consequently, the actual use of an information system; these factors are *perceived usefulness (PU) and perceived ease to use (PEOU)*. In accordance with the TAM, PU and PEOU are defined by external variables relevant to the use of a particular system of information. The attitudes towards usage (ATU) of the system concern the end-users' evaluation of the desirability of employing a specific technology (Surendran, 2012).

Ibrahim (2018) used the TAM in his study to find the level of technology acceptance among academics. A survey was employed using a sample of 355 academics from Nigerian universities. The main finding of this study proved the TAM to be a useful theoretical tool to understand the users' acceptance of technology. Further, the results revealed that the variances in self-efficacy (SE), social influence (SI), system accessibility (SA), PU, and PEOU contributed to a change in behavioural intention (BI) to use technology.

Abdullah and Ward (2016) used the TAM model in a study designed to identify the most commonly used external factors in the context of e-learning adoption. A

quantitative meta-analysis of 107 papers spanning the last 10 years (2006 – 2016) was performed. The results showed that the best predictor of students' PEOU of e-learning systems is self-efficacy, followed by enjoyment, experience, computer anxiety, and subjective norms. The best predictor of students' PU of e-learning systems is enjoyment, followed by subjective norms, self-efficacy and experience.

Another study, conducted by Tarhinia et al. (2017), examined the effects of individual-level culture on the adoption and acceptance of e-learning tools by students in Lebanon using a theoretical framework based on the TAM. A questionnaire was administered to 569 undergraduate and postgraduate students. The results of the study revealed PU, PEOU, subjective norms, and quality of work life to be significant determinants of students' behavioural intention towards e-learning.

Bousbahi and Alrazgan's (2015) study found that efforts to improve and enhance learning environments in higher education led several HEIs to choose to implement an LMS for their educational activities. However, the LMS was not used to its full potential due to continued resistance by academics and students. Their empirical study examined factors influencing academics' lack of acceptance of the LMS. A survey was administered to IT faculty members in order to better understand their views on LMS integration into their courses. The results showed that motivation, organisational support, and load anxiety were important factors in the perception of the usefulness of the LMS among academics. The authors' findings can be used to extend the TAM for LMS acceptance, which can then be used to assess stakeholders in current implementations of LMS and, thus, help HEIs to improve their LMS implementations, which can eventually lead to planning and evaluating the use of e-learning. Based on the findings of Bousbahi and Alrazgan (2015), figure 2.7 below is an explanation of McFarland and Hamilton model of technology acceptance.

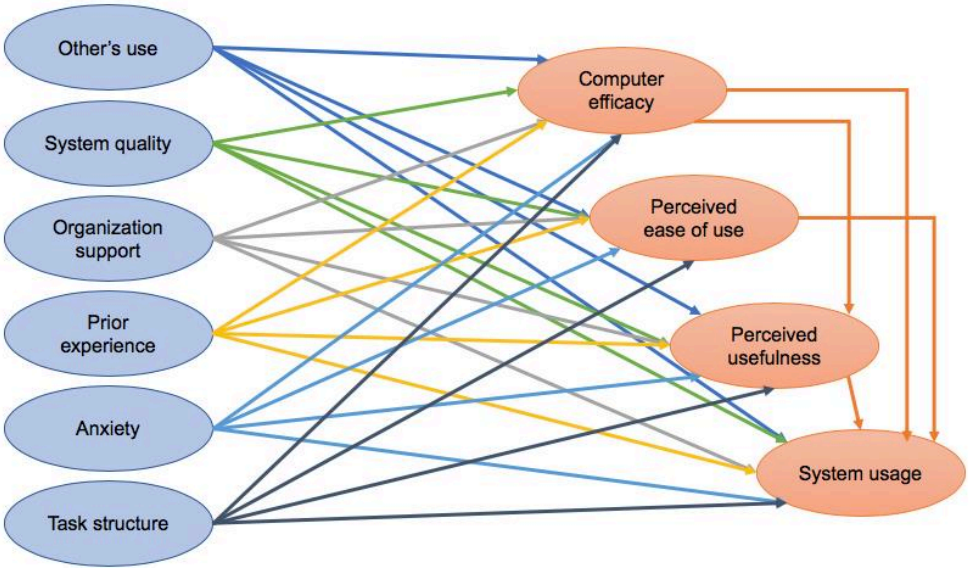

Figure 2.4: McFarland and Hamilton model of technology acceptance (Bousbahi and Alrazgan's, 2015)

The figure above illustrates the intertwined links among a range of factors in technology acceptance, ruled by computer efficacy (which is present technology), PEOU, PU, and system usage (which are the current real circumstances and physical environment). These factors are influenced by task structure, anxiety, users' prior experience, organisational support, system quality, and other's use (which are the present organisation). The illustration offers an important insight that HEIs' users' acceptance perspectives regarding a new technology vary according to these factors, which hence provides an understanding of the importance of preparing HEIs' users for the education technology.

2.9.1.1 Technology Acceptance Among Saudi Universities

There exists limited literature related to LMS acceptance in the Kingdom of Saudi Arabia (KSA) higher education institutes (HEIs). The study by Chaubey and Bhattacharya (2015) showed technology such as LMS acceptance by teachers are influenced by organisation factors, characteristics of those teachers, the technology. Another study by Alghamdi and Bayaga (2016) revealed that LMS such as blackboard is used in different ways within universities of KSA. It showed that LMS is not only widely used, but also mostly accepted by teachers in HEIs. Yet, some teachers were also found to be using LMS for purposes other than

teaching. Nevertheless, the study concluded that there exist wider acceptance of blackboard LMS within Saudi universities, which has resulted into early adoption of this LMS by faculty members. This reflects that there exists attitudinal acceptance of Blackboard as compared to other types of LMS in Saudi universities (Alharbi, 2013).

Technology plays a critical role in Distance Learning, since it facilitates a continuous flow of education that offers better learning experience, enhances knowledge among learners, and make them ready to face challenges in their upcoming careers (Algahtani, 2012). The study by Alsmadi (2020) explored factors which result into successful acceptance and use of LMS in distance learning in HEIs. It conducted survey among 149 higher education students who belonged to the distance learning program. The designed questionnaire inspected technology acceptance by focusing on the key variables of LMS usage, design and outcome. The path analysis of the survey results revealed that LMS technology acceptance and satisfaction of DL learners was significantly affected by the LMS design. As a result, learners satisfied with LMS affected the overall benefits to a large extent.

Another important study by Binyamin et al. (2017) used the Technology Acceptance Model (TAM) for examining the extent of acceptance of Blackboard LMS by students at Kind Abdulaziz University, KSA. The study sample comprised of the 2016 Fall semester 150 Saudi students who belonged to wide-ranging colleges and disciplines. 142 responses were generated from conducting the survey on both online and offline platforms. The analysed results showed that perceived usefulness and attitude of students influenced their behavioral intention, which in turn affected their actual use of LMS. Moreover, it showed that perceived ease of use posed similar impact on perceived usefulness and attitude of students. Most importantly, it highlighted that LMS technology will play an integral role in learning of students in KSA HEIs in the future.

The aforementioned literature review related to LMS acceptance in KSA shows that the extent of acceptance and usage of LMS within educational field in HEIs is affected by individual contexts of instructors and attitude of students

(Alshammari, 2015). Overall, it can be summarised that acceptance, usage and adoption of technology such as LMS depends on attitude of academics and students, such that their intention is reflected from their attitude which in turn formulates the actual behaviour. Based on this, it can be deduced that academics need to show positive attitude towards using LMS while teaching so that learners can gain wide benefits from enhanced learning and effective LMS-based teaching.

2.9.1.2 Academics / Instructors acceptance

Users' technology acceptance is a multidimensional attitude that is affected by different technical and social factors. In the literature, acceptance of the technology was measured based on PU, consumer satisfaction, intent to use, and/or actual use of the technology (Ibrahim, 2018; M and Ghinea, 2013; Asiri et al., 2012; Alghamdi and Bayaga, 2016). In some instances, LMS is adopted to ease the challenges facing instructors in dispensing their duties (Kaup *et al.*, 2020), while other studies conclude that HEIs have as much impetus to adopt these programs as any other stakeholders. Several issues could influence the instructors' acceptance of the technology of LMS, which could be linked to the characteristics of instructors, as suggested by Ball and Levi (2008), organisational considerations, as proposed by (Asiri et al., 2012), and technology, as proposed by (DeLone and McLean, 2003).

Ball and Levi (2008) focused on emerging educational technology. The purpose of their study was to investigate empirically the factors influencing instructors' intention to use. Fifty-six instructors' responses were collected from a small, private university. The findings indicated that self-reliance regarding computers, computer anxiety, and technology experience had a strong influence on the intention of instructors to use emerging educational technology. In accepting any information system, including an LMS, user self-efficacy is widely recognised as an essential issue. Self-efficacy is defined as "*the belief of an instructor in his/her ability to use LMS for teaching effectiveness and achieving instructional goals for distance education*" (Zheng *et al.*, 2018). Computer self-efficacy, therefore, means self-assessment of the capacity of individuals to apply computer skills to

fulfil tasks (Chen, 2017). With regard to attitudes towards an LMS, experience with the use of technology is taken into consideration, along with other issues related to the instructors' technology acceptance of the LMS, which should also be considered in any investigation of LMS acceptance (Al-Busaidi and Al-Shihi, 2009).

Generally, technology factors that affect users' acceptance of such information systems can be related to system quality, information quality, and service support quality (DeLone and McLean, 2003). According to Liaw et al. (2007), the quality of the LMS was found to significantly affect the instructors' PU, perceived enjoyment, and perceived self-efficacy, which consequently affected their intention to use the system in the classroom.

2.9.1.3 Students / learners acceptance

Learners are considered the main users of LMS. Although these programs are implemented at the institutional level, they are designed to solve challenges and present benefits to the learners (Basilaia et al., 2020). Brennan (2020) identifies the advantages accruing to institutions that utilise technology to achieve better efficiency and effectiveness in learning, while Joshi et al., indicated that the adoption of LMS occurs as more of a necessity rather than a choice, as evidenced during the Covid19 crisis. Emergent research concurs on the fact that the adoption of LMS is mostly advantages to both the learners and instructors. However, the shift to a new system can cause a negative experience. In addition to the adverse effects arising from resistance to change, hence delays in achieving the benefits of LMS, (Gratz & Looney, 2020), while new teachers who lack experience in the market place may not be able to adapt to the new learning strategies (Amoah and Naah, 2020). Either way, most of the emergent and extant studies concur on the fact that using LMS contributes to active learning for learners. LMS also supports several educational featured for learners' courses (Carvalho et al., 2011) and offers online learning tools such as e-mail, online discussion sessions, forums, online quizzes, assignments, and instructional materials such as audio, video, and text media (Abdullah and Ward, 2016). When learners have Internet access and a proper device, they can access the

information whenever they want. When meeting other people face-to-face is not easy, group members can use online tools to complete their tasks. E-learning is extremely cost-effective in this respect (Arkorful and Abaidoo, 2014).

Technology acceptance factors and the intention of learners to use an LMS are essential in improving the learning environment and attracting learners to continue using it as part of their educational life (Park, 2009). Another concern relevant to the acceptance of an LMS is the attitude towards it. According to Wang et al. (2012), learners' attitude towards an LMS is improved when it is integrated with college curricula. The attitude of individuals should be taken into consideration in an LMS acceptance investigation. Learner experience with the use of technology (EUT) also plays a vital role in technology acceptance. The EUT of the individual is the exposure of the individual to the technology as well as his/her existing skills and skills he/she gains by using the technology (Thompson et al., 2006).

Anxiety regarding computers is also a critical factor in learners accepting an LMS. Computer anxiety is the fear that people feel when using computers or considering the possibility of using computers. Computer anxiety plays an important role in technology adoption (Sun et al., 2008). Computer fear has a negative effect on the e-learning environment and, thus, on the perceived satisfaction of the user (Piccoli et al., 2001). Sun et al. (2008) found that computer anxiety had a significant impact on the perceived satisfaction of learners with e-learning, while Raaij and Schepers (2008) found that computer anxiety had an influence on the PEOU of e-learning by the learners.

Another issue that may be critical to the acceptance of an LMS by the learners is personal innovativeness. Personal innovation in the context of IT means the behaviour of a person reflecting the propensity to experiment with and adopt new information technologies independently of the conveyed experience of others. Being accustomed to adapting to new systems and processes, an innovative person will understand the utility and ease of use more quickly than will a non-innovative person (Mahat et al., 2012).

2.9.2 Design Reality Gap Model (ITPSOMO Model)

Heeks (2003) developed the design-reality gap model—the information, technology, processes, objectives, skills, management systems, and other resources (ITPOSMO) model—to identify the gap between reality and the design of such IS (in this research LMS). Figure 2.5 shows the design reality gap model.

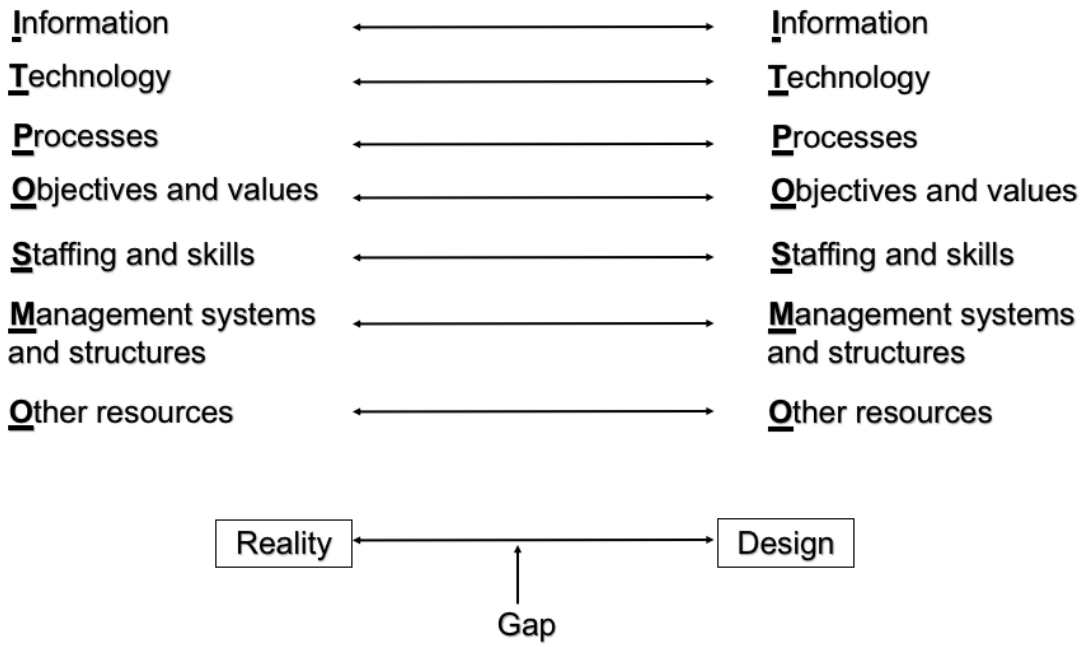

Figure 2.5: Design reality gap model (Heeks, 2003)

According to Heeks (2003), IS for e-government initiatives may fall into one of these three outcome categories:

- **Total Failure:** An organisation's initiative is never implemented or is implemented but immediately abandoned.
- **Partial Failure:** The major goal of an organisation's initiative is not attained and/or the outcomes of the organisation's initiative are significantly undesirable.
- **Success*:*** An organisation's initiative attained major stakeholder goals and the outcomes of the project were not experienced as significantly undesirable.

Failure of an information system depends on various circumstances. It may occur when the system as a whole does not operate as originally intended or is hostile to the users and, subsequently, is underutilised. A system that is not cost effective may also fail. Another cause can be the complexity of the system, due to which progress is abandoned before it is completed. With regard to information systems, projects which are completed according to the policies of the organisation, within the deadline, and under the stipulated budget are called successful projects, whereas projects which do not meet these criteria are called failed projects in IS and, as such, are also termed challenging projects (Kaur et al., 2013; Abubaka et al., 2016).

The number of failures in IS projects has grown in the last few years. There are several reasons for this trend, including lack of knowledge, difficulties related to technology, functional problems, and managerial issues. IS failures include any projects that fail to meet requirements, achieve goals, fulfil required roles, meet expectations, or achieve collaboration among all information systems components during the allotted schedule and budget. In order to achieve project goals and successfully carry through initiatives, organisations should carefully consider success factors such as education, training, necessary infrastructure, and management discipline (Al-Ahmad et al., 2009, Afolayan, 2016)). IS failure means there is a gap between project design and reality. Evaluation of the success and failure of IS conducted by classifying the nature and dimension of these gaps (Rugchatjaroen, 2015).

The design-reality gap model has been widely used by IS researchers in order to identify the causes of success or failure of IS projects. Examples of works that employ this model include: “Conceptual Framework of eService delivery system in Developing Countries with a high level of Instability” (Alsaeed and Adams, 2016), “Critical Perspectives of E-Government in the Developing World” (Afolayan, 2016), and “Understanding the Usability of Course Management Systems (CMS) in Developing Countries: An Empirical Analysis” (Hoque *et al.*, 2015).

The identification of success or failure in IS using the ITPOSMO model depends on the level of gaps existing between the design and the reality of each element of the LMS. A wider design-reality gap leads to a higher possibility of project failure and vice versa. There follows an explanation of the meaning of each element of the ITPOSMO acronym (Hoque *et al.*, 2015):

- *I* stands for the information types required in communication among LMS stakeholders. This is relevant when the system implementation is assumed to comprise all the content for all the learning resources, such as e-courses and e-content resources.

- *T* stands for the technology used in the HEIs. This involves the technology required for the LMS implementation project and a comparison of the stakeholders' requirements for the design of the LMS application vs. the real situation of the LMS implementation.

- *P* stands for the work processes undertaken in the HEIs. Here, the LMS design is assumed to be a rational model of all learning activities for the learners, the instructors, and administrators to reduce the process cycle. This can be mismatched with the reality, resulting in delays for some learning processes.

- *O* stands for the objectives and values for the successful implementation of an LMS within HEIs. This concerns the stakeholders' objectives and values that are needed for the successful implementation of the LMS vs. the current real objectives and values of the LMS.

- *S* stands for the staffing numbers and skill types/levels and competencies required by the HEIs to operate the LMS.

- *M* stands for the management systems and structures in the HEIs that are required in LMS implementation.

- *O* stands for other resources, including time, financing required for successful implementation, and resistance.

A scale from 0 to 10 is used to measure the design-reality gap for each element.

Table 2.4: ITPOSMO rating for each element's gap (Heeks, 2003)

No change				Some degree of change						Radical change
0	1	2	3	4	5	6	7	8	9	10

" '0' rating would indicate 'no change between the design proposal and current reality"

" '5' rating would indicate 'some degree of change between the design proposal and current reality"

" '10' rating would indicate 'complete and radical change between the design proposal and current reality"

After the evaluation of each element of LMS implementation, if a gap is found between the design and the reality, the result is failure of the element. However, if a gap is not found between the design and the reality, that indicates the success of the element (Heeks, 2003). Subsequently, the rating numbers of each element will be added up and interpreted according to the following criteria (table 2.5):

Table 2.5: **Gap Assessment** (Heeks, 2003)

Overall Rating	Likely Outcome
57 – 70	*"Your e-government project will almost certainly fail unless action is taken to close design-reality gaps"*
43 – 56	*"Your e-government project may well fail unless action is taken to close design-reality gaps"*
29 – 42	*"Your e-government might fail totally, or might well be a partial failure unless action is taken to close design-reality gaps"*
5 – 28	*"Your e-government project might be a partial failure unless action is taken to close design-reality gaps"*
0 – 14	*"Your e-government project may well succeed"*

Heeks (2003) stated that the rate of failure IS projects in developing countries; 35% total failures, 50% partial failures, and only 15% are successes. That is because of the gap between design and reality of these information systems (IS). Moreover, Heeks point out that the seven elements of design reality gap model (ITPOSMO) are sufficient to provide a comprehensive understanding of design-

reality gaps. Therefore, this study is considered the design-reality gap (ITPOSMO) model to fill the implementation gap of LMS in the context of real circumstances and physical environments that exist in KSA HEIs. This clarification of the design-reality gap will help mitigate future risk of failure in the implementation of the LMS project in HEIs.

2.9.2.1 Technology context of learning management systems implementation

According to Alshammari et al. (2016), the technological context of LMS implementation in KSA HEIs comprises all relevant technologies concerning the HEIs, including those that are already being used internally and those that are available externally but are not currently in use within the HEIs. This applies to the technological context pertinent to Al-Imam Mohammad ibn Saud Islamic University. The emergence of e-learning has had a significant impact on the education sector in the KSA. Most HEIs are already offering e-learning focused on the PC Internet. The purpose of e-learning is to provide interactive online content. Nevertheless, most lessons are taught by an instructor in the form of one-sided teaching. Still, due to the rapid proliferation of educational technologies, digital learning is also required as there is a growing need for interactive classes (Kasim and Khalid, 2016).

Hoque et al. (2015), emphasised that technology factors include three dimensions: 1) information that is both formal and informal; 2) technology that focuses primarily on information handling; and 3) processes which involve activities related to tasks and broader business processes as well. According to Alkharang and Ghinea (2013), however, stated that aside from these four factors, the technology dimension also includes bandwidth and internet speed limitations. Further, Kituyi and Tusubira (2013), emphasised that the capabilities of the e-learning platform and requirements for e-learning integration in HEIs reflect the technical competence exhibited by the ICT infrastructure of HEIs. Still, due to the rapid proliferation of educational technologies, digital learning is also required as there is a growing need for interactive classes.

2.9.2.2 Human context of learning management systems implementation

The human context encompasses factors of objectives and values as well as staffing and skills within HEIs that may influence the HEIs' need for technology adoption and operation and its ability to acquire and actually deploy resources (Hoque et al., 2015). Alkharang and Ghinea (2013), however, stated that aside from these factors, the human dimension also includes attitude. Further human context factors are leadership, sufficient training, personnel skills, competence, and adequate knowledge about the organisation's projects play key roles in LMS implementation (Asiri et al., 2012), which must be looked into when considering the ITPOSMO model for the current study.

2.9.2.3 Organisation context of learning management systems implementation

LMS have been introduced in most HEIs in today's world. These web-based LMS are planned to support teaching and learning activities. They are comprised of various features that empower academics to share learning materials, as well as provide interaction with their students both synchronously and asynchronously (Alharbi and Drew, 2014). Thus, enhancing the quality of instruction and spreading access to education are some of the motives behind LMS adoption (Asiri *et al.*, 2012). According to Hoque et al. (2015), organisational factors include two dimensions: 1) management systems and structure, such as managerial practices that are required in the LMS implementation and flexibility of organisational structures; 2) other, such as time, finance, and resistance. To assess the effectiveness of HEI leadership and teams over time, data should be collected in the form of learners' responses regarding their satisfaction with the adoption and implementation of the selected LMS.

Ozkan et al. (2009) focused on the research, adoption, purchase, and implementation of a new LMS for online teaching-learning at an HEI. Forty-two respondents answered survey questions. The results showed that there are three constraints to consider before the introduction and implementation of an LMS that are crucial to achieving the intended goals of the institution for its students.

First, it is essential to understand and concentrate on learner characteristics before purchasing the online delivery platform. In other words, it is necessary to recognise the attitudes, motivations, beliefs, and trust levels of students, especially when they are enrolled in an autonomous and self-directed learning environment. It is expected that the environment will be specifically designed to meet and facilitate these needs and make the learning experience positive.

Second, the institutional structure is essential in that multimedia technology, tools, and resources will facilitate and enhance student learning and engagement in the classroom. The information gathered at HEI by IT professionals and managers is vital to the potential success of the existing, revised, or discontinued LMS. With learners and instructors' success in the classroom in mind, IT professionals and administrators at the HEI are required to conduct research and compare and contrast the different LMS to select the best fit for the needs of the institution. Feedback from the users of the LMS can be converted into the knowledge needed to choose a platform that will increase student enrolment, enhance learning, and improve classroom engagement and participation.

Additionally, a smooth flow of knowledge and information with media technology facilitation, learning resources, and tools is required for the success of learners, the effectiveness of academics, and for institutions to increase the bottom line over time. With feedback from academics as well as learners, IT professionals and administrators will have the necessary information to make strategic and financial management decisions that will add value to the overall success of the institution (Ozkan et al., 2009); this must be taken into account by the current study, which aims to facilitate the implementation of LMS in HEIs and to increase the positive attitude of users towards LMS in KSA HEIs. Alkharang and Ghinea (2013), however, stated that aside from these factors, the organisation dimension also includes cost and time.

2.10 Overview of Interpretive Structural Modelling (ISM)

According to Attri et al. (2013), ISM 'is a well-established methodology for identifying relationships among specific items, which define a problem or an issue'. Further, ISM is a methodology that is interpretive as the expert judgment of the group decides how the variables are related to such issue. Based on the relationship on overall structure is extracted ISM structure from the complex set of variables. ISM is a modelling technique which identifies how the specific relationships to the overall structure are designed in a graphical model. ISM is intended as a group learning process; however, in some cases, ISM is used individually (Attri et al., 2013).

Several researchers have increasingly employed the ISM approach to reflect the interrelationships between different elements related to the issue (Panackal and Singh, 2015; Singh and Kant, 2008; Jharkharia and Shankar, 2005; Ravi et al., 2005; Singh and Kant, 2008). ISM approach starts with an identification of success factors. Then establishing the contextual relationship among success factors. A structural self-interaction matrix (SSIM) is developed based on the nature of contextual relationships among the success factors. The next step of ISM, SSIM transformed into a binary matrix called the reachability matrix, and its transitivity is checked. Once transitivity embedding is complete, a matrix model is obtained. After this, the partitioning of success factors and extraction of the structural model called ISM is derived (Attri et al., 2013).

Jharkharia and Shankar (2005) used the ISM methodology for supply chain barrier processes, to understand mutual influences so that those barriers which are at the root of other barriers (called driving barriers) and those which are most influenced by the others (called dependent barriers) are identified. Ravi et al. (2005) employed the ISM to determine the critical reverse logistics variables to improve the productivity and performance of computer hardware supply chains, and the key finding of their study was that environmental concern is the primary cause of the initiation of reverse logistics practices in computer hardware supply chains. Singh and Kant (2008) applied the ISM methodology to develop the

relationships among the identified knowledge management barriers, as well as, to understand the mutual influences of barriers.

In this research, ISM employed to identify and rank the key success factors for LMS implementation in KSA HEIs, to establish the relationships among the identified success factors using the interpretive structural modelling (ISM) approach and to discuss the implications for practicing managers of this research. These success factors affect one another. Therefore, it is essential to recognise the nature of these factors so that the driving factors and dependent factors are recognised. For this purpose, the ISM approach has been utilised.

Steps of the ISM development model, are illustrated below:

1- Variables identification, which are relevant to LMS implementation issues in higher education institute, this step could be done by any group problem solving technique or survey.
2- Establishing the contextual relationship among variables. This step shows the relationship between success variables indicating whether or not one variable leads to another.
3- Developing a structural self-interaction matrix (SSIM) of variables, which indicates pair-wise relationship between variables of the system.
4- Developing a reachability matrix from the SSIM, and then checking the matrix for transitivity. Transitivity of the contextual relation is a basic assumption in the ISM which states that if element A is related to B and B is related to C, then A is necessarily related to C.
5- Partitioning the reachability matrix into different levels.
6- Based on the relationships in the reachability matrix, removal of the transitive links.
7- Constructing the ISM model by replacing element nodes with statements.
8- Review of the ISM model to check for conceptual inconsistency and make the necessary modifications.

Section 5.6.4 presents the ISM implementation in current research.

2.11 Research Gap

The primary objective of the literature review was accessing an up-to-date understanding of LMS implementation with a focus on the context of real circumstances, and physical environment exists in KSA. The following particular research gaps were identified by a review of the literature:

- There is little research being conducted on the actual use of LMS in the KSA, resulting in limited usable material for this research.
- There is a gap between the purpose implementation and the reality of LMS.
- There are no clear stakeholders' requirements for the successful implementation of the LMS associated with the required services in HEIs from the larger research community would contribute to knowledge creation in the broader use of LMS.
- The current state of the stakeholders of LMS requires more investigation in terms of concerns and motivations.
- There are a few studies focused on the factors that influence users' decisions about how and when they will use LMS and what influences users' attitudes to use emerging educational technology in HEIs.
- There is little research being conducted on the meso-level consideration of LMS which is needed by HEIs, academics and students alike for better-facilitating education activities.
- There is a need for some form of the roadmap that can help HEIs to improve the LMS in KSA.

2.12 Summary

The purpose of this chapter was to present a comprehensive literature review regarding e-learning, the LMS, and its implementation in HEIs to inform the research questions. As explained in the introductory chapter, the aim of this study is a framework for the development of LMS for HEIs in the context of the KSA. The chapter began with the basic concept of e-learning and how its evolution has brought unprecedented change to the educational sector. Further, it introduced one of the most widely used e-learning systems, the LMS. The potential facilitators and barriers relevant to the implementation of LMS were discussed in the light of rigorous scientific literature. In addition, the need for LMS in HEIs was also addressed. Finally, an attempt has been made to identify the various pitfalls in the implementation of LMS in order to build a framework for the present study.

3 RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides an overview of the research methodology utilised to address the research questions mentioned above. Scientific research methodology refers to the set of procedures, utilised to gather the knowledge along with adherence to rigorous scientific values including objectivity, precision and accuracy (Creswell, 2014). Selecting the appropriate research methodology, which has relevancy with the research aims, objectives and questions, is an essential step in this procedure. Therefore, while selecting the research methodology, special consideration has been given to the research aim and objectives by addressing a specific choice of research questions, research philosophy, data collection methods and data analysis methods. The pragmatism philosophy, along with the mixed-methods, have been considered to be most relevant to the nature of the research aims. Moreover, it helps to a framework development for LMS in KSA HEIs and increasing the positive attitude of users towards LMS by using technology acceptance model (TAM), design reality gap model (ITPOSMO model) and interpretive structural modelling (ISM).

3.2 Research Paradigm and Philosophy

As philosophical research is considered one of the research pillars, it is important to understand the meaning of paradigm. The term paradigm is defined as "*a basic belief system and theoretical framework with assumptions*" (Abdul Rehman and Alharthi, 2016). According to Kuhn (1970), A research paradigm is defined as "*the set of common beliefs and agreements shared between scientist about how problems should be understood and addressed*". Thus, once the researcher has identified research paradigm, the first step for designing research should be taken, which is to select a methodology that reflects the philosophical assumptions of researcher paradigm (Collis and Hussey, 2013). According to Easterby-Smith et al., (2012), there are two types of research philosophy which are "Ontology" and "Epistemology ".

Ontology is defined as the study of being and focusing on the structure of reality and nature of its existence (Al-Saadi, 2014). It is also outlined as an idea which is based on the existence of and association between various societal characteristics, including cultural norms, social actors, and social structures. Ontological issues inquire those matters and things which are found in a society. In other words, ontology reflects assumptions related to nature and type of the existing reality (Idoudi *et al.*, 2019). Epistemology includes assumptions which are made related to the nature of knowledge. It also offers guidance related to exploring the world. In other words, it shows ways in which the world could be explored and interpreted. It includes knowledge and understanding of its included aspects, such as scope, nature and validity of the knowledge (Al-Saadi, 2014).

Research philosophies are the set of beliefs and values regarding the way of gaining knowledge. Scientific research methods, therefore based upon their own particular set of beliefs and values (Mackenzie and Knipe, 2006). The common types of research philosophies followed by scientific research methods are positivism, interpretivism and pragmatism (Creswell, 2014). Positivism refers to the philosophy that holds the notion that real knowledge and actual reality-based upon "positive observable facts" (Kaboub, 2008). It emphasises objectivity and is critical of a subjective phenomenon and is closely related to quantitative research.

In contrast, interpretive researchers understand “the world of human experience” (Cohen et al., 2002). Interpretivism professes that actual reality cannot uncover without considering the subjective phenomenon. Therefore, it is considered much more closure to qualitative research (Thanh and Thanh, 2015).

On the other hand, pragmatism philosophy is based on the idea of whatever works, i.e. it is centred on the theory of truth. It aims to solve practical real-life issues instead of assuming about the nature of existing or gathered knowledge. In other words, the research philosophy of pragmatism follows action-based research methods (Maarouf, 2019). The rationale for selecting pragmatism as this current research philosophy is that it will be suitable for the mixed-method approach adopted for this research. The underlying assumption of the pragmatism philosophy will form a strong basis for the mixed-method research by offering a logic and epistemology, which will help the researcher to better integrate qualitative methods with quantitative approaches. In this way, the use of pragmatism philosophy will allow integration between assumptions, methods, paradigms and approaches related to data gathering and analysis (Neuber, 2019).

3.3 Research design

Research design is defined as the structure and plan to investigate and retrieve answers for the formulated research questions. It outlines the overall program or scheme of the research study, by guiding throughout the hypothesis’s formulation, implications, to the analysis of the research findings (Kennedy-Clark, 2013). There are different types of research design, such as quantitative or qualitative research design (mono-method), and mixed-method research design.

This current study will choose the mixed-method design in order to seek triangulation. The justification for this selection is that use of both quantitative and qualitative methods will help in gathering complementary yet different data related to same study topic, which would help the researcher to better understand the underlying research problem. Furthermore, use of mixed-method design will prove to be beneficial in terms of interlinking non-overlapping issues and distinct strengths of both quantitative and qualitative methods (Fram, 2014). For instance,

the wider sample size, identification of trend and attainment of generalisation through quantitative method will support the small sample size of qualitative method. On the other hand, the qualitative method will offer support by offering in-depth and detailed responses. In short, the researcher will be able to expand and validate the quantitative statistical outcomes with the thorough qualitative data.

Table 3.1: Qualitative and Quantitative Approaches (Creswell, 2014)

Aspect	Qualitative	Quantitative
Purpose	Quality or meaning of experience	Quantity, frequency, magnitude
Approach	Observe and interpret	Measure and test
Data collection	Interviews, documents, observation	Questionnaire, secondary data
Goals of investigation	Understand, describe, discover	Predict, control, confirm, test
Sample	Small size	Large size

3.4 Case study design

Al-Imam Mohamed bin Saud Islamic University in KSA founded in 1950 in Riyadh city. Like other universities in KSA, it operates under the Ministry of Education. By 2017, it comprises of fifteen collages, fourteen of which are in Riyadh and one is out of Riyadh in the region of Al-Ehsa; such as College of Sharia, College of Economics, College of Computer Information and Sciences, College of Medicine and College of Engineering, to name a few. Also, it comprises three institutes in Riyadh: Supreme Jurisdiction Institute, Supreme Institute for Dawah and Ihtisab and one for teaching the Arabic language for non-Arabic native speakers, as well as sixty Sharia institutes kingdom-wide. Table 3.2 below shows general information about Al-Imam Mohamed bin Saud Islamic University students. Further, Al-Imam Mohamed bin Saud Islamic University has around three thousand academic staff and five thousand employees (*About university*, 2018).

Table 3.2: General Information of the Al-Imam Mohamed bin Saud Islamic University Students (*university web site*, 2018)

NO	Academic Program	Saudi Students			Non-Saudi Students			Total
		Male	Female	Total	Male	Female	Total	
1	Foundation Students	4257	3344	7601	70	37	107	7708
2	Undergraduate Students	28772	25704	54476	1109	442	1551	56027
3	Distance Learning	47656	29105	76761	2167	3831	5998	82759
4	Master's Students	6236	6741	12977	278	80	358	13335
5	PhD Students	1111	980	2091	82	12	94	2185
Total		88032	65874	153906	3706	4402	8108	162014

3.5 Data collection

Based on the aforementioned choice of mixed-method design, this study will use a mix of two data collection approaches, including online questionnaires and semi-structured interview. The rationale for choosing both data collection tools is that statistically reliable data gathered from the questionnaire will be validated and tested for its credibility through comparing and contrasting with interview responses.

3.5.1 Questionnaires Design

The second research objective of investigating attitude of users towards LMS based on the technology acceptance model will be attained by conducting online questionnaires among academics and students of Al-Imam Mohamed bin Saud Islamic University; which contain six sections, including Demographic characteristics of participants, investigating of academics and students perception regarding LMS in terms of perceived ease of use, perceived

usefulness, attitude toward the use, organisation support (the technology acceptance); and Barriers faced academics while they are using LMS (Design reality gap). The relationships between the variables of perceived ease of use, perceived usefulness, attitude toward to use, and organisation support are measured by the TAM questionnaire. Whereas Barriers faced by academics while they are using LMS measured by the Design reality gap (ITPOSMO) model. The survey consisted of Likert-type scale questions to collect empirical data. In addition, open-ended questions were added in order for the respondents to express their personal views on LMS implementation, the details of questionnaires given as follow:

The first questionnaire (Appendix A) was for academics which contains six sections, include Demographic information such as (gender, college, academic rank and work experience), Perceived Easy to Use include (easiness to use LMS, increase interacting with LMS if it is clear and understandable, easiness to learn how to use LMS, easiness to find learning resources through LMS), perceived usefulness include (improvement in learning performance through LMS, helpful in increasing academic productivity, enhancement in increasing effectiveness to do academic tasks), attitude toward using (improving the ICT skills among academics, enhancement in increasing educational process, facilitating the educational process), university support (agreeableness to use LMS under supervision instructor, agreeableness to use LMS with provision of proper technical support), and Barriers faced academics while they using LMS. Another questionnaire (Appendix B) was for students which contains six sections, include Demographic information such as (gender, collage and academics program), Perceived Easy to Use include (easiness to utilise virtual classroom through LMS, ease in receiving homework online through LMS, easiness to participate in online discussions through LMS, easiness in finding information online through LMS, ease in arranging a video conference with students through LMS, easiness to make online academic consultations through LMS), perceived usefulness include (improvement in learning performance through LMS, helpful in increasing academic productivity, enhancement in increasing effectiveness to do academic tasks), attitude toward using (improving the ICT skills among academics,

enhancement in increasing educational process, facilitating the educational process), university support (agreeableness to use LMS under supervision instructor, agreeableness to use LMS with provision of proper technical support), and Barriers faced students while they using LMS.

The reasons for different used questionnaires are to that a large number of LMS users can reach. Besides, to yield to more precise information. As research philosophy is pragmatism; which allows the researcher to use several instruments to achieve research goal and objectives.

3.5.2 Survey Design

There are different kinds of interview, such as structured interview, semi-structured interview, and unstructured interview. This study will use the semi-structured interview because the researcher will be guided throughout the interview process by following an interview protocol. A guided and structured conversation between research participants and the interviewer (researcher) will take place, which will be supported by gathering additional data from participants. It is a flexible interview method that allows the researcher to remain focused whilst gathering detailed information related to feelings, thinking and viewpoints of participants (Birkland, 2012).

The third research objective of identification and analysis of the critical barriers for the implementation of LMS using the design-reality gap (ITPOSMO) model will be attained by conducting a semi-structured interview. Semi-Structured interview questions have been developed based on the research aim, objectives and questions; to identify what is the organisation's vision to facilitate education activities, level of organisational staffs IT skills, organisation's satisfaction regards the current implementation of LMS, the key barriers, how they act with LMS, and stakeholders requirements by investigating their concerns and motivations.

Semi-structured interviews were conducted involving 21 participants; seven participants administrators personal (Dean/head), eight IT personal and six E-learning personal, all of whom agreed to be interviewed. The survey enables collection of views, attitudes, and judgments of administrator, IT department and

E-learning department about LMS implementation in Al-Imam Mohamed bin Saud Islamic University (Appendix C).

3.6 Data analysis

Qualitative and quantitative data analyses were utilised; quantitative data analysis was carried out. After the qualitative data collection, qualitative data analysis was carried out to explore the reasons associated with quantitative data. The description of both data analyses is given as follow:

Statistical Package for Social Sciences was utilised for quantitative data analysis. Cronbach alpha is commonly used in SPSS to measure the internal consistency of a survey or a questionnaire that forms a scale and to determine if that scale is reliable. Thus, Cronbach alpha was used for quantitative data of the study to ensure that data can be meticulously manipulated and carefully and adequately analysed. Descriptive statistics including mean, standard deviation and percentages will be reported. In addition to it, the Pearson Product Moment correlation coefficient will be utilised to indicate the extent to which two variables are linearly related.

For qualitative data analysis, a thematic analysis will be utilised, and it primarily involves the extraction of themes (Creswell, 2014). Saturation level was reached after 18 interviews from different colleges and deanships. Following steps were taken during data analysis.

1- In this step, the researcher prepared the collected data for analysis. This entailed transcribing interviews, optically scanning of written notes, typing up field notes, acquainting with data and arranging the data into different types depending on the sources of information.
2- During this step the researcher performed a general appraisal of the information gathered appraisal which gave the opportunity to reflect on its overall emerging meaning.
3- Systematic coding of the data was carried out. Due to the limited number of interviewees, data analysis software was not used.

4- Coding was used for further integration of the data into a smaller number of themes or categories. These themes serve as the significant findings in this phase. Themes were analysed for each individual case and also across the different cases. After that, the descriptions and themes were represented in the qualitative narrative.

3.7 Sampling Techniques

The sample of this research is the Al-Imam Mohammed bin Saud Islamic University in Saudi Arabia. According to the university website, the total number of students is 162014 and the total number of academics is 2693. The researcher received 1548 students questionnaire, and 275 academics questionnaire, however, the valid response of academics questionnaire is 129 (most of them incomplete and missing data). This sample is valid since there exists a lower margin of error for a wider sample size. Yet, the confident level of the study sample will be examined by finding the value of “p”. The significance value of p = 0.05 will show the confidence level of 95%.

Academics and students are considered key stakeholders for LMS implementation as they are using the LMS technology for educational activities, in which investigating their level of required ICT skills, and proper training is essential to ensure the effective and useful utility of the system.

It is important to explain the stakeholder groups involved in the LMS implementation. The researcher was conducted several interviews with a selected sample of employees of Al-Imam Mohamed bin Saud Islamic University, who are responsible for LMS implementation in Colleges, Deanship of Information Technology and Deanship of E-Learning. The sample has been achieved via a purposive sampling technique, which resulted in the identification of 21 participants, all of whom agreed to be interviewed. Semi-Structured interviews with these individuals were held over 50 days, starting on the 14th of May 2018. Data of this research were stored in a secure computer file using Word and Excel.

3.8 Reliability and Validity

The reliability of the questionnaire will be identified by calculating value of Cronbach Alpha for each scale used in the questionnaire. A value of 0.7 or higher will reflect higher internal consistency and reliability of the questionnaire. Moreover, validity of the interview has been ensured by designing interview questions in such a way that they sought answers as per the formulated research questions and objectives.

Research validity in this study is ensured through the use of research triangulation; which means using more than one method in investigating LMS implementation in the KSA HEIs. In particular, the interviews validated the survey, which is reported in Section 5.6.1.

3.9 Summary

In this chapter, a comprehensive account of the research philosophy, strategy and methodology relevant to the present research aims and objectives are presented and discussed. In addition to it, data collection and data analysis techniques are also presented. It is formalised that mixed-method research is an appropriate avenue to carry out the present study.

4 INITIAL FRAMEWORK

4.1 Introduction

In this chapter, development process of the theoretical framework will be presented. Whereas the Technology Acceptance Model (TAM) and Design Reality Gap (ITPOSMO) Model shall provide a theoretical foundation for the research work. The main purpose of the study is to justify the suitability of the TAM for investigating the attitudes of users towards the LMS, and ease of exploring the gap between the purpose of implementation and the reality of the LMS through their direct link with the research aim (see Section 2.9). These reasons render the TAM and the design-reality gap model suitable for this research.

4.2 Joining TAM and Design reality gap model

In order to understanding the LMS implementation gap among academics and students, it is necessary to identify the key challenges in implementing and adopting LMS in the Kingdom of Saudi Arabia (KSA) HEIs. In addition to it, factors that influence technology acceptance have been carefully studied with an aim to explain the various aspects affecting the users' attitude towards the use of LMS.

The elements of design reality gap model can be grouped in three aspects: technical (information, technology, process); human (objectives and values, staff and skills); and organisational (management system and structure, others) (Elkadi, 2013).

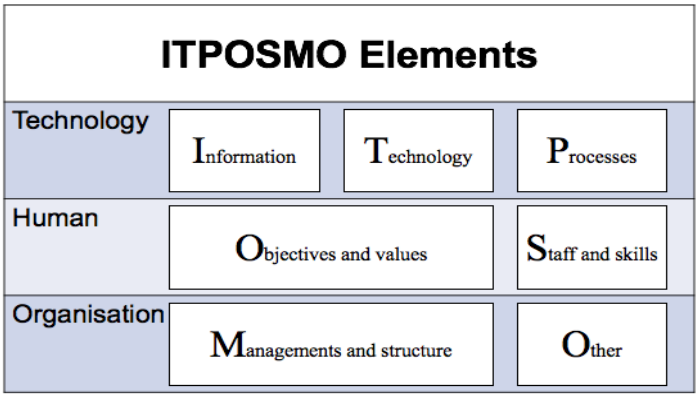

Figure 4.1: Elements of ITPOSMO model (Elkadi, 2013)

The reason behind grouping the first three elements of design reality gap (ITPOSMO) model in terms of Technical aspect (information technology and processes) is to focus the technological aspect of LMS implementation in KSA HEIs which comprises all relevant technologies concerning the HEIs (Asiri et al., 2012; Kituyi and Tusubira, 2013; Alshammari et al., 2016). Two elements of the design reality gap (ITPOSMO) model namely (objectives and value, staff and skills) are grouping as Human aspect, this group was developed with the objective not only to acquire and adopt latest technological trends and operational activities but also have the ability to deploy these resources accordingly (Hoque et al., 2015). Organisation aspect includes management systems and other of the design reality gap (ITPOSMO) model, are presenting managerial practices that are required in the LMS implementation and flexibility of organisational structures, to assess the effectiveness of HEIs leadership/teams over the period of time (Alharbi and Drew, 2014).

Literature review reveals that understanding what comprises the user technology acceptance, is necessary for the continuance usage of LMS, are perceived ease of use (PEU), perceived usefulness (PU), attitude towards using (ATU), organisational support and interactivity of the system. The TAM identifies two parameters i.e. perceived usefulness (PU) and perceived ease to use (PEOU) that determine attitudes, intentions which consequently identify the actual use of such systems. The first parameter of TAM is PEU, which describes the user's perception of how easy it is to work with the system. PU is another TAM parameter, which determines the level of work achieved after using the system. In accordance with the TAM, PU and PEOU are defined by external variables relevant to the use of a particular system of information. The attitudes towards usage (ATU) of the system is concerning to the end-users' evaluation and desirability of employing a specific technology (Surendran, 2012).

The TAM is utilised for the research purpose; however, some factors of the TAM have been excluded, such as Behavioural intention to use technology and Actual use, which are included in the original model. The reason for their exclusion is that the LMS is not fully adopted, implemented and used in most academics

activities in the Kingdom of Saudi Arabia (KSA) (Alghamdi and Bayaga, 2016). Therefore, this research focuses on facilitating the implementation of the LMS in HEIs of KSA and increasing the positive attitudes of users towards the LMS (Alshardan et al., 2015; Bousbahi and Alrazgan, 2015). The attitude towards the usage of LMS is concerned with the users' evaluation and desirability of employing its application (Surendran, 2012). The technology, the human, and the organisation are linked in the perspective of the user's attitude towards using the LMS. Thus, the design-reality gap model has been integrated into the TAM in this study's investigation with the objective of facilitating the implementation of the LMS in the Al-Imam Mohamed bin Saud Islamic University.

The diagram below shows the relationship between the design reality gap (ITPOSMO) model and TAM:

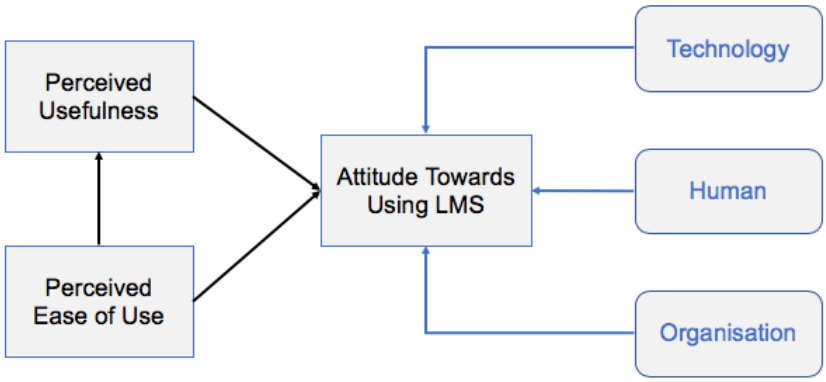

Figure 4.2: The design reality gap model in TAM (developed by author)

Asiri et al. (2012) emphasised that various studies have provided evidence that a positive attitude towards using the LMS has an impact on motivation and learning amongst academics and students. This study focuses on conceptualising the theoretical framework that influences the utilisation of the LMS by using the TAM. This study is based on the library research approach in identifying the critical variables related to the factors influencing the use of an LMS in higher education. The external factors considered in this study include barriers faced by the faculty members and demographic factors, whereas the internal factors include the attitude of faculty members towards using the LMS, their beliefs towards e-learning, and their competence level in using the LMS, all

of which influence the use of the LMS for teaching and learning purposes. Asiri et al. (2012) study is useful to the current research as it was directed to understanding and implementing technology in HEIs; thus, it serves as a guide regarding how this study should address its research problems.

4.3 Conceptual framework for the development of the LMS

A framework is generally a real or conceptual structure intended as a support or guide for building something that expands the structure to create something useful (Cohen, Manion and Morrison, 2002). Further, a conceptual framework is defined as "*a visual or written product, that explains, either graphically or in narrative form, the main things to be studied the key factors, concepts, or variables and the presumed relationships among them*" (Miles and Huberman, 1994). Maxwell (2008) stated that developing a conceptual framework is a structured process that could be carried out by using one of the following sources: 1) experiential knowledge (which means, in brief, that what you bring to the research is treated as 'bias' from your background and identity); 2) existing theory and research (this includes published and unpublished research work); 3) pilot and exploratory studies (which means, in brief, generating an understanding of the concepts and theories held by the other people where you are studying—this is also called interpretation); and 4) thought experiments (which basically draw on both theory and experience to answer "what if" questions).

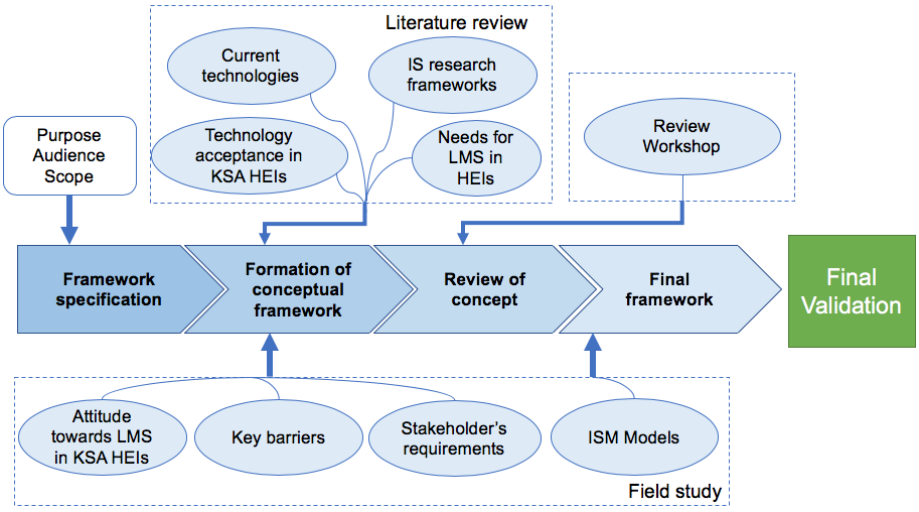

Figure 4.3: A framework development process for the LMS

Figure 4.3 illustrates the development steps for the final framework of the current study, the approach is based on the development process presented by Almanei et al., (2018) that includes four phases: 1) capture the research specification—the purpose of the current study, targeted audience, and scope; 2) construct the conceptual framework—make the appropriate choice of IS research frameworks to assess LMS implementation, analyse the key barriers, and identify stakeholders' requirements and success factors); 3) review/evaluation —review the field study results based on expert judgment and then find opportunities for improvement; and 4) complete the final framework.

4.3.1 Specifications phase

The starting point for developing any framework is identifying what this framework is supposed to be able to do. Thus, it is essential to clarify the purpose of the framework, the intended audience, and the scope of the framework. The following points are mentioned for clarifying these issues (Almanei et al., 2018).

Purpose: The purpose of the framework is to improve the implementation of LMS for active learning environments through a series of steps that HEIs can adopt.

Targeted audience: Employees of HEIs who are responsible for adopting, managing, and operating the LMS; technology providers within the educational organisations.

Scope:

(1) Provide a clear definition of the stakeholders' requirements of the LMS implementation in HEIs, which can be adapted for active learning environments.

(2) Provide a sequence of steps that allows HEIs to understand how users are convinced to accept and use an LMS within an educational organisation.

(3) Provide useful insights generated from key barriers and success factors of the LMS, and by simply

documenting insights in order to prevent the reoccurrence of implementation problems within HEIs.

4.3.2 Development of conceptual framework for the development of the LMS phase

In this phase, the researcher clearly defined the content to be included in the conceptual research framework. For this purpose, two primary sources of data were available for the researcher to develop the conceptual framework: 1) secondary data from the literature review to get help in understanding how users are derived to accept and use an LMS within an educational organisation (see Chapter 2); and 2) initial data from the field study of LMS implementation in the KSA educational organisation and the experts' views on the key barriers and success factors (see Chapter 5).

Additionally, the most suitable method of organising the conceptual framework was analysed, which led to the conclusion that the basis of the conceptual framework should be the most convenient IS model. During this phase, it was decided that the initial framework would be developed on the basis of above models and frameworks. The conceptual framework consists of four main stages: identifying the requirements and need for LMS in HEIs, identification of stakeholders' requirements, investigate the technology acceptance level through users' attitude towards the use of LMS and main barriers, and then identification of success factors to improve the current implementation and enhancement of a positive attitude towards using the LMS. The above approach allowed for the step-by-step integration of information from the available data and ensured that all data would be considered. Further, during the conceptual framework, the flow between conceptual framework phases was made compatible, and unnecessary activities were removed accordingly.

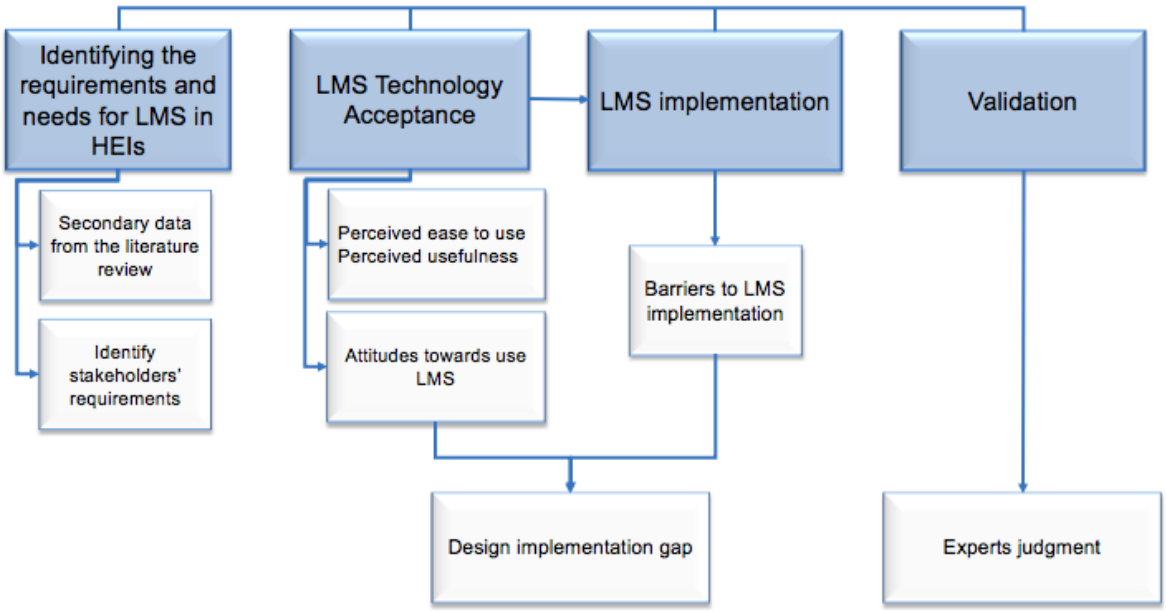

Figure 4.4: Conceptual framework for the development of LMS (developed by author)

The three diagrams above (Figures 4.2, 4.3 and 4.4) helped the researcher in proposing the final framework for the development of the LMS: suggest the main requirements and needs for LMS implementation in HEIs in the context of KSA's education policy in order to achieve the high-quality educational outcomes and to develop users' skills and capabilities. The next stage involved the integration of two IS research frameworks, namely, the TAM (PEOU, PU, and ATU) and the design-reality gap model (technology; information, technology, process–human; objectives and value, staff and skills–organisation; management system and structure, other). This allowed the identification of the users' technology acceptance level and critical barriers. The third stage focused on the analysis of critical barriers faced by LMS implementation. These barriers include lack of ICT skills, lack of technical support team and lack of training, to name a few. After that, on the basis of real circumstances and the physical environment, demonstrated success factors for the LMS was elaborated. At the final stage focus was given on the issues involved evaluation that judges the validity of the proposed framework.

4.3.3 Development of the final phase of the framework for the development of the LMS

The final framework was developed according to the data captured in the review phase as well as data collected from the field study. Chapter 6 presents the final framework as well as the final evaluation.

4.4 Summary

In this chapter, creation steps of the conceptual framework relevant to the present research's aims and objectives are presented and discussed. In addition to it, justification of integrating the TAM and the design-reality gap model (ITPOSMO) which provide theoretical foundations to this study, is presented.

5 A FIELD STUDY AND DATA ANALYSIS

5.1 Introduction

Chapter 5 presents the results for the academics' survey, the students' survey, and the interview data. The use of two surveys is justified by its appropriateness to determining the extent of existing ICT skills, usefulness, training, commitment, organisation support for academic and students in LMS implementation. This part of the study was pertinent in demonstrating the general and overall perceptions of academics and students. A statistical analysis approach was used for the analysis of the quantitative data. The qualitative part of the present study was designed to explore the gap between the proposed implementation of the LMS and reality. The qualitative data was analysed using a thematic analysis approach. The evidence generated by the present study was helpful in a framework development for LMS in HEIs. Figure 5.1 below summarises the various components of the results, analysis, and discussion of the present study.

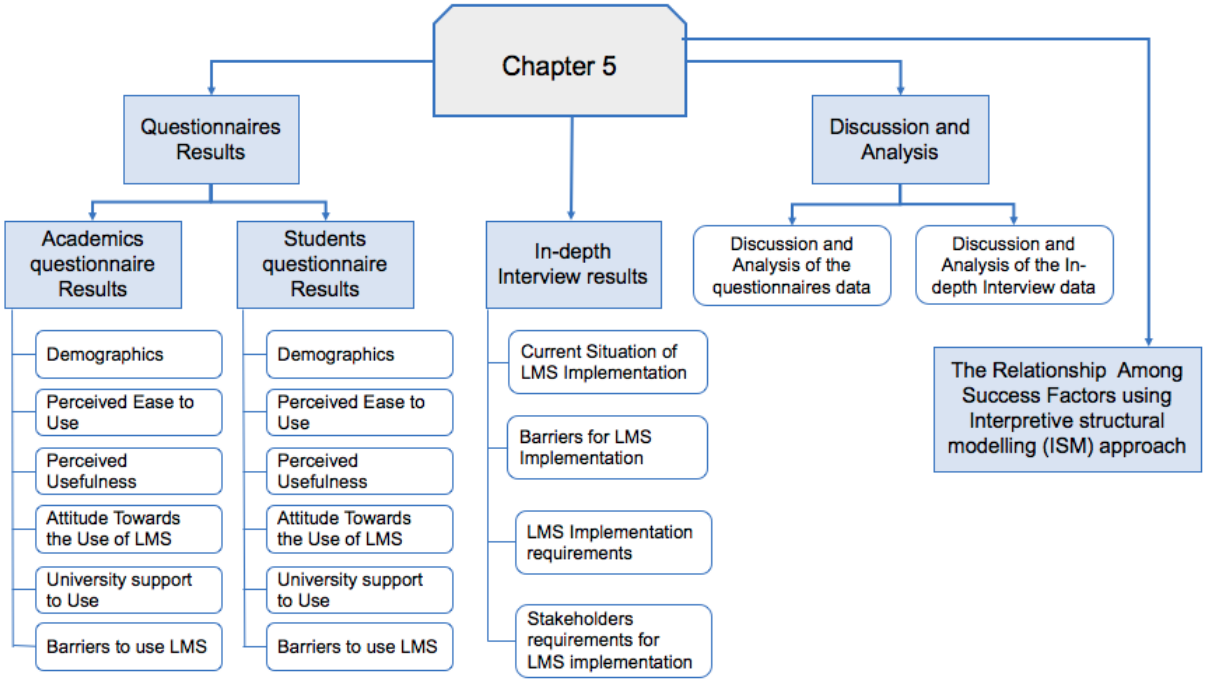

Figure 5.1: Summary of Data Analysis and Discussion (developed by author)

5.2 Surveys Results

Surveys data are presented in this section. Statistical Package for Social Sciences (SPSS) version 25.0 was used for data analysis. Initially, a unique ID was given to each case and data was entered into SPSS utilising ID rather than the name of an individual to ensure the confidentiality of the data. Further, data cleansing was done, to make sure that the final data file on which analysis is carried out is free from any human error. Due to the descriptive nature of data, mostly descriptive statistics was used. Descriptive statistics including frequencies, percentages, mean and standard deviation falling under different categories of variables (under investigation) were reported. The questionnaires utilised in the study investigate four aspects of LMS use according to the technology acceptance model (TAM) including perceived ease of use (PEOU), perceived usefulness of LMS (PU), attitude towards LMS (AUT) and organisation context of LMS Implementation. The correlation coefficient is used to determine the relationship between variables. The academics survey questionnaire is in Appendix A, whereas the students survey questionnaire is in Appendix B. The interpretation and meaning of results in this section are discussed in 5.3.

5.2.1 Academic Survey Results

Reliability Instruments: For the investigation of inter-item reliability of the questionnaire, Cronbach Alpha Coefficient was utilised. The overall Cronbach Alpha for academics was 0.732, indicating homogeneity of the items that further illustrate the inter-item consistency. The reliability of the questionnaire is acceptable (i.e. between .70-.90) (John W. Creswell, 2018; Mohamad et al., 2015). Table 5.1 shows that Cronbach's Alpha for academic's questionnaire.

Table 5.1: Reliability Statistics for academics

Scale	Number of Items	Cronbach's Alpha
Perceived ease of use (PEOU)	4	.838
Perceived usefulness (PU)	3	.889

Attitude towards LMS (AUT)	3	.893
Organisation support	2	.861
Barriers to use LMS	7	.578
Overall reliability	19	.732

Demographics Characteristics: There were two academics groups, 80.6 percent male respondents and 19.4 percent female respondents, the ratio as males were more than females.

On the basis of college, humanities and social sciences 21.7 percent were more than applied sciences 20.9 percent, administration sciences 17.1 percent, Islamic studies 14 percent, medical and health sciences 18.6 percent and other 7.8 percent.

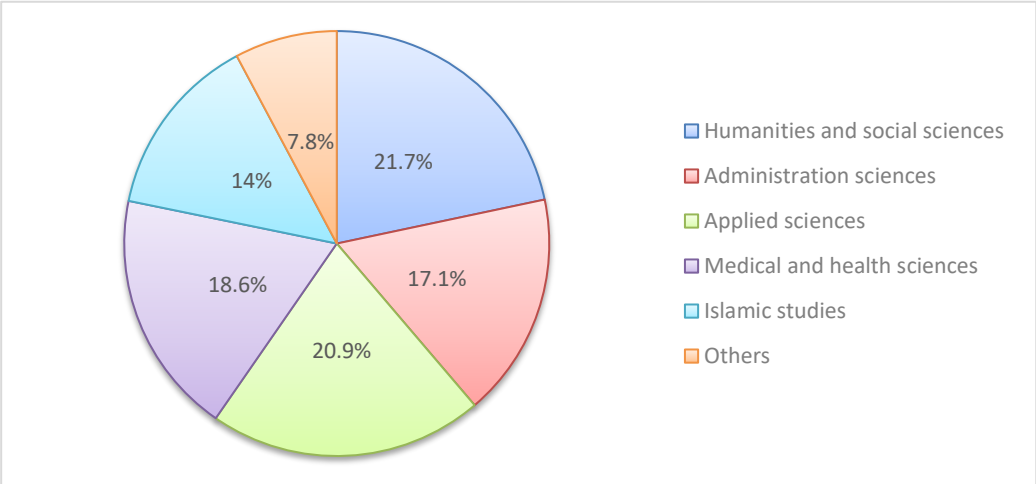

Figure 5.2: Percentage of academics' college

Those with academic rank lecturer 33.3 percent were greater in number than those with rank instructor 27.9 percent, assistant professor 21.7 percent, professor 10.9 percent and associate professor 6.2 percent.

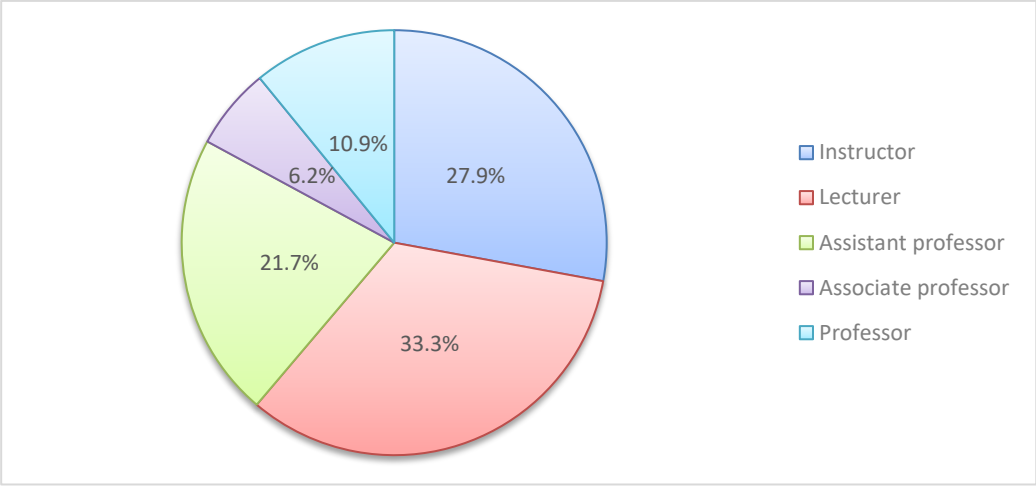

Figure 5.3: Percentage of academics' rank

There were 38 percent of individuals with work experience at university of less than a year, which was the greatest number of respondents. Whilst the least number of respondents with work experience at university from more than 7 years and less than 10 years was 7.9 percent.

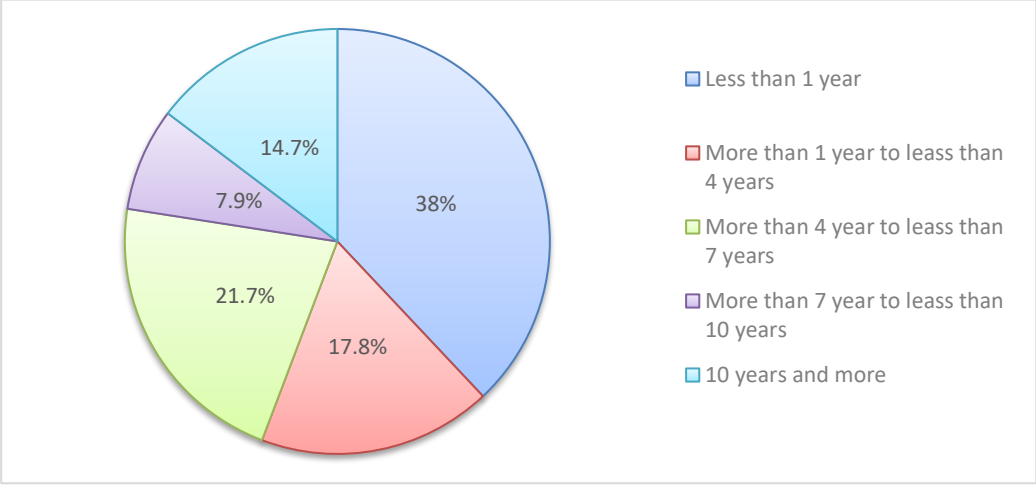

Figure 5.4: Percentage of academics' work experience

5.2.1.1 Academic Survey Findings

The findings in this section relate to the responses from academics who were involved in the survey study.

Perceived Ease of Use for Academics

This component includes four questions pertaining to the easiness to use LMS, increase interacting with LMS if it is clear and understandable, easiness to learn how to use LMS, Easiness to find learning resources through LMS. The results of these questions were given below.

The participants agreed with the statement that “using LMS is easy for me”. It is evident in the respondents 39.5 percent “strongly agreed” with the statement. Similarly, 37.2 percent reported, “Somewhat agreed”. Therefore, the cumulative agreement is 76.7 percent (meaning 78.4 of academics had much experience to use LMS).

Moreover, the participants agreed with the statement that “my interacting with LMS will increase if it is clear and understandable”. It is evident in the respondents 52.7 percent “strongly agreed” with the statement. Similarly, 32.6 percent reported, “somewhat agreed”. The cumulative agreement on this statement is 85.3 percent.

Forty percent of the participants strongly agreed with the statement that “it is easy to learn how to use LMS”. Similarly, 45 percent reported, “somewhat agreed”. The cumulative agreement on this statement is 85.3 percent. Only 48.8 percent of academics strongly agreed that it would be easy to find learning resources through LMS.

Perceived Usefulness for Academics

This component possesses items pertaining to improvement in ICT skills among academics, Helpful in increasing academic productivity, Enhancement in increasing effectiveness to do academic tasks. The perceptions of the academics regarding these issues are given below in the form of tables.

There were 39.5 percent who somewhat agreed that my job performance would improve with LMS, which was the largest number (meaning, academics quality and accuracy of academic work will be increased with LMS). Similarly, 41.9 percent reported “Strongly agreed”. The cumulative agreement on this statement is 81 percent.

Additionally, 41.1 percent, which was the most number, declared that my productivity would increase with LMS (meaning, academics agreed that using LMS may reduce the cycle time of educational processes). The least number 0,8 percent claimed that they disagreed it to no extent.

Moreover, 40.3 percent, which was the most number, declared that my effectiveness on my job would enhance with LMS (meaning, academics ability may enhance to create maximum value, in the minimum time and effort). The least number 0,8 percent claimed that they disagreed it to no extent.

Attitude Towards Using LMS for Academics

This component possesses items pertaining to improving the ICT skills among academics, enhancement in increasing educational process, facilitating the educational process.

Sixty-two of the participants strongly agreed with the statement that “administrators should give priority to LMS training in order to improve the ICT skills of academics”. Similarly, 27.1 percent reported, “somewhat agreed”. The cumulative agreement on this statement is 89.1 percent.

Furthermore, 54.3 percent, which was the largest number, claimed that LMS increases the educational process in my university, while 0.8 percent, which was the least number, strongly disagreed that to no extent.

When the study examined the likelihood of LMS facilitates educational process, the majority of the participants are strongly agreed with the statement that “LMS facilitates the educational process”. It is evident in the respondents 54.3 percent “strongly agreed” with the statement. Similarly, 27.9 percent reported, “Somewhat agreed”. The cumulative agreement on this statement is 82.2 percent.

Organisation context of LMS implementation

This part of questionnaire included items pertaining to agreeableness to use LMS under supervision instructor and agreeableness to use LMS with provision of proper technical support.

When the study examined the likelihood of use LMS when provided with the instructor-led training, the highest number of respondents was 65.9 percent, indicated that I am likely to use LMS if I am provided with the instructor-led training, whilst only 5.4 percent of respondents, held disagreed that I am likely to use LMS if I am provided with the instructor-led training.

Additionally, 73.6 percent, which was the largest number, strongly agreed that I am likely to use LMS if the university provides excellent technical support. However, only 5.4 percent of respondents, had disagreed that I am likely to use LMS if the university provides excellent technical support.

Barriers Factors Faced Academics' who use LMS

According to the survey respondents, information issues percentage such as (lack of resources data, information corruption or inconsistent) was 48.8 percent. Then, technology issues were the highest frequent issues faced by academics who used LMS with 37.2 percent. These issues include infrastructure issues, inappropriate choice of software and LMS is difficult to use. Process issues percentage such as (conflict between user departments, lack of productivity, and fail to underestimate of timeline) was 31 percent. Then, staff and skills issue percentage such as (lack of skills to handle IT poor, personal skills, leadership styles and bureaucracy) was 29.5 percent. After that, management systems and structure issues percentage (lack of managing change properly, stakeholders' involvement and lack of resources and capabilities for education activities) was 19.4 percent. Objective and value issues percentage was 17.8 percent. Finally, other issues percentage was 11.6 percent.

5.2.2 Student Survey Results

Reliability Instruments

For the investigation of inter-item reliability of the questionnaire, Cronbach Alpha Coefficient was utilised. The overall Cronbach Alpha was 0.842, indicating homogeneity of the items that further illustrate the inter-item consistency. The reliability of the questionnaire is acceptable (i.e. between .70-.90) (John W. Creswell, 2018; Mohamad et al., 2015). Table 5.2 shows that Cronbach's Alpha for student's questionnaire.

Table 5.2: Reliability Statistics for Student

Scale	Number of Items	Cronbach's Alpha
Perceived ease of use (PEOU)	7	.829
Perceived usefulness (PU)	3	.865
Attitude towards LMS (AUT)	5	.707
Organisation support	2	.832
Barriers to use LMS	7	.469
Overall reliability	24	.842

Demographics Characteristics: Females representation in the sample was slightly higher in proportion 57 percent as compared to males 43 percent.

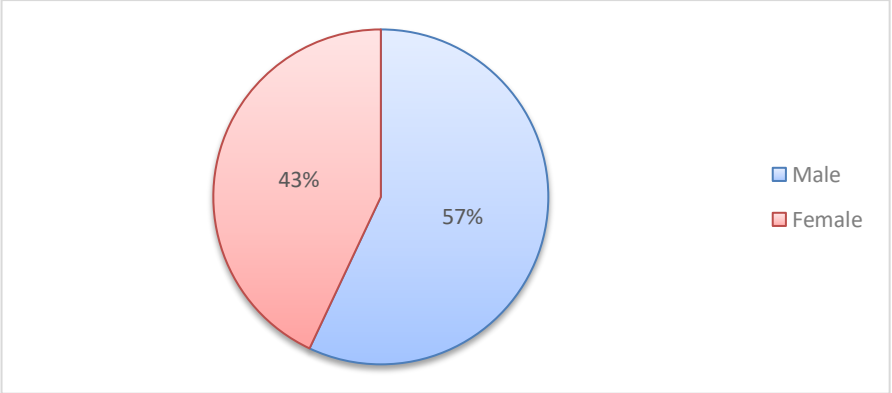

Figure 5.5: Percentage of students' gender

Approximately, half proportion of participants was enrolled in administrative sciences 48.8 percent. Individuals who study in Islamic studies collages were more than humanities and social sciences with 25.9 percent and 3.9 percent respectively.

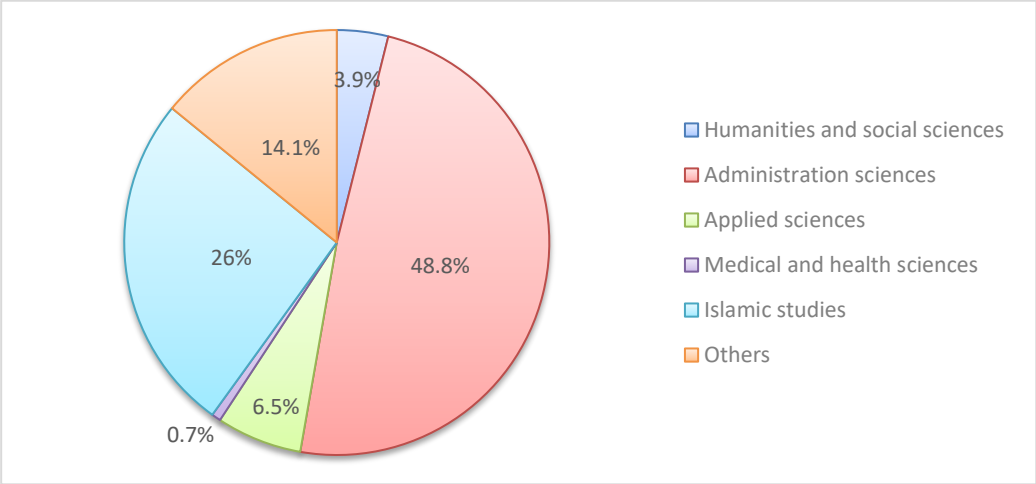

Figure 5.6: Percentage of students' college

On the basis of education, participants enrolled in the bachelor's degree program were at high rates at 92.4 percent.

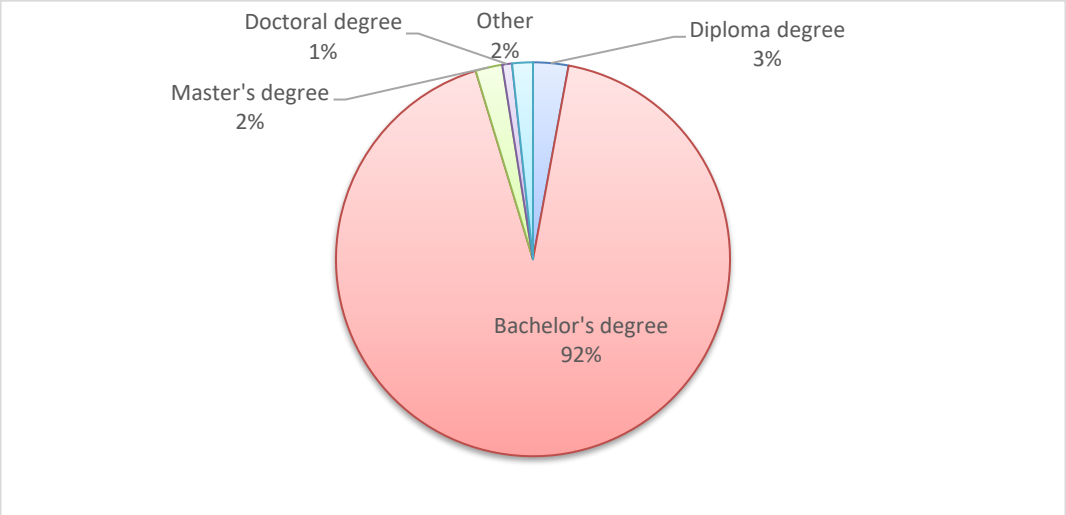

Figure 5.7: Percentage of students' Education

5.2.2.1 Student Survey Findings

The findings in this section relate to the responses from students who were involved in the survey study.

Perceived Ease of Use for Student

This component includes six-question pertaining to the easiness to utilize virtual classroom through LMS, Ease in receiving homework online through LMS, Easiness to participate in online discussions through LMS, Easiness in finding information online through LMS, Ease in arranging a video conference with students through LMS, Easiness to make online academic consultations through LMS. The results of these questions were given below.

The majority of the participants agreed with the statement that “it is easy to utilize virtual classroom through LMS”. It is evident in the respondents 40.9 percent “strongly agreed” with the statement. Similarly, 37.5 percent reported, “somewhat agreed”. Therefore, the cumulative agreement is 78.4 percent (meaning 78.4 of students had much experience to use a virtual classroom through LMS).

Moreover, the participants agreed with the statement that “it is easy to receive homework online through LMS”. It is evident in the respondents 44.8 percent “strongly agreed” with the statement. Similarly, 35.60 percent reported, “somewhat agreed”. The cumulative agreement on this statement is 80.4 percent.

Unlike the previous two statements, the responses given by participants on the statement “it is easy to participate in online discussions through LMS” are more dispersed and variant. About half the proportion of participants selected either “strongly agreed” 30.8 percent or “Somewhat Agreed” 28.6 percent. The cumulative agreement was slightly above half proportions of participants 59.40 percent. In contrast to it, a minimal number of participants indicated that they are either “Strongly disagreed” 5.4 percent or “Somewhat disagreed 14.9 percent with the statement.

The majority of the participants agreed with the statement that “it is easy to find information online through LMS”. It is evident in the respondents 36 percent

“strongly agreed” with the statement. Similarly, 35.3 percent reported, “somewhat agreed”. The cumulative agreement on this statement is 71.3 percent.

Responses on the statement “It is easy to make video conferencing with students through LMS” are mixed. As less than half the proportion of the participants endorsed the statement by selecting either “Strongly Agreed” 15.6 percent or “Somewhat agreed” 20.3 percent; hence, the cumulative agreement was 35.90%. In contrast, a considerable proportion of participants selected “Somewhat disagree” 17 percent and very few indicated “Strongly agreed” 8.9 percent. The cumulative disagreement was 25.9 percent.

Thirty-four of the participants strongly agreed with the statement that “it is easy to make online academic consultations through LMS”. Similarly, 34.9 percent reported, “somewhat agreed”. The cumulative agreement on this statement is 69.2 percent.

The majority of the participants agreed with the statement that “it is easy to give online examinations through LMS”. It is evident in the respondents 38.5 percent “strongly agreed” with the statement. Similarly, 29.8 percent reported “somewhat agreed”. The cumulative agreement on this statement is 68.3 percent.

Perceived Usefulness for Student

This component possesses items pertaining to improvement in learning performance through LMS, helpful in accomplishing academic tasks more quickly, enhancement in increasing effectiveness to do academic tasks. The perceptions of the students regarding these issues are given below in the form of tables.

The majority of the participants are agreed with the statement that “LMS will improve my learning performance”. It is evident in the respondents 41.3 percent “strongly agreed” with the statement. Similarly, 32.7 percent reported, “somewhat agreed”. The cumulative agreement on this statement is 74 percent.

Moreover, the participants agreed with the statement that “LMS will enable me in accomplishing academic tasks more quickly”. It is evident in the respondents 43.8

percent “strongly agreed” with the statement. Similarly, 44 percent reported, “somewhat agreed”. The cumulative agreement on this statement is 87.8 percent.

The majority of the participants agreed with the statement that “LMS will enable my effectiveness to do academic tasks”. It is evident in the respondents 41.7 percent “strongly agreed” with the statement. Similarly, 31.8 percent reported, “somewhat agreed”. The cumulative agreement on this statement is 73.5 percent.

Attitude Towards Using LMS for Student

This component possesses items pertaining to easy implementation of LMS within colleges, non-technicality of LMS, helpful in achieving high academic performances. The majority of the participants are agreed with the statement that “University has enough resources for the implementation of LMS within their collages”. It is evident in the respondents 32.2 percent “strongly agreed” with the statement. Similarly, 34.7 percent reported, “somewhat agreed”. The cumulative agreement on this statement is 66.9 percent.

Fifty-nine percent maintained that using LMS is a good idea to apply within the university and another 2 percent disagreed that (meaning, they prefeed using modern education technologies) compared to traditional education.

Responses given by participants on the statement “Using LMS does not require technical ability” are more dispersed. About half the proportion of participants selected either “strongly agreed” 20.4 percent or “Somewhat Agreed” 36.3 percent. The cumulative agreement was slightly above half proportions of participants 56.7 percent (meaning students had enough skills to use LMS). In contrast to it, a minimal number of participants indicated that they are either “Strongly disagreed” 9.2 percent or “Somewhat disagreed” 17.6 percent with the statement.

Furthermore, 35 percent, which was the largest number, strongly agreed that using LMS will help me to obtain high grades, while the smallest number of respondents was 4.4 percent, who disagreed that using LMS will help me to obtain high grades.

Additionally, 40 percent of respondents who strongly agreed that LMS would help me to achieve the learning outcomes required for my studies. Two percent, which was the least number, had disagreed that.

Organisation context of LMS implementation

This part of questionnaire included items pertaining to agreeableness to use LMS under supervision instructor and agreeableness to use LMS with provision of proper technical support. When the study examined the probability of likely to use LMS if provided with the instructor-led training, the highest number of respondents was 68.3 percent, indicated that I am likely to use LMS if I am provided with the instructor-led training, while only 5.6 percent of respondents, held disagreed that I am likely to use LMS if I am provided with the instructor-led training.

Additionally, 40 percent, which was the largest number, strongly agreed that I am likely to use LMS if the university provides good technical support. However, only 4.4 percent of respondents, had disagreed that I am likely to use LMS if the university provides excellent technical support.

Barriers Factors Faced Students' who use LMS

According to the survey respondents, technology issues were the highest frequent issues faced by students who used LMS with 49.2 percent. These issues include infrastructure issues, inappropriate choice of software and LMS is difficult to use. Then, information issues percentage such as (lack of resources data, information corruption or inconsistent) was 40.6 percent. Staff and skills issues percentage such as (lack of skills to handle IT poor, personal skills, leadership styles and bureaucracy) was 38.3 percent. Then, other issues percentage was 33.5 percent. Management systems and structure issues percentage (lack of managing change properly, stakeholders' involvement and lack of resources and capabilities for education activities) was 29 percent. Objective and value issues percentage was 27.9 percent. Finally, process issues percentage such as (conflict between user departments, lack of productivity, and fail to underestimate of the timeline) was 23.6 percent.

5.3 Discussion of Surveys Data

The findings indicated that the participants, including academics and students, had positive perceptions and attitudes towards many elements of the LMS. This was evident from the responses to the first question, i.e., “It is easy to utilise virtual classrooms through the LMS.” A majority of the students agreed with the statement (78.4%). This indicated that, in general, university students had a favourable opinion regarding the ease of use of the LMS. Similarly, other questions related to ease of use revealed that a majority of the participants were in agreement about the ease of utilising the LMS. For instance, the cumulative agreement on the benefit of receiving homework through the LMS was 80.4%. However, there were a few elements of the LMS for which the findings were different. A low proportion of students showed an understanding of the usefulness of the LMS in generating discussions and video conferencing (59.40% and 35.90%, respectively). This degree of agreement was small compared to other questions. This finding is intuitive, and it seems reasonable that a straightforward explanation for it is that the degree and quality of discussion achievable in face-to-face interaction is not possible in digital communication. Another putative reason might be that the use of the LMS platform provided a controlled, formal educational environment where students were required to complete their assignments, whereas discussion through face-to-face interaction and an informal learning environment allow the students to engage in higher-quality interactions (Dogoriti et al., 2014). However, some researchers and specialists in e-learning proposed that such limitations associated with the LMS can be addressed and corrected, in terms of its impact on learning, teaching, and ease of communication, by making it more user-friendly (Carvalho et al., 2011; Asiri *et al.*, 2012; Kulshrestha and Kant, 2013). In this regard, the provision of multiple display options, a simple and powerful publishing format, and flexible storage would be improvements. In addition, incorporating multiple media elements to enable efficient, effective, informal, and flexible communication could increase the ease of interaction.

Although the students’ disagreed regarding the ease of generating discussions and video conferencing, the majority of the students were in agreement with the

ease of receiving homework through the LMS, searching online literature on the LMS, online academic consultation, and online examinations. These results can be explained by the fact that due to restrictions associated with lockdowns during Covid19, the LMS are the only viable avenue through which learning can occur (Basilaia, 2020).

In contrast to students, academics expressed their endorsement of the ease of use of the LMS on all of the questions. The findings concur with researchers such as (Kaup et al., 2020; Shahzad et al., 2020; Shenoy, Mahendra, and Vijay, 2020), who perceive LMS as being part of the rationale why learning was possible during the lockdown. In general, both the instructors and students the researcher's surveyed responded positively, although the students were less positive about the ease of use in discussions through the LMS. This can be attributed to the fact that LMS systems are built for use by instructors, to facilitate teaching (Auer and Tsiatsos, 2019), even though they also contribute to the learning process (Dash, 2020). The academics differed from the students by more often indicating a higher consensus in their rating of the efficiency of communication activities. For teaching and learning activities, however, both the instructor and student respondents rated the activities as easy. These findings indicate a gap between instructors and students and their perceptions of the benefits and usage levels of IT and LMS technologies (Hornik et al., 2007). As long as students fail to see the relevance of interactive tools for their learning or instructors' teaching, they are likely to continue to view IT as merely a quick and accessible means of retrieving course documents and getting messages from instructors.

The next portion of the questionnaire for students pertained to improvement in learning performance through the LMS, helpfulness in accomplishing academic tasks more quickly, believing that LMS content is not informative, enhancement of effectiveness in doing academic tasks, and usefulness in increasing academic productivity. The views reflect what (Brennan, 2020) discussed concerning teachers ensuring that LMS For instance, the degree of agreement on the questions relevant to learning performance through LMS was 74%; helpfulness in accomplishing academic tasks more quickly was 87.80%; enhancement of

effectiveness in doing academic tasks was 73.50%, and usefulness in increasing academic productivity was 64.60%. These findings concur with the previous literature. For example, one study that addressed the perceptions of students towards LMS demonstrated that increased familiarity with and usage of web-based tools and social media had transformed the students' view of Internet technology in the learning process (Almarashdeh et al., 2011).

Similarly, data from academics also demonstrated that an LMS would likely enhance their teaching abilities. Such a finding can be attributed to various explanations. For example, the accessibility and availability of the notes prepared before the lecture on an LMS are useful to the teachers. This functionality lightens the burden of the teachers and facilitates communication and the imparting of concepts to students during the lecture, provided they have studied the handout notes. This finding clearly demonstrates that academics have a positive attitude towards LMS. Such technology offers students the opportunity to interact with the materials before the lecture and to post relevant questions and clarifications during the class, which can save time and provide optimal learning (Asiri *et al.*, 2012).

However, there is a need to interpret these findings with caution as success and academic achievement do not solely depend upon the use of an LMS. Many other factors must be considered. Social and technical factors, such as expectations, attitudes, culture, practices, the content and design of curricula, and facilitators/barriers regarding their implementation will eventually affect the academic performance of academics and students alike. It is wise to remember that an LMS or the provision of cyber interaction relevant to education and learning are simply resources among others that are available to academics and educators (Schofield and Davidson, 2002).

Data regarding the ease of implementation of the LMS within colleges indicate that the majority of the academics and students reported that the LMS could be easily implemented in their universities. This finding partially concurs with the previous literature indicating the significance of the institutional role in implementing an LMS. The literature considers that if universities have the

necessary infrastructure and equipment for e-learning, it should be easy to implement an LMS (Selim, 2007). This implies that students, staff, and academics may be compelled to develop the inclination to use an LMS if their institutions place emphasis on their availability and use for higher academic purposes.

Further findings indicated that the students lacked the interest to get themselves trained in LMS use as the majority of the students disagreed with this point. This is in contrast with the widely held view that before the implementation of LMS, there is a need for training. In the 21st century, youngsters are well acquainted with IT (Ng et al., 2020); the daily use of IT devices has enabled them to utilise IT effectively (Shenoy et al., 2020). Therefore, the present findings indicate that the students might have a basic understanding of the LMS due to their increased exposure to IT (Claro *et al.*, 2012). However, students generally agreed to use the LMS under the supervision of an instructor and with the provision of proper technical support. In contrast, academics were in favour of obtaining training to use the LMS. On the other hand, there is a need for training of the instructors, who might not have had as much exposure to IT tools as the students (Amoah and Naah, 2020). Furthermore, since instructors require knowledge of all components and elements of the LMS, including technical knowledge on how to troubleshoot, there is a need for training of the instructors.

Overall, in the era of the 21st century, learning is faster, more knowledge is available, and the dissemination of knowledge occurs more quickly than in the past. Consequently, students and academics are more disposed to gain quick access to knowledge and information. Therefore, the concepts of e-learning, ICT, and LMS are handy tools that provide students and academics with quick access to learning materials and even reminders about upcoming assignments and projects. This may have positive implications as such tools provide academics with easy access to students in connection with their coursework and learning materials. LMS might be problematic in specific areas, such as communication and discussion; however, these issues can be overcome through the availability of diverse modes of social media platforms. Universities may provide specialised training programs to students and, particularly, academics. A majority of the

students and academics expressed positive views about the LMS; therefore, the provision of the LMS as a teaching modality can be improved and then considered applicable.

5.4 Interview Results

Semi-Structured interview questions have been developed based on the research aim, objectives and questions. Those interviews were conducted by the researcher with a selected sample of employees, who are responsible for LMS implementation in Colleges, Deanship of Information Technology and Deanship of E-Learning. The sample was achieved via a purposive sampling technique, which resulted in the identification of 21 participants, all of whom agreed to be interviewed. The interview questions and answers are in Appendix C. Table 5.3 presents interviewees' job positions and gender.

Table 5.3: Interviewees' job positions and gender

Interviewees	Male	Female	Total
Dean / Head	5	2	7
IT Personal	8	0	8
E-learning Personal	6	0	6
Total	19	2	21

HEIs Vision to Implement LMS

The researcher arranged a separate meeting with university administrators, IT personal and E-Learning Personal; the interviews participants were asked about the IT vision within your organisation, specifically to LMS.

In the first question, the researcher sought to determine the vision of IT within the institution, with a particular focus on learning in HEIs. The responses from the administrators revolve around improvement in the educational processes, in response to both the internal and external environments.

The responses from the IT personnel reveal that their views revolve around technical aspects of IT, spanning from the use of online platforms to improve the efficiency of operations that were reliant on offline options. The responses reveal a deeper and more diversified range of visions, some which exist in different levels. For instance, Interviewee 2 cites improvements under e-learning platforms, depending on the skills, capabilities and resources available within the institution.

The responses from the general participants reveal more generalist views on the visions within the organisations, because they may not be particularly involved in the decision making and implementation of the visions. Their visions are broader and more loosely defined, ranging from second-order effects such as improvement in student services (Interviewee 3) to management-oriented outcomes (Interviewee 1).

Level of IT Skills within Organisation Staff

The ratings for the level of IT skills within the organisation staff is assessed in this question. The views are varied based on the knowledge available to the staff, within their functional departments in the institution. Among the administrators, who have access to information about the skills of the staff, the views differ slightly from those of other categories of respondents. Their views range from 1 to 4, with no consensus.

The majority of the IT staff concur that the level of IT skills among the university staff is estimated at 4, revealing that the IT staff, who are primarily involved in the activities associated with LMS, gauge their skills highly.

Finally, among the E-learning personal, most perceive the IT skills of the university staff as being at 4, in line with the views of the IT staff.

HEIs Satisfaction Level to Current Implementation of LMS

The level of satisfaction of the HEI to the current level of implementation also varied based on the responsibilities of the respondents. None of the interviewees indicated a maximum level of satisfaction, although a higher proportion of the IT

staff and other members of the staff ranked the current level of satisfaction as ‘high’.

Based on the responses, the administrators perceive the level of satisfaction with LMS in the university as varying from ‘high’ to ‘very low’, without a specific consensus among the interviewees.

The responses hereunder reveal that the majority of IT staff, five out of eight, perceive the level of satisfaction as being ‘high’, with a rating of 4. Similarly, the lowest level of satisfaction is judged at low, with a rating of 2.

The views of the e-learning personal regarding the satisfaction mirror what the IT staff perceive, with the majority judging the level of satisfaction at ‘high’ with a rating of 4. However, their views are more diversified, with one of the interviewees judging the level of satisfaction at ‘very low’, with a rating of 1.

Barriers Faced HEIs to Successful Implementation LMS

The level of dissatisfaction identified in the previous question indicates the presence of barriers. The barriers identified by the administrators are diverse and span across a range of factors, including the organisational and national culture (Interviewee 4) to management-related factors, such as resistance to change.

Among the IT staff, the barriers for LMS in HEIs are framed from the technical perspective, with particular barriers including interdepartmental bottlenecks from improper integration (Interviewee 1) to quality management concerns (Interviewee 8).

In the case of other participants, generic barriers are identified, including lack of resources (Interviewee 1 and 3) to lack of organisational commitment and uncertainty about the future (Interviewee 6).

Overlaps in LMS Implementation in HEIs

The possibility of there being overlaps in the implementation of LMS in HEIs is investigated in this question. Among the administrators, the responses range

from there being no overlaps (Interviewee 1, 4 and 6), to the presence of specific overlaps that have identifiable impacts on LMS (Interviewee 5 and 7).

Among the IT staff, the responses lean towards there being overlaps in the LMS, a situation that can be attributed to their technical ability to identify overlaps. The responses attribute the presence of overlaps to the nature of IT systems (Interviewee 1), to there being no overlaps (Interviewee 3).

Finally, among the e-learning personal, the presence of overlaps can be attributed to the fact that they are not fully aware of the functions under LMS (Interviewee 2), to the fact that the LMS has functions that allow the learners to participate in activities that were not possible before the LMS was introduced.

Project Manager to Guide LMS Implementation Process in HEIs

The involvement of project managers in the implementation of LMS in HEI is attributed to the overriding perception that the process is fundamentally a project.

Among the administrators, the involvement of project managers is evident from the fact that the implementation of the project is viewed as other IT projects. From an administrative perspective, the implementation of LMS is treated as other it projects, including other e-learning projects (Interviewee 1 and 2), and other technical projects requiring specialized knowledge (Interviewee 3).

The IT staff perceive the implementation of LMS from a diversity of perspectives, because in some institutions, it is implemented internally without a particular project manager (Interviewee 1), to the utilisation of the project managers in the IT department (Interviewee 3, 6 and 7).

Finally, among the e-learning personal, the implementation of the process is viewed as a general management activity, within is implemented by the university management under the Deanship of the Information Technology (Interviewee 1 and 4). In some instances, it is implemented under the directorate of learning, but not viewed as a unique project.

LMS Implementation Requirements within HEIs

The responses to the questions in requirements for the implementation of LMS in HEIs are presented in this section. Based on the views of the administrators, the requirements span from technical to professional skills, with elements of quality management through standardisation (Interviewee 5).

The IT staff identify the requirements as spanning from management capabilities, strategic awareness, technical skills in IT, resources and capabilities and the ability to create knowledge for continuous improvement.

Among the e-learning personal, the requirements for implements of the LMS include the suitability of the technology for the existing learning systems and strategies, as well as the potential that the new technology will contribute positively to learning. Similarly, the creation of e-courses to go with the LMS system was also a requirement. Unlike the other categories of respondents, the students did not focus on the technical, strategies and quality dimensions of the requirements, but rather focused on the functionality of the LMS.

Stakeholder Cooperation for LMS implementation in HEIs

The responses relating to the cooperation from stakeholders on the implementation of LMS in the HEI are included in this section. The administrators perceive the cooperation as ranging from highly favourable (Interviewee 1), to moderate and limited (Interviewee 2), to lacking and available when necessary.

Among the IT staff, the level of stakeholder cooperation is estimated at moderate (Interviewee 8) to low (Interviewee 2), even though it is viewed as an integral component of the implementation of LMS. The disparity can be attributed to the fact that there are different stakeholders required for the various functions.

Among the e-learning personal, the level of stakeholder cooperation varies from high to low, primarily because they only experience the successful dimensions of LMS. After all, for learners to use the system, it implies that it has already been successful implemented. The learners indicate that stakeholders, primarily faculty and university staff, play a key role in the implementation of the LMS.

5.5 Triangulation

The term *triangulation* refers to the researcher using more than one method or source of data in the study of social phenomena (Creswell, 2014). It has been viewed as a method for the development of measures to create a high level of confidence in research findings. This is a way to ensure the validity of research using a set of methods to collect data from different sources on the same topic. However, triangulation does not necessarily aim at cross-validating results but rather at capturing different dimensions of the same phenomenon (Creswell, 2014).

Triangulation is exemplified by the interview question “What is the level of satisfaction with the LMS within your university?” being reinforced by the academic survey statement “During your work in your university, how long have you used a learning management system (LMS)?” Another example is the interview question “How do you assess the level of IT skills within the university staff?” being reinforced by the survey statement “Using an LMS is easy for me; my interaction with an LMS will increase if it is clear and understandable, etc.” A final example is the interview question “What are the main barriers that you face in the implementation of an LMS in your university?” being reinforced by the survey statement “Which of the following barriers have you usually faced while using an LMS: information problems (e.g., lack of data resources, information corruption, or inconsistency), technology problems (e.g., infrastructure issues, inappropriate choice of software, or the LMS is difficult to use), process problems (e.g., conflict between user departments, lack of productivity, or fail to underestimate of timeline), etc.”

5.6 Analysis and Discussion of the Interview Data

This section presents the analysis and discussion of the interview data. The interview data from the current research generated the following themes: (technology, human, organisational) barriers faced in LMS implementation; stakeholders' requirements (university, technical provider, content provider, and learners and instructors); success factors.

5.6.1 Barriers currently faced in the current implementation of the LMS in a HEI

IT-based academic activities are useful in that they remove geographic and temporal constraints and spread education to more students. This alone can be hugely helpful in countries with low literacy rates as one of the significant problems in such regions is the accessibility of education. LMS can be used to increase and widen the target population of education. Therefore, to improve the quality of education and facilitate optimal outcomes, successful implementation of IT-based educational tools like LMS is indeed required. Appropriate infrastructure and responsive technical support are necessary to achieve such a milestone. However, the effective implementation of LMS is still lacking for a range of reasons. The first reason in the list is the acquaintance of faculty with traditional ways of teaching. There are several reasons behind the utilisation of the traditional teaching approaches still prevalent in HEIs: lack of technical skills and knowledge, inadequate training and assistance with technology, and insufficient IT support. Nelson (2003) reported that academic staff had not acquired the necessary IT skills to make use of an LMS in order to support their teaching activities.

In comparison, academics who decide to use an LMS commit to doing so for two main reasons. First, they understand the value of the LMS in the way in which it supports, liberates, and disentangles communication between students and academics. This represents the strategic dimension, which is discussed by (Almaiah et al., 2020; Kaup et al., 2020). Secondly, academics may be driven to consider the use of an LMS obligatory (Babić, 2012; Reilly et al., 2012). Based on the findings, the adoption of LMS is considered obligatory when HEis have no

option by to utilise the LMS, such as during the current lockdowns (Ng et al., 2020), or in response to changes in the learning environments towards digitised environments as a way of enhancing the effectiveness and efficiency of learning and teaching (Shahzad et al., 2020). Regardless of the rationale for the adoption of LMS, it is apparent that the system eventually plays a strategic and imperative role in the learning environment for most HEIs.

Similarly, the barriers related to the effective implementation of the LMS were explored and are presented below in light of the existing literature. The findings from the semi-structured interviews regarding the implementation of the LMS are reviewed about all of the ITPOSMO gaps. These barriers are grouped under three aspects: 1) technology barriers (information, technology, process); human barriers (objectives and values, staff and skills); and 3) organisational barriers (management system and structure, others).

5.6.1.1 Technology barriers

Analysis of the data from the present study revealed that several technological barriers could hinder the effective implementation of LMS in educational settings. These are lack of IT infrastructure in the institutions, incomplete functionalities of the LMS, lack of integration between e-learning and other systems, and maintenance issues, to name a few.

- **Information:** The information dimension seeks to assess the quality of learning information content, which matches instructors' and learners' needs and guarantees the provision of a sufficient quality of content. Further, the LMS was designed assuming that the content provider would provide complete and timely data. However, the reality was that the LMS was missing learning content. The survey findings indicated that participants, including academics and students, have faced information issues while using the LMS. The proportions of the academics and students encountering such difficulties were 48.8% and 40.9%, respectively. One of the university administrators (Administrator 2) expressed what he thought were the key information barriers to LMS implementation: "*Lack of the required and adequate content for e-learning*

and insufficient work on its formation and publication in the necessary manner, which is a key element for the beneficiary to use." According to Hoque et al. (2015), incomplete and missing information in an educational technologies for higher education represent a gap along the information dimension. Similarly, this study revealed that an information gap exists due to the lack of required content for e-learning. In light of the above findings, it is evident that a wide information gap occurred in the LMS project implementation. Gap rating = 4.4.

- **Technology**: The technology dimension includes the existence of sufficient required hardware and software for the LMS operations. Bearing this in mind, HEIs are keen to provide the proper combination of hardware and software for instructors and learners, which helps to facilitate educational activities. However, they have faced several technical issues. Technical issues have been encountered by 37.2% of academics and 49.2% of students while using the LMS.

  Administrator 6, who worked in a university, expressed what he thought about the technology barriers to LMS implementation: "*[..] there is a need to enhance the IT infrastructure of the institution*". IT infrastructure is one of the most critical factors that can facilitate the use of LMS in educational institutions (Elkaseh, Wong and Fung, 2015). Therefore, the IT infrastructure in HEIs should be flexible enough to support any technology and software tools without problems. As noted by Oliver (2001), one of the most critical factors for the successful implementation of e-learning in Australian HEIs is technological infrastructure. Indeed, flexible and appropriate technological infrastructure can facilitate the effective implementation of LMS or any other software. Moreover, IT infrastructure can positively affect the PEOU of LMS among academics and students (Alebaikan and Troudi, 2010).

  Further, regarding technical issues, Member of IT personal 4 , who worked in a university, expressed what he thought about technology barriers to LMS implementation: "LMS should be integrated with other university systems." As Kituyi and Tusubira (2013) pointed out in their study of a

framework for the integration of e-learning in HEIs in developing countries, LMS integration can be achieved through three phases. 1) Before integration, several activities should be carried out, including the analysis of user characteristics, analysis of the learning environment, and identification of learning methods. At this stage, the university, lecturers, and students are the stakeholders responsible for carrying out the specified activities. 2) During the integration phase, there are several actions that should be undertaken as well, including the integration of face-to-face activities with e-learning activities. HEIs should ensure that certain e-learning features are present in their e-learning systems, such as audio learning, video learning, and content management. At this stage, the lecturers, students, and the technology provider are the stakeholders responsible for carrying out the specified activities. 3) After integration, the actions that should be carried out include the evaluation of integrated systems, the evaluation of users' performance, and continuous user training to ensure that the integrated LMS works properly. The relevant stakeholders responsible for implementing these activities are HEIs, the technology provider, the lecturers, and the students. This study is relevant to the current research because of its discussion of LMS integration, which provides clarification of the integration phase.

The E-learning personal 2 said that, *"[..] our organisation faces multiple barriers in the implementation process, which include quality support, including pedagogical and technical support*". A study from the literature review, Iqbal and Qureshi (2011), indicated that one of the barriers to LMS implementation is the lack of technical support. As they mentioned, an "e-learning program without proper technical support will end up in disaster." This is because LMS implementation requires a great deal of confidential information to be uploaded and stored by instructors and learners.

The interviews revealed that incomplete requirements and difficulty applying certain academic procedures were problems encountered during the implementation. Administrator 5, an interview participant, said that "*incomplete requirements and functionalities are some of the major*

barriers faced in the implementation of the LMS". This is reflected in the study of Yeo (2002) in which the author considered weak definitions of requirements and scope to be failure factors.

In the technology dimension, several technical issues persisted, including that the IT deanship operates more than 10 systems with a limited staff, there is a lack of IT infrastructure in new buildings, and a technical support team is also lacking. In the current circumstances, a skilful IT team is required to support the LMS adoption, which will be discussed in the following section.

Finally, an LMS should be flexible enough to be integrated with other IT tools to widen the horizon of its functionality. Therefore, there are still various changes needed to improve the technology dimension of LMS implementation, which represent a gap here. Gap rating = 4.8.

- **Process:** The LMS has been designed to organise and facilitate educational activities and the learning process and to increase speed and accuracy. One issue encountered in LMS implementation was that HEIs could not automate certain academic procedures through the LMS. The proportion of academics and students who faced process issues while using the LMS were 31% and 23.6%, respectively. Administrator 2 stated, " *Lack of clear policies is considered one of the major barriers faced in the implementation of the LMS*". Administrator 3 said "*We still have overlaps between our departments; however, we are working to improve that*". In addition, Administrator 5 said "*There are definitely certain overlaps (necessary and unwarranted both) between various aspects of the LMS. Some major overlaps, in my opinion, include assessments, evaluations, academic resources, etc.*". Kefalas et al. (2003) discussed the barriers to implementing LMS; they listed several resources for acquiring useful information on the current state of quality assurance in learning systems. New educational environments based on new technology should provide a high-quality experience. This study identified five specific quality attributes in such learning systems: 1) availability of the technological platform, together with the administrative staff, when needed to deliver the

defined services at the agreed service level; 2) usability such that users are able to carry out specific tasks effectively, efficiently, and with satisfaction; 3) learning effectiveness through appropriate learning materials, proper content, and clarity of objectives; 4) performance capability to ensure the performance of tasks within the agreed time and with available resources; 5) security, which is the ability to respond to a threat to the learning system; and 6) the potential to change (Kefalas *et al.*, 2003). Moreover, Avidov-Ungar and Shamir-Inbal (2013) emphasised that collaboration among LMS stakeholders, including IT and academic staff, helps to inspire staff motivation, commitment, and mutual responsibility. One of their findings was that the implementation of ICT is a process that takes time and effort in instructional systems. Therefore, the academic staff's commitment to ICT adoption was accompanied by training and support, resulting in their empowerment.

The E-learning personal 1 indicated the "*[..] difficulty in applying some academic procedures through the e-learning system.*" This is reflected in the study of Jacobs et al. (2018), in which the authors found that to ensure the successful implementation of an LMS in HEIs, the identification of educational processes and the development of a set of LMS requirements were essential.

This is reflected in the study of Jacobs et al. (2018), in which the authors found that to ensure the successful implementation of an LMS in HEIs, the identification of educational processes and the development of a set of LMS requirements were essential.

The process still needs to be re-engineering to improve its execution as the current LMS implementation has several issues, such as the difficulty of applying certain academic procedures through the LMS, a lack of LMS procedures and rules, and overlap of tasks among departments. Gap rating = 2.4.

5.6.1.2 Human barriers

- **Objectives and values:** The general objectives of the LMS are to provide better utilisation of the allocated learning resources and achieve improved

education for both instructors and learners. However, 17.8% of academics and 27.9% of students said that the LMS does not fully meet their objectives. The interviews convincingly indicated the reasons that some participants were hostile to LMS implementation. For instance, one administrator stated that "*LMS is already implemented in our organisation. The problem we are facing is that it is not being used to the extent to which it should be used. Teachers use it occasionally and, similarly, the students only use it if their teacher asks them to do so. The main problem here is that the teachers don't have sufficient time to manage courses here along with their teaching, so there must be a coordinator for LMS who can assist the teachers in LMS-related activities*" (Administrator 4).

Noteworthy in this regard was the comment of E-learning 2, who highlighted the "*lack of knowledge of users of the importance of e-learning and techniques and keenness to use and benefit from them*". Further, E-learning 5, noted, *"[..] There are a few barriers that can be faced by an organisation while implementing an information system, such as fear of losing control and chances of being monitored.*"

These findings indicate that the motivation behind the acceptance and utilisation of the LMS by the academic staff is, generally, obligation; moreover, it indicates that practices for implementing the LMS have not been internalised. Consequently, the academics feel forced to utilise it without really appreciating or internalising the advantages and ease it can deliver. Contemporary academic tradition advocates the use of LMS as a necessary component of the course curriculum (Nelson, 2003). Therefore, the gap in this area was wide. As the interviews indicated, there was a lack of policies and clear objectives for organisation staff, limited chances of staff being monitored by top management, a lack of knowledge of the importance of using the LMS, and staff fear of losing control of their privileges. Therefore, despite the supposed development of actual plans and strategies, these are merely paid lip service and will be difficult to achieve without concerted action. Gap rating = 2.7.

- **Staff and skills:** In developing countries, human resources in HEIs suffer from a general lack of skills, knowledge of all aspects of the LMS, and the specific human skills required for installation, maintenance, management, and implementation of ICT infrastructure. Of the participants, 29.5% of academics and 38.3% of students claimed that the number of staff dealing with the LMS in their respective institutions was low. Administrator 1, an interview participant, noted the "*Lack of expertise and competencies of staff in the field of e-learning.*" Further, in this regard, Administrator 6 indicated that "*The staff are not well equipped with necessary IT skills.*" This points to a lack of staff who are sufficiently equipped with the necessary IT skills for the implementation of the LMS, a lack of expertise and competencies in the field of e-learning, and a lack of proper training for existing staff to operate and manage the LMS. This scenario has prominently arisen in many HEIs in developing countries that are faced with a limited number of qualified staff and training programmes. This might also be the main reason that teaching faculty lack interest in learning skills relevant to LMS. However, the basic intent and purpose of LMS applications is the provision of simple and fast communication platform for students that is conducive to collaborative and shared learning and academic activities (Dietz-Uhler and Bishop-Clark, 2001; Grandgenett and Grandgenett, 2001). In this regard, building motivation among the academics to recognise the utility and advantages of the LMS is key to introducing this new milieu. Such motivation can provide a foundation for implementing further training programs for the LMS in universities.

  In addition, the students in any college may miss the homework deadline if they do not receive a notification or announcement. Other students might need someone to help them to complete their homework assignments or to understand the materials they are studying. Time in college is very limited, and the students cannot always interact with teachers for as long as needed. The LMS solves all these problems for learners and instructors as a system that facilitates the management of college learning resources for both learners and instructors. The system provides communication

environments for learners and instructors, such as e-mail, messaging, or submissions via web browser. Gap rating = 3.8.

5.6.1.3 Organisation barriers

- **Management system and structure:** The most important factor in starting the e-learning initiative is that HEI employees must understand the related objectives and plans. Therefore, the management has sought the engagement of HEI employees by announcing the objectives and plans to everyone. According to the participants, academics and students have also encountered management system and structure issues while using the LMS. The proportions of academics and students reporting these issues were 19.4% and 29%, respectively. The interviews indicated unclear requirements and the lack of necessary skills and training as problems encountered during the implementation. Administrator 5 said that *"[..] incomplete requirements and functionalities are some of the major barriers faced in the implementation of the LMS."* The problem of lack of organisational preparedness during implementation was also implied by one member of the e-learning personal 6, who said "*our organisation uses LMS software to plan, implement, facilitate, assess, and monitor student learning. The software centralises course preparation, educational content and resources, and the delivery and tracking of student activities. It is not easy to achieve these steps successfully; our organisation faces multiple barriers to the implementation process, which include organisational preparedness during implementation [..]*".

  Administrator 2 pointed out a "*[..] Lack of appropriately conducted training courses for faculty members and adequate capacity to qualify them*." The organisation can control these organisational factors. For example, there is a wide variety of courses at present, including undergraduate and graduate programs. The undergraduates focus more on professional skills, and graduate students focus more on research skills. Similarly, the course disciplines may vary among the fields of natural sciences, engineering, social sciences, etc. It has been noted that the IT skills of students enrolled in natural science and engineering courses are usually

superior to those of students in the social sciences. Studies have also found that factors such as course content and course discipline are related to satisfaction with LMS usage (Ozkan et al., 2009; Naveh et al., 2010). These factors should be considered when preparing customised LMS programs for particular types of courses and audiences.

This section highlighted a lack of organisational preparedness during implementation, a lack of binding regulations on all those using e-learning, a lack of appropriately conducted training courses for faculty members and adequate capacity to qualify them, insufficient clarity concerning the requirements, and a lack of user involvement. Gap rating = 2.8.

- **Other:** The survey findings indicated that 11.6% of academics and 33.5% of students encountered other issues while using the LMS. According to the interview data, Administrator 7 said that "*financial constraints are one of the barriers to LMS implementation.*" In connection with this, E-learning personal 5 mentioned that "*there are several barriers that can be faced by an organisation while implementing an information system, such as user resistance."* These findings regarding other factors hindering LMS implementation are similar to those found in Munkvold (1999) study, which investigated challenges of IT implementation for supporting collaboration in distributed organisations. The study pointed out the barriers to the implementation of LMS; these barriers include resistance from organisational units, lack of incentives, and technological incompatibility. Rivard and Lapointe (2012), added user resistance to new technology as another barrier that can be a crucial issue during ICT adoption. Another large resource gap was found to exist during the implementation of the LMS. Unfortunately, developing countries, which often have less-educated communities, are still faced with resistance to the use of new technology, users' cultural issues, and financial constraints as introducing LMS systems in HEIs can incur additional financial liabilities for institutions. Gap rating = 3.2.

5.6.1.4 Summary of the Design-Reality Gap

The point totals for each dimension are presented in the diagram below (Figure 5.8). This study reveals large design-reality gaps for the dimensions of Technology, Information, and Staff and Skills.

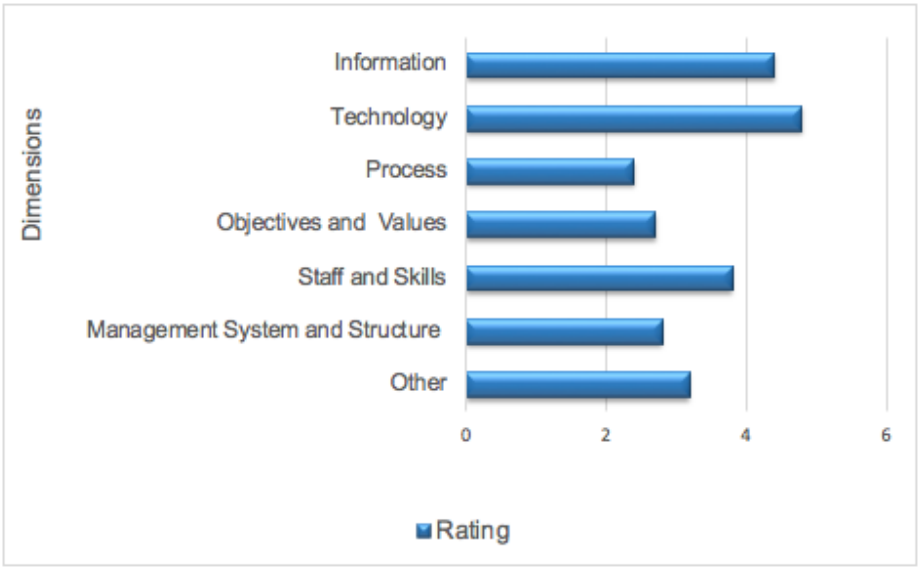

Figure 5.8: Diagram of Gaps

Overall rating. In this research, the score regarding the probability of success of the implementation of the LMS is 24.2, which falls between 15–28, for which the likely outcome is "*Your e-government project might be a partial failure unless action is taken to close design-reality gaps.*" Table 2.5 shows the gap assessment ratings and likely outcomes.

Altogether, the findings from the surveys and interviews were encouraging for the implementation of the LMS as the results showed that the academics and students were flexible and open to its implementation. However, there is still a gap between perception and reality in the current implementation of the LMS. This gap highlights a paradox: on the one hand, people are open to implementation, while on the other, the rate of implementation is low. The interviews also indicated that the overall level of IT skills of university staff is moderate, for which the score was 3.23 out of 5. According to Administrator 2, "*The average level of IT skills vary from department to department according to*

specialisation and according to the employee, his work, and requirements; but, as a general average, most departments are not specialised in IT, Level 2." In this regard, another administrator added, "*I would give a 3.5 ranking in general for IT skills of organisational staff (5 being best in my assessment, although I would again suggest, to improve your survey, you should clearly describe the interpretation scale, i.e., whether 5 means best of 1 means best). Level of IT skills is generally higher in the technical and administrative sections of the organisation* (Administrator 5)."

Another interview participant said, "*I would rate the level of IT skills within the university staff as 4. Our university staff not only provides its staff with basic and advanced IT skills training courses but also actively engages them in data entry, data processing, and reporting activities to ensure that the staff learns the processes of verification, handling, and rectification of errors of LMS systems effectively* (E-learning personal 6)."

The satisfaction level was moderate as well, with an overall score of 3 out of 5. According to Administrator 5, an interview participant, the "*Level of IT skills is generally higher at technical and administrative sections of the organisation. The level of satisfaction with the LMS in my organisation would be at 4*." An interview with another member of the IT personnel 4 yielded the response "*4 out of 5. Nowadays, using ICT for educational activities has increased; therefore, it is easy to browse online resources and use technology tools for both academic staff and students*." This situation fits into the design-reality gap model well. Moreover, it probably indicates that some barriers may remain hidden and that the exploration of such barriers is perhaps key to the successful implementation of the LMS in HEIs.

In the preceding part of the thesis, the range of barriers explored in this study have been discussed in the light of the reality gap model and existing literature. Table 5.4 summarises the barriers in each dimension.

Table 5.4: Summary of Barriers

NO	Design Reality Gap	Barriers Factors	
1	Information	1. Lack of the required content for e-learning	
2	Technology	1. Lack of IT infrastructure of the institution 2. Lack of integration between e-learning system and other systems 3. Lack of technical support team 4. software to facilitate educational activities	5. Incomplete requirements and functionalities of current LMS 6. Maintenance issues and system failures 7. Lack of full package
3	Process	1. Difficulty of apply some academic procedures through e-learning system	2. Lack of LMS procedures and rules 3. Overlap of tasks between our departments
4	Objectives and Values	1. Lack of policies and clear objectives 2. Staff chances of being monitored	3. The lack of knowledge of the importance of e-learning 4. Staff fear of losing control
5	Staff and Skills	1. Lack of expertise and competencies in the field of e-learning management 2. The staff is not well equipped with necessary IT skills	3. New staff hiring 4. Training for existing staff 5. lack of IT skills
6	Management System and Structure	1. Organisational preparedness during implementation 2. Lack of regulations binding on all using e-learning 3. Unclear of requirements	4. Lack of training courses for academics in the appropriate manner and adequate capacity to qualify them 5. Lack of users' involvement
7	Other	1. Resistance to use new technology 2. Financial constraints 3. Users culture	

5.6.2 Stakeholders Requirements to Successful Implement LMS in HEIs

HEIs are continually striving for the provision of high-quality academic services; in this context, they are utilising novel technologies to assist academic ventures among the educational community. There are different types of stakeholders involved with such information systems, each being identified with at least one function. According to Haran (n.d.), there are five stakeholders in LMS: educational organisations, technology providers, content authors, instructors, and learners. LMS allows those stakeholders to collaborate and communicate online in real-time.

Wagner et al. (2006) discussed key stakeholders in their work, “E- Learning in Higher Education: A Stakeholders’ Analysis.” They analysed needs and concerns for each stakeholder. They also identified a stakeholder-to-stakeholder responsibility matrix for success within HEIs. Stakeholders’ have an important role to play and several responsibilities to achieve success in their implementation of LMS. Their findings indicated that successful LMS implementation is, thus, dependent upon cooperation among stakeholders.

Educational organisation: This includes universities and colleges. HEIs should be clear about the objectives they wish to achieve through the LMS and then decide which LMS is best suited to meeting these objectives (Iqbal and Qureshi, 2011b). The interviews indicated that the university should understand users’ characteristics and online needs, the technology infrastructure, level of skills and training, and degree of technology acceptance. Furthermore, the university should provide technical support for learning systems and full integration with other systems within university systems. E-learning personal 1 mentioned that *"There are several requirements of e-learning implementation in my university, which could help us to be successful in our implementation processes, including awareness of students and academic staff, the proper technology infrastructure to operate and manage the LMS . . . ."*. Administrator 1, an interview participant, underlined that it is important to *"understand users’ characteristics and online needs, IT skills for university staff and faculty members, and appreciate training*

for faculty members and students." IT personal 5 stated that *"Provide training courses on how to use the LMS, accurate information of LMS contents."*

Nowadays, students are more literate in technology; thus, HEIs should provide better IT services to facilitate lecture delivery and create new technology-mediated learning opportunities for students. Moreover, HEIs should integrate technology into classrooms and provide e-learning opportunities to provide access to a larger pool of learners. As e-learning becomes more widely accepted and more online courses are offered, geographical boundaries between institutions and students will be removed (Young, 2001).

Technology Provider: This refers to vendors who are responsible for developing the technology for educational institutions. The LMS should be considered a core information system to be implemented in HEIs because technology provides better learning environments that allow students and instructors to cooperate easily during the learning process. Technology standards are also an important consideration for this group of stakeholders. Since HEIs often have different solutions implemented by different departments, adherence to common standards promotes interoperability (Friesen, 2005). The interviews clearly indicated the technical provider requirements for successful implementation of the LMS. For example, Administrator 7 stated that the "*university needs advanced software, skilled workers, and efficient professionals in the area of IT.*" One administrator said, "*In our organisation, anyone who has an e-mail address on the university domain can access the LMS. Teachers need special rights, and for that, they request teacher rights from IT Support at the start (only once), and after that, they can manage their accounts themselves* (Administrator 4)." Selim (2007) emphasised that implementing any LMS in HEIs without plenty of technical support would end up in disaster. Therefore, any LMS that HEIs plan to select should be easy to install and for users to operate. The constant evolution of the demands of hardware and customer expectations creates pressure on technology providers to hurry to introduce new product offerings (Huynh et al., 2003).

Contents Provider: The third group of LMS stakeholders are the content providers, who create online course content that may be created by teachers or derive from either internal or external sources. The motivation of content providers is to provide content modules that should be effective in learning processes. E-learning personal 1 stated in an interview that "*there are several requirements for e-learning implementation in my university, which could help us to succeed in our implementation processes. These include transferring traditional courses to e-courses and supporting e-content.*" Educational content should be created in a format that can be used across various e-learning platforms. If the content providers fail to do so, their potential target audience would be limited. It is equally important to ensure that the content provided is consistent with the learning methodologies used in different HEIs and is, therefore, more likely to lead to successful learning (Greenagel, 2002). The type of educational content, the learning environment, and even the characteristics of each learner can affect learning (Zhang et al., 2006). Providers of e-learning content should take these aspects into consideration when developing content.

Instructors: Instructors have educational experience which they should transfer to learners. In the interviews, the E-learning personal 4 mentioned that the "*LMS allows faculty members to interact with their students.*" Currently, several sessions held through the LMS may not involve face-to-face interaction between instructors and learners. In the traditional learning environment, instructors are the primary source of students' knowledge. However, in new learning environments, instructors shift to being managers of students' knowledge resources (Romiszowski, 2004). For instance, in a traditional classroom scenario, the instructor delivers the content to the class and answers learners' questions, whereas in a new learning environment, such as an asynchronous e-learning environment, the instructor is more of a coordinator of content, which learners then peruse at their own pace (Teo and Gay, 2006).

Learners: Learners are the major consumers of learning processes. This research considered students in higher education. Students' activities that are conducted through the LMS include exercises, sharing experiences, submitting

assignments, and checking their marks (Romiszowski, 2004). LMS provides an entirely new learning environment for learners, requiring a different set of skills to be successful. Critical thinking, research, and evaluation skills are becoming increasingly crucial as learners have access to an increasing volume of information from a variety of sources that must be sorted (Wagner, Hassanein and Head, 2008).

5.6.3 Success Factors for Improve LMS implementation in Higher Education Institutes

According to the barriers faced in the current implementation of the LMS in an HEIs (mentioned in section 5.6.1), a significant gap is seen between the purpose design and the reality for the implementation of LMS from the users' perspective, and this gap should be narrowed if HEIs want to facilitate learning activities (Hoque *et al.*, 2015). Success factors that help HEIs implement LMS have been identified from several researchers (Elkaseh et al., 2015; Alharbi and Drew, 2014; Al-Nefaie, 2016). These authors considered the Technology Acceptance Model (TAM) identified by Davis (1989) to identify the success factors of LMS implementation in HEIs, whereas other authors used other theories to identify success factors (Hoque et al., 2015; Olson et al., 2011). Therefore, success factors for LMS implementation within HEIs grouped into three aspects: (1) technology; (2) human; and (3) organisation. The technology aspect of LMS includes information, technology, and process. The human aspect of LMS includes objective, value, staff, and skills. The organisational aspect of LMS includes management systems, structure, and others.

- **Technology factors:** Proper technology infrastructure reflects facilitating conditions which make sure that the infrastructure is easily accessible and convenient. As a result, the LMS can be used effectively. In other words, presence of proper technology infrastructure helps both academics and students in terms of adopting the LMS successfully. Due to this, a proper technology infrastructure reflects effective usefulness and ease of use of LMS, which in turn leads to positive behaviour of academic and students towards the system (Solangi et al., 2018). Availability of IT equipment that helps users perform academic activities is another technology success

factors. As per findings of Basak et al. (2016), LMS can be implemented successfully in HEs by focusing on technological factors. Some of the key technological factors include hardware and software, and an ease of access to IT equipment. Access to IT equipment facilitates adoption of LMS, which in turn strengthens the development of online learning within HEIs. Clear policies for LMS implementation is crucial for effective implementation of the LMS because it governs how LMS can be developed, used, managed and administered. LMS policy further helps HEIs in adhering to Higher Education Standards Framework. It also guides the academic board in decision-making process related to LMS design and development based on the set budget (Iqbal and Qureshi, 2011). The fourth technology success factor for an effective LMS implementation is Educational Process Reengineering (EPR). EPR is used to improve performance of teaching learning activities, academic administration, and educational assessment. Generally, HEIs operate, maintain and manage educational administration by using technologies. Yet, lack of scientific approach requires more attention towards role of students, teachers and administration staff while integrating technology with learning. Therefore, EPR process helps HEIs in terms of enhancing the main teaching-learning processes via selection of suitable technologies (Khalid et al, 2011). Technical Support for the LMS operation is another technology success factor. This is so because effective use of LMS by users require support services. Otherwise, lack of technical support and training results into poor utilisation of key features of LMS. Resultantly, this leads to two outcomes. First of all, there would be no usage at all of LMS. Secondly, there could be limited usage of LMS based on its relatively few features only (Mtebe, 2015). LMS software that covers the university needs is considered as technology success factor. According to Kraleva et al. (2019), installation of LMS software is necessary for self-hosted LMS, which allows users to run and use LMS by either accessing to server of the HEIs or installing on their hard drives. In addition to it, an integration of LMS with other systems such as student information system has proven to be highly effective and advantageous. A study by Abu-shawar et al. (2006) showed that

effectiveness of integration between LMS and information system of a HEIs is based on consistency of the data. It also revealed that this integration offers benefits in terms of reduced cost and time efforts, in addition to transforming manual services into automatic ones. Common examples include automatic creation of accounts, enrolment process, and grade distribution. The eighth technology success factor for an effective LMS implementation is a high-quality maintenance plan for LMS software and hardware. According to Oludele et al. (2014), maintenance costs are highly crucial in contrast to buying costs of LMS. Therefore, desired performance of LMS can be attained by regularly performing both testing and maintenance procedures of LMS. This eventually results into minimal occurrence of sudden system failures. Complete E-courses portfolio is one of the technology success factors. According to Queirós et al. (2011), an effective integration of LMS with specialised e-portfolio system offers a positive learning experience to students within an educational setting. The rationale for integration of LMS with e-portfolio system is that it allows the user to employ e-portfolio as an assessment tool. The last technology success factor for an effective LMS implementation is information accuracy. According to Ohliati and Abbas (2019), quality of information provided by LMS is measured through its timeliness, relevancy, accuracy, consistency and completeness. For example, accuracy is an output feature of LMS that defines quality of information.

Table5.5: Technology success factors of LMS

SN	Technology Success Factors	Reference
1	Proper technology infrastructure to operate and manage LMS (including all of the information technology-related equipment)	(Solangi et al., 2018), (Pocatilu et al., 2009), (Edda, 2012), (Bora and Ahmed, 2013)
2	Availability of IT equipment that helps users perform academic activities	(Basak et al., 2016), (Goffe and Sosin, 2005)

3	Clear policies for LMS implementation	(Radif, 2016), (Iqbal and Qureshi, 2011)
4	Educational process reengineering	(Khalid et al., 2011), (Kefalas et al., 2003)
5	Technical support for the LMS operation	(Mtebe, 2015), (Edda, 2012), (Bora and Ahmed, 2013)
6	LMS software that covers the university needs	(Kraleva et al., 2019), (Edda, 2012)
7	Technical integration with other systems	(Gautreau, 2011), (Asiri et al., 2012), (Abu-Shawar et al., 2006)
8	High-quality maintenance plan for LMS software and hardware	(Oludele et al., 2014), (Goffe and Sosin, 2005), (Kefalas *et al.*, 2003)
9	Complete E-courses portfolio	(Rajesh, 2016), (Queiros et al., 2011)
10	Information accuracy	(Rajesh, 2016), (Ohliati and Abbas, 2019)

Human factors: The first human success factor for an effective LMS implementation is comprehensive vision to focus on educational goals. It is a crucial component that exists within the planning stage of LMS. As per findings of Al-Fraihat et al. (2017), LMS can be implemented effectively if there exists clear purpose, vision and measurable goals related to use of online tools and teaching technologies. Yet, it must be noted that the study of current online learning context of HEIs is necessary for a clear identification of LMS purpose, vision and goals. Clear implementation of the educational processes through LMS is another human success factors. This is so because when right people are trained for gaining right knowledge or skills at the right time, then educational processes can be implemented clearly, thereby leading to a reasonable learning management system. In other words, academics productivity reflects better implementation, which in turn leads to better adherence to educational principles of LMS (Govindasamy,

2001). In addition to it, strengthening and standardisation of IT education resources is important human success factors. This is so because when strong and customised online IT resources are offered, then this leads to better academic performance through LMS. In other words, the success of LMS implementation depends on internal IT resources and expertise, control of their administration, and development of LMS in the future (Turnbull et al., 2019). The fourth human success factor for an effective LMS implementation is strong knowledge of LMS aspects to proactively provide support for learning initiatives and motivate learners. This reflects that quality of instructor or teacher plays a crucial role in affecting learners' behaviour by sharping their behaviour during the online course, and thus, applying LMS effectively. Instructors can offer support to learners through tehri teaching style, strong knowledge, response timeliness, and assistance during the online learning process (Lwoga, 2014). The fifth human success factor for an effective LMS implementation is IT staff with high level of computer skills. It means that support and computer skills of the IT staff leads to better service quality, and thus, effective LMS application. IT staff can deliver exceptional and effective computer skills by being responsive and available whilst delivering technical assistance and exercising their computer skills. In this way, high computer skills will lead to better online learning system, and thus, predict high learner satisfaction with LMS (Lwoga, 2014). Moreover, proper training programs is necessary to improve staff skills. According to Solangi et al. (2018), proper training programs shows a strong profile of users. A trained user will be confident and show positive attitude while accessing technology. Therefore, provision of proper training programs to users enhance their experience and technical efficacy during conduction of online courses, using internet in the learning process, administrating the course, and thus, using LMS. The last human success factor for an effective LMS implementation is high level of human competencies. As per findings of Solangi et al. (2018), LMS can be implemented successfully based on performance of instructors. Self-efficacy of instructors shows their learning efficiency and competency. When are self-confident and use interactive pedagogies while performing,

then this results into innovative outcomes of LMS. Besides it, the success factor also reflects technology competency of students. It means that when students have firm belief on their capability and ability of using online learning technologies, then this results into effective LMS implementation during the learning process (Ayub et al., 2010).

Table 5.6: Human success factors of LMS

SN	Human Success Factors	Reference
1	Comprehensive vision to focus on educational goals	(Al-Fraihat et al., 2017), (Mayer, 2004)
2	Implementation of the educational processes through LMS	(Govindasamy, 2001), (Zampunieris, 2006)
3	Strengthening and standardisation of IT education resources	(Turnbull et al., 2019)
4	Knowledge of all aspects of the LMS	(Lwoga, 2014), (Mtebe, 2015)
5	IT staff with high level of computer skills	(Whelan and Bhartu, 2007), (Lwoga, 2014)
6	Proper training programs	(Pyla, 2012)(Solangi et al., 2018)
7	High level of human competencies	(Gautreau, 2011), (Ayub et al., 2010),(Solangi et al., 2018)

Organisation factors: The first organisational success factor for an effective LMS implementation is top management support. According to Basak et al. (2016), support from the top management is very crucial during designing, planning, implementing, and monitoring LMS. Top management support also leads to enhanced awareness and encouragement towards users relative to using the online learning/teaching platform. Deep understanding of users'

needs to facilitate education activities is another orgnisational success factors. As per findings of Phongphaew and Jiamsanguanwong (2018), common needs of users while using LMS include ease of use and a less complex system. When these needs are met, then users show satisfaction with LMS and adopts it successfully. A usability test is highly useful in this regard since it reflects users' needs, and thus, leads to high adoption rate of LMS through its easy design. In addition to it, academics support to produce digital content is another organisational success factors. According to Santiago et al. (2020), online campus offers support to academic so that they can better apply LMS. Common examples of teaching support include encouragement of teaching innovation, facilitation of student tracking, self-assessment, virtual forums, promoting communication among various users, self-learning, and provision of online teaching experiences with different extents of virtuality. The fourth organisational success factor for an effective LMS implementation is proper training program for users based on their needs. As per findings of Solangi et al. (2018), proper training programs shows a strong profile of teacher. A trained teacher will be confident and show positive attitude while accessing technology. Therefore, provision of proper training programs to teachers enhance their experience and technical efficacy during conduction of online courses, using internet in the learning process, administrating the course, and thus, using LMS. Moreover, encourage academics and students to using LMS is one of the organisationl success factors. According to Santiago et al. (2020), effectiveness of LMS is based on how far it engages learners, provides interesting learning, and allows them to seek self-development proactively. In other words, when learners are encouraged to take part in online learning through an easily accessible LMS, then it not only fulfils user needs, but also lead to successfully execution of LMS functions. The next organisational success factor for an effective LMS implementation is increase awareness level for academics and students. As per findings of Juhary (2014), learning through LMS among students can be improved if the top management believes in the learning management system. This in turn requires the top management to

enhance awareness of LMS among students and academics for supporting learning activities among students. The last organisational success factor is increase knowledge sharing among LMS users. According to Iqbal and Qureshi (2011), high capability of interaction among users while using LMS results into its effective execution. For example, academics can share knowledge by posting key announcements in a specific area which is easily accessible by all students. Likewise, students can share their viewpoints with academics through the discussion board. In this way, knowledge sharing transforms the role of students from passive viewers to active participants. Besides these, knowledge sharing through wikies, live chat rooms and blogs also allows flexible communication among teachers and students, and thus, LMS leads to desired learning and teaching outcomes.

Table5.7: Organisation success factors of LMS

SN	Organisation Success Factors	Reference
1	Deep understanding of users' needs to facilitate education activities	(Al-Nefaie, 2016), (Phongphaew and Jiamsanguanwong, 2018)
2	Top management support	(Naveh et al., 2010), (Basak et al., 2016)
3	Necessary support to academics to produce digital content by	(Cavus, 2013), (Santiago et al., 2020)
4	Proper training program for users based on their needs	(Pyla, 2012), (Solangi et al., 2018)
5	Encourage of academics and students to using LMS	(Wingo et al., 2017), (Santiago et al., 2020)
6	Increase awareness level for academics and students	(Al-Emran et al., 2016), (Juhary, 2014)
7	Allow LMS users to insert and retrieve required data of education activities	(Iqbal and Qureshi, 2011)

5.6.4 Interpretive Structural Modelling (ISM) Approach to Determine the Relation Between Success Factors for facilitating the Implementation of LMS in HEIs

The following steps involved in ISM methodology:

Structural self-interaction matrix (SSIM): For completing the SSIM, two experts with essential and valuable knowledge about the research theme and aims were identified (Jharkharia and Shankar, 2005; Attri et al., 2013). The criteria for selecting these experts included academics who should have enough knowledge about education technology, working in the higher education sector as well as their work experience is more than 7 years in the higher education sector. After that, an email was sent to the experts explaining to them the aim of this study. At this point, the researchers arranged a meeting with experts to discuss the identified success factors. Then, they were consulted to assist in identifying the nature of contextual relationships among the success factors for improving LMS diffusion. To analyse the success factors in developing SSIM, the following four symbols have been used to denote the direction of the relationship between success factors (i and j).

A, if variable i affects j.

B, if variable j affects i.

C, if variable i and j affect each other.

D, if there is no effect between each other.

Based on contextual relationships, the SSIM was developed for variables identified for the success factors in terms of technology (Table 5.8), the human (Table 5.9), and the organisational (Table 5.10) in LMS.

Table 5.8: SSIM for technology success factors

Success Factors	10	9	8	7	6	5	4	3	2
1	D	D	A	A	A	A	A	B	C
2	D	D	A	B	B	B	B	B	

3	A	A	A	D	A	A	A
4	A	A	B	B	D	B	
5	D	D	A	A	B		
6	A	A	A	B			
7	A	D	A				
8	A	A					
9	D						
10							

Table 5.9: SSIM for human success factors

Success Factors	7	6	5	4	3	2
1	B	B	B	B	C	A
2	B	B	B	C	B	
3	D	A	A	B		
4	B	A	B			
5	C	C				
6	A					
7						

Table 5.10: SSIM for organisational success factors

Success Factors	7	6	5	4	3	2
1	D	A	A	A	D	B
2	A	A	A	A	A	
3	A	C	A	B		
4	A	C	A			

5	A	B
6	A	
7		

Reachability matrix:

The next step of the SSIM was to transform it into a binary matrix called the initial reachability matrix by substituting A, B, C, and D by 1s and 0s. The rules for the substitution of 1s and 0s are as follows:

- if the (i,j) entry in the SSIM is A, then the (i,j) entry in the reachability matrix becomes 1 and the (j,i) entry becomes 0.
- if the (i,j) entry in the SSIM is B, then the (i,j) entry in the reachability matrix becomes 0 and the (j,i) entry becomes 1.
- if the (i,j) entry in the SSIM is C, then the (i,j) entry in the reachability matrix becomes 1 and the (j,i) entry becomes 1.
- if the (i,j) entry in the SSIM is D, then the (i,j) entry in the reachability matrix becomes 0 and the (j,i) entry becomes 0.

Table 5.11: Initial reachability matrix for technology success factors

Success Factors	10	9	8	7	6	5	4	3	2	1
1	0	0	1	1	1	1	1	0	1	1
2	0	0	1	0	0	0	0	0	1	1
3	1	1	1	0	1	1	1	1	1	1
4	1	1	0	0	0	0	1	0	1	0
5	0	0	1	1	0	1	1	0	1	0
6	1	1	1	0	1	1	0	0	1	0
7	1	0	1	1	1	0	1	0	1	0
8	1	1	1	0	0	0	1	0	0	0
9	0	1	0	0	0	0	0	0	0	0

10	1	0	0	0	0	0	0	0	0	0

Table 5.12: Initial reachability matrix for human success factors

Success Factors	7	6	5	4	3	2	1
1	0	0	0	0	1	1	1
2	0	0	0	1	0	1	0
3	0	1	1	0	1	1	1
4	0	1	0	1	1	1	1
5	1	1	1	1	0	1	1
6	1	1	1	0	0	1	1
7	1	0	1	1	0	1	1

Table 5.13: Initial reachability matrix for organisational success factors

Success Factors	7	6	5	4	3	2	1
1	0	1	1	1	0	0	1
2	1	1	1	1	1	1	1
3	1	1	1	0	1	0	0
4	1	1	1	1	1	0	0
5	1	0	1	0	0	0	0
6	1	1	1	1	1	0	0
7	1	0	0	0	0	0	0

The final reachability matrix is obtained by incorporating the transitivities as enumerated in the ISM methodology. It shows the driving power and dependence of each variable. The driving power of a success factor is defined as the total number of effecters (including itself), which may help to achieve. At the same

time, dependence is the total number of success factors that are responsible for this effecter, which may help to achieve it. The variables' driving power and dependencies will be used in the MICMAC analysis, where the variables will be classified into four categories of autonomous, dependent, linkage and independent (driver) variables.

Table 5.14: Final reachability matrix for technology success factors

Success Factors	10	9	8	7	6	5	4	3	2	1	Driving Power
1	1*	1*	1	1	1	1	1	0	1	1	9
2	1*	1*	1	1*	1*	1*	1*	0	1	1	9
3	1	1	1	1*	1	1	1	1	1	1	10
4	1	1	1*	0	0	0	1	0	1	1*	6
5	1*	1*	1	1	1*	1	1	0	1	1*	9
6	1	1	1	1*	1	1	1*	0	1	1*	9
7	1	1*	1	1	1	1*	1	0	1	1*	9
8	1	1	1	0	0	0	1	0	1*	0	5
9	0	1	0	0	0	0	0	0	0	0	1
10	1	0	0	0	0	0	0	0	0	0	1
Dependence	9	9	8	6	6	6	8	1	8	7	

1 indicates the transitivity relationships*.

Table 5.15: Final reachability matrix for human success factors

Success Factors	7	6	5	4	3	2	1	Driving Power
1	0	1*	1*	1*	1	1	1	6
2	0	1*	0	1	1*	1	1*	5
3	1*	1	1	1*	1	1	1	7
4	0	1	1*	1	1	1	1	6
5	1	1	1	1	1*	1	1	7
6	1	1	1	1*	1*	1	1	7
7	1	1*	1	1	1*	1	1	7
Dependence	4	7	6	7	7	7	7	

1 indicates the transitivity relationships*.

Table 5.16: Final reachability matrix for organisational success factors

Success Factors	7	6	5	4	3	2	1	Driving Power
1	1*	1	1	1	1*	0	1	6
2	1	1	1	1	1	1	1	7
3	1	1	1	1*	1	0	0	5
4	1	1	1	1	1	0	0	5
5	1	0	1	0	0	0	0	2
6	1	1	1	1	1	0	0	5
7	1	0	0	0	0	0	0	1
Dependence	7	5	6	5	5	1	2	

1 indicates the transitivity relationships*.

Level Partitioning:

The reachability and antecedent set for success factor variables are determined from the final reachability matrix. It includes comparing the reachability and antecedent sets of success factor variables and delineating levels on the basis of intersection sets. Then, the intersection of reachability and antecedent sets is derived for all success factors. The success factor for the reachability and intersection sets is the same as the top-level success factor in the ISM hierarchy.

Table 5.17: Iteration for technology success factors showing all levels

Success factor	Reach set	Antee Set	Inter set	Level
1	1,2,4,5,6,7,8,9,10	1,2,3,4,5,6,7	1,2,4,5,6,7	4
2	1,2,4,5,6,7,8,9,10	1,2,3,4,5,6,7,8	1,2,4,5,6,7,8	4
3	1,2,3,4,5,6,7,8,9,10	3	3	5
4	1,2,4,8,9,10	1,2,3,4,5,6,7,8	1,2,4,8	3
5	1,2,4,5,6,7,8,9,10	1,2,3,5,6,7	1,2,4,5,6,7	4
6	1,2,4,5,6,7,8,9,10	1,2,3,5,6,7,8	1,2,4,5,6,7,8	4
7	1,2,4,5,6,7,8,9,10	1,2,3,5,6,7	1,2,4,5,6,7	4
8	2,4,8,9,10	1,2,3,4,5,6,7,8	2,4,8	2
9	9	1,2,3,4,5,6,7,8,9	9	1
10	10	1,2,3,4,5,6,7,8,10	10	1

Table 5.18: Iteration for human success factors showing all levels

Success factor	Reach set	Antee Set	Inter set	Level
1	1,2,3,4,5,6	1,2,3,4,5,6,7	1,2,3,4,5,6	2
2	1,2,3,4,6	1,2,3,4,5,6,7	1,2,3,4,6	1
3	1,2,3,4,5,6,7	1,2,3,4,5,6,7	1,2,3,4,5,6,7	3
4	1,2,3,4,5,6	1,2,3,4,5,6,7	1,2,3,4,5,6	2

5	1,2,3,4,5,6,7	1,3,4,5,6,7	1,3,4,5,6,7	3
6	1,2,3,4,5,6,7	1,2,3,4,5,6,7	1,2,3,4,5,6,7	3
7	1,2,3,4,5,6,7	3,5,6,7	3,5,6,7	3

Table 5.19: Iteration for organisational success factors showing all levels

Success factor	Reach set	Antee Set	Inter set	Level
1	1,3,4,5,6,7	1,2	1	4
2	1,2,3,4,5,6,7	2	2	5
3	3,4,5,6,7	1,2,3,4,6	3,4,6	3
4	3,4,5,6,7	1,2,3,4,6	3,4,6	3
5	5,7	1,2,3,4,5,6	5	2
6	3,4,5,6,7	1,2,3,4,6	3,4,6	3
7	7	1,2,3,4,5,6,7	7	1

The top-level success factor of the hierarchy would not help achieve any other success factor above its own level. When the top-level success factor is identified, it is separated out from the other success factors. After that, the same process finds the next level of success factor. This process continues until the levels of each success factor are found. These identified levels help in building the digraph and final model. The success factors along with their reachability set, antecedent set, intersection set and their respective levels are shown in terms of technology (Table 5.17), human (Table 5.18) and organisational (Table 5.19).

Formation of ISM-based model:

The structural model of LMS diffusion in HEIs has been generated based on the final reachability matrix of each dimension (technology, human, and organisational), and the digraph is drawn. The transitivities are removed as described in ISM methodology.

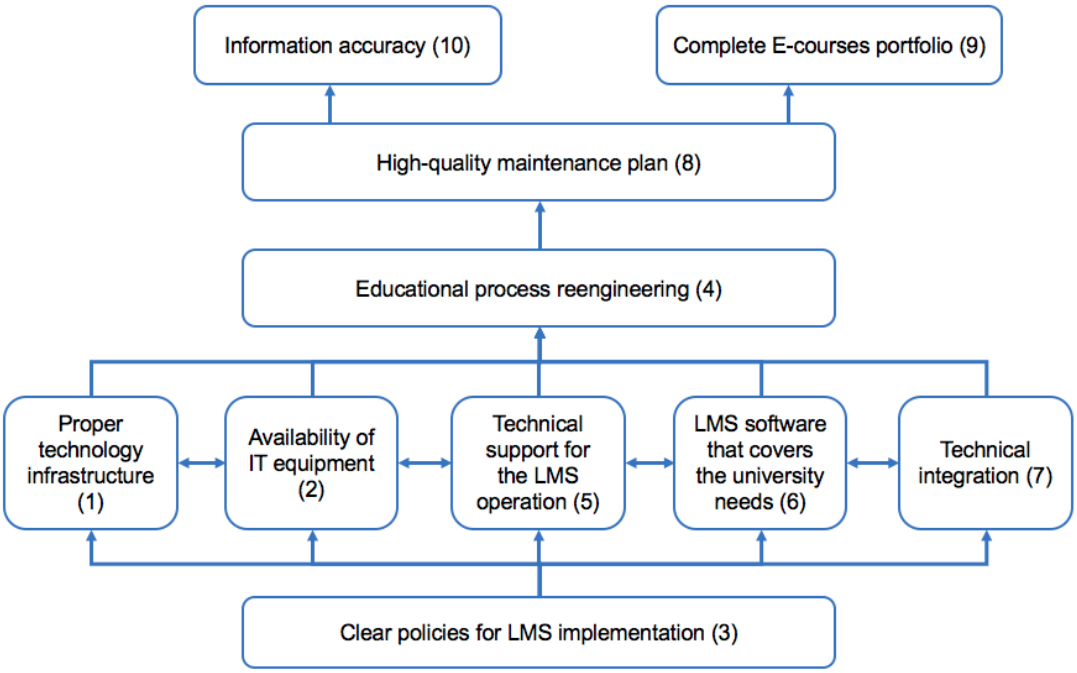

Figure 5.9: ISM-based model for the technology success factors

In respect to the technology aspect, it has been observed that ‘clear policies for LMS implementation’ is the fundamental effector that is driving all other technology success factors. That because this helps in setting a general plan of action used to guide desired outcomes as it form the basis of the ISM hierarchy. Several universities in KSA have chosen to introduce LMS to their institutions. Therefore, if they have a clear policy for LMS implementation, it will be the most powerful effector to drive other success factors (Alshammari et al., 2016; Alharbi and Drew, 2014). Proper technology infrastructure', 'Availability of IT equipment', 'technical support', 'LMS based on the university's needs' and 'technical integration' are dependent on ‘clear policies for LMS implementation’. These factors are much needed for a clear policy for the successful operation of LMS services, to help users perform academic activities and provide user-friendly assistance to LMS users. Moreover, the technical integration in educational activities within this context could consequently make teaching easy, increase users engagement, make collaboration effective as well as make information accessible. This results in providing educational process reengineering (EPR). EPR is necessary to help instructors and learners effectively function within educational activities as well as reduce classroom interruptions and discipline

problems because they tell learners how things will work (Kituyi and Tusubira, 2013). The maintenance plan is needed to enhance system reliability and availability as well as to avoid system failures or errors. The accurate information and complete e-courses portfolio are not driving effectors as they appear at the top of the hierarchy. They are a combination of the university's data from various sources to provide users with a unified view, which depicts the successful implementation of technology operations (Rajesh, 2016).

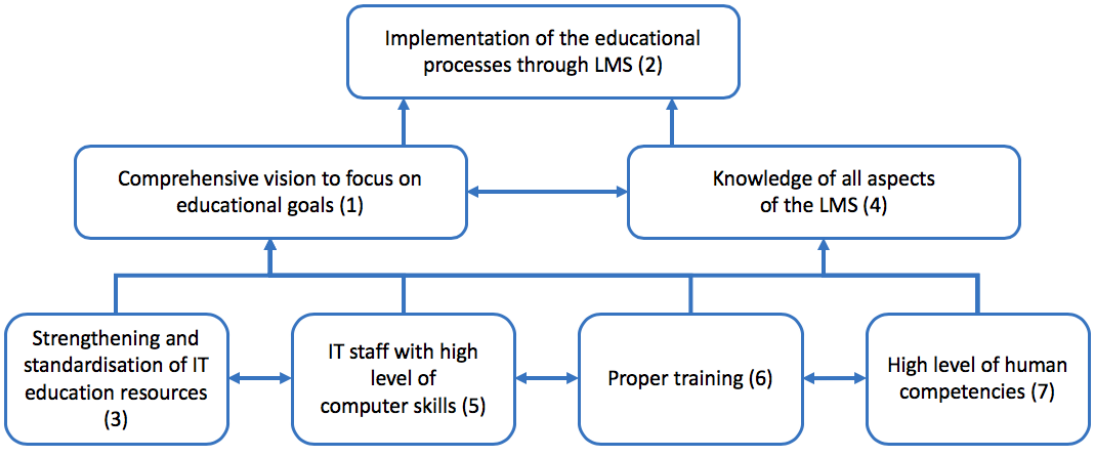

Figure 5.10: ISM-based model for the human success factors

Regarding the human aspect the study found that; the strengthening and standardisation of IT education resources were required. It also found significant that, computer skills for IT staff and proper training of staff was necessary, in order to impart that knowledge to users and improve human competencies. These were very significant factors for success in improving the LMS utilisation and wide spread implementation across the university. These factors were affecting each other. The link between these factors suggests that staff in Saudi universities need not only the necessary skills to handle and operate LMS but may also cooperate in introducing LMS in their institutions successfully. According to Asiri et al. (2012), proper training, high level of computer skills, and competencies play vital roles in the adoption of LMS in the HEIs. A comprehensive vision to focus on educational goals and to the delivery of necessary knowledge of LMS aspects for end-users are dependent on these factors. One of the significant benefits of a vision is that; it can be motivating and

inspiring to ultimate users. When an individual understands and aligns with the organisation vision, they are able to readily commit to, and engage in, the organisation's efforts. That leads to the Implementation of the educational processes through LMS (Mayer, 2004; Zampunieris, 2006). Implementation of the educational processes through LMS should easily be facilitating educational activities, which often result in the successful implementation of human operations. This variable appears at the top of the hierarchy and is very important factor in development of learning opportunities and acceptance within organisation.

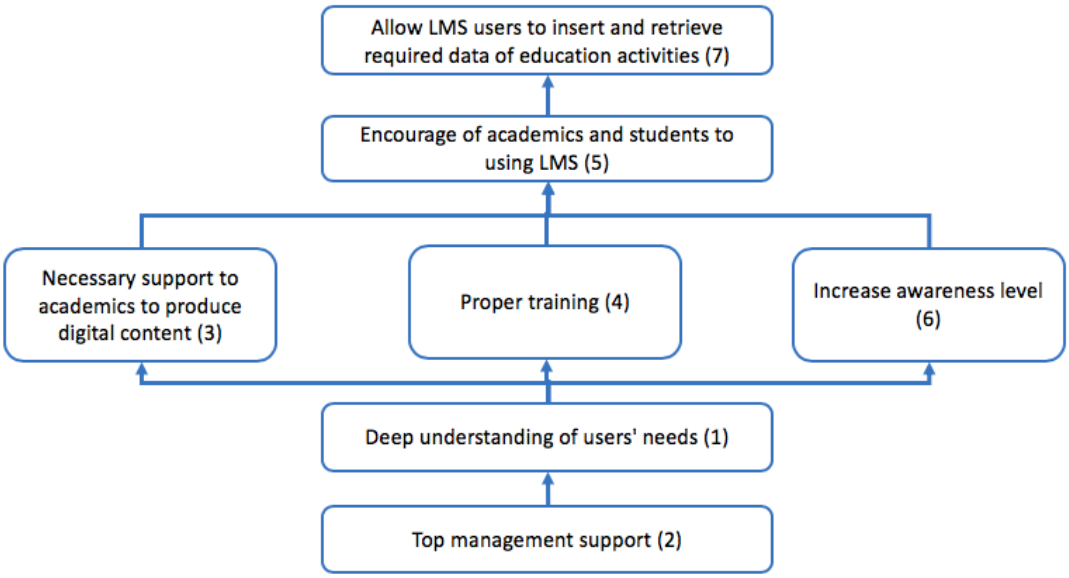

Figure 5.11: ISM-based model for the organisational success factors

In respect to the organisational aspect, it is indicated that top management support is a very significant factor for improving the organisational aspect of LMS as it forms the base of the ISM hierarchy. Saudi universities still need to top management support to improve LMS implementation within their institution. According to (Naveh et al., 2010), top management support leads to an increase in LMS usage and user satisfaction. It also helps the organisation's staff to understand users' characteristics and online needs to facilitate educational activities as each university may have different requirements. Necessary support to academics to produce digital content, a proper training for end users and increases the awareness level among academics and students are dependent on

the university's requirement to facilitate educational activities. These factors lead to increasing the encouragement of academics and students to use the LMS. This encouragement drives to allowing LMS users to insert and retrieve all required data of educational activities. Ozkan et al., (2009) suggest that necessary support to LMS users', proper training and awareness are important factors to increased users' attitude of LMS. Thus, the management of HEIs must address these factors more carefully in LMS implementation. These factors help to achieve the desired result variables and appear at the top of the ISM hierarchy for the organisation aspect.

MICMAC Analysis:

Success factors in terms of technology, human, and organisational aspects have been classified based on their driving and dependence power into four categories:

- Autonomous success factors.
- dependent success factors.
- linkage success factors.
- independent success factors.

This classification of success factors for the LMS diffusion are similar to the classification used by Mandal and Deshmukh(1994). In this analysis, the success factors in terms of technology, human, and organisation variables, as described earlier, are classified into four clusters (Figures 5.12, 5.13, and 5.14).

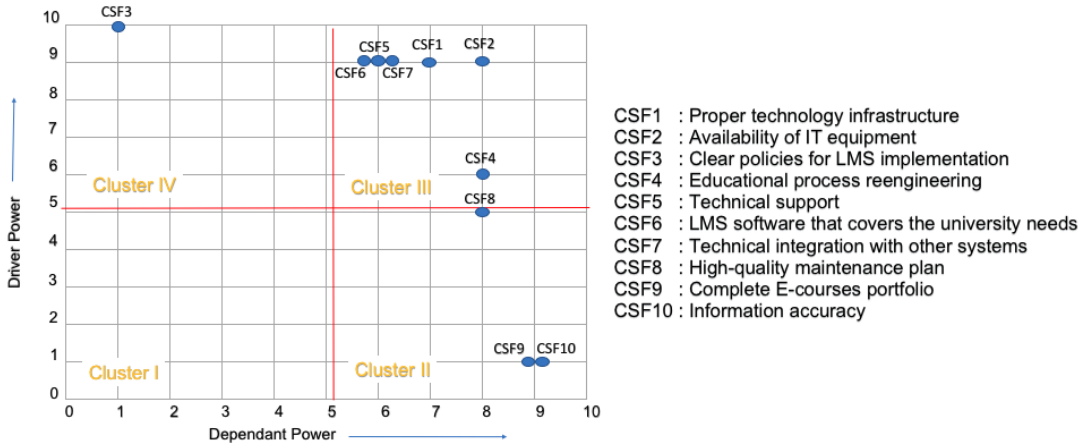

Figure 5.12: Cluster of technology success factors

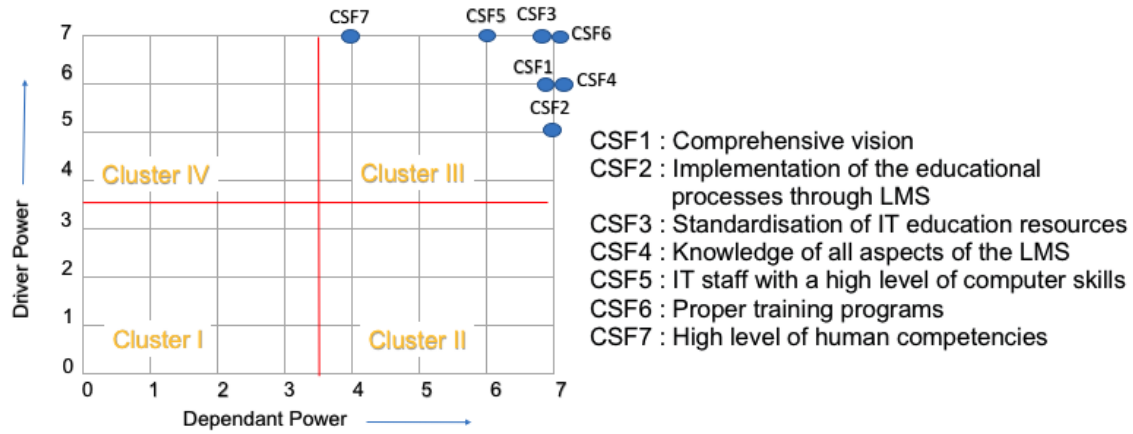

Figure 5.13: Cluster of human success factors

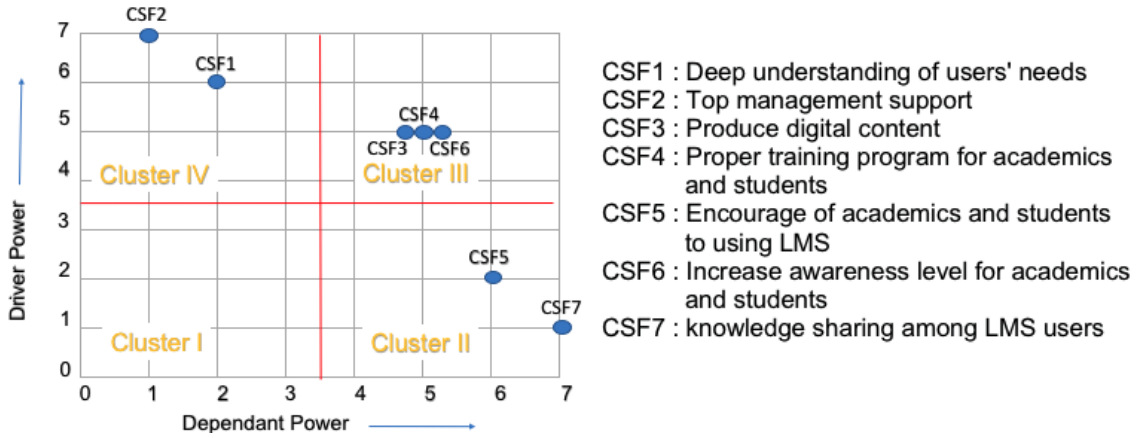

Figure 5.14: Cluster of organisational success factors

Autonomous variables are represented in the first cluster and have weak driving power and dependence. The “dependent variables” represent the second cluster which have weak driving power but strong dependence. Whereas, “linkage variables”, the third cluster, have strong driving power and strong dependence. The fourth cluster have strong driving power but weak dependence and are called "independent variables". Tables 5.14, 5.15, and 5.16 show the driving power and dependence of each success factor in terms of technology, human, and organisational aspects. The objective behind the classification of the success factors is to analyse the driver power and dependency of the success factors in terms of technology, human, and organisational aspects. This is shown in the

driver power-dependence diagram in Figures 5.12, 5.13, and 5.14. For example, to explain these figures, it is observed from the technology aspect in Table 5.14 that success factor one, 'Proper technology infrastructure to operate and manage LMS', has a driver power of nine and a dependence power of seven; therefore, in Figure 5.12, it is positioned at a place which corresponds to a driver power of nine and a dependence power of seven. The objective behind the classification of the success factors is to analyse the driver power and dependency of the success factors in terms of technology, human, and organisational aspects.

Data from the technology aspect (Table 5.14, and figure 5.12) shows that proper technology infrastructure is necessary to operate and manage e-learning and clear policies for the implementation and extended use/support of LMS functions related to technology. Both instructors and learners must have access to same technologies in the same time domain giving a need to continuous update of new services and monitoring of existing use of such technological services These are very significant concepts for improving the technology aspect of LMS. Similarly, data from human aspects shows that, strengthening and the standardisation of IT education resources, level of computer skills for IT staff, proper training programmes for staff to deliver knowledge to users as well as a high level of human competencies in use and management of LMS services are also very significant factors for improving the human aspect of LMS (Table 5.15, and figure 5.13). The support of top management is again a very significant organisation success factor for improving the organisational aspect of LMS implementation across the departments and courses (Table 5.16, and figure 5.14). All these factors have high driving power and less dependence power. Therefore, these factors can be treated as key success factors for improving LMS in HEIs. They can also act as a guide for HEIs so that management may effectively deal with these factors and the management can decide an appropriate course of action for the successful implementation.

This study has other implications for practicing managers. The following points summarise the managerial implications emerging from this study:

Technology implications:

- A high-quality maintenance plan for LMS, complete e-courses portfolio and information accuracy are weak drivers, yet are strongly dependent on other variables. The primary goal of an effective maintenance plan is avoiding delay. An effective maintenance plan is to improve productivity and work quality by anticipating and eliminating potential delays during educational activities. This can be supported with the analysis of technology success factors' result, which showed that desired performance of LMS can be attained by regularly performing both testing and maintenance procedures of LMS (Oludele et al., 2014). On the other hand, e-learning content and information accuracy together are the main factors that increase or decrease the efficiency of the e-learning system (Alla and Faryadi, 2013).
- There are six technology success factors for LMS implementation, namely, 'proper technology infrastructure to operate and manage LMS', 'Availability of IT equipment that helps users perform academic activities', 'Educational process reengineering', 'technical support', 'LMS based on the university needs' and 'technical integration'. They are the linkage variables and have strong driver power as well as strong dependence. Thus, proper IT infrastructure enabling and facilitating process changes in contemporary HEIs. The technical teams work on installing, configuring, and updating hardware and software. They also work on fixing any issue related to the equipment that may come up on a daily basis. Additionally, the technical integration in educational activities within this context could consequently make educational activities easy for users. Therefore, HEIs should work together with technology providers to improve these factors to improve the performance of LMS implementation. This can be supported with findings of Solangi et al. (2018), Basak et al. (2016), Iqbal and Qureshi (2011), Mtebe (2015), Kraleva et al. (2019) and Abu-Shawar et al. (2006).
- The clear policies for LMS implementation were observed as having greater driving power. This means that almost all experts HEIs and technology providers were clear enough towards the importance of clear

and specified policies so that proper technology infrastructures, IT equipment, technical support provisions, and needed LMS modules are well integrated through a set of specified procedures. They believe it may be discussed at length perhaps during the planning stage for efficient and integrated LMS and its functions as per HEIs objectives. Welle-Strand and Thune (2003), clear policies for LMS implementation expected to facilitate learning and to make it more efficient. This is very important that technology failures may be the least observable incidents. This can be justified by findings of Iqbal and Qureshi (2011) who showed that LMS policy is crucial for effective implementation of the learning management system because it governs how LMS can be developed, used, managed and administered. That idea is further supported by the next level of the ISM model, where; educational process reengineering, better maintenance plans and standard formats of courses are specified. The conversion of existing courses or development of new modules may then follow the patterns. This way success is more achievable and therefore, HEIs must consider flawless technology success factors implementation carefully in LMS implementation.

Human implications:

The autonomous, dependant and driving human success factors (Figure 5.13) are relatively disconnected from the system. As this study shows, there are no autonomous, dependant and driving human success factors in terms of LMS diffusion. This may be a cause of the low success of implementation in most organisations as human are difficult to uniformly work for success until an organisational top-level commitment and possible rewards are in place. The third cluster consists of linkage human success factors that have strong driving power and strong dependent power. In this study, all human success factors show as linkage variables.

Above discussion is further supported by results in 5.10 and 5.13. Figure 5.10 presented the ISM model of human success factors, therefore gives driving importance to four human success factors namely; 3,5,6 and 7^{th} factors identified

by this model for human factors of the ISM model. This can be supported with findings of Turnbull et al. (2019), Lwoga (2014), Solangi et al. (2018) and Ayub et al. (2010). As without these factors, the technology aspects would be meaningless and ineffective. Which may consequently result in low usage and ultimate failure of LMS implementation.

Organisational implications:

- The “dependent variables” represent the second cluster which have weak driving power but strong dependence. 'Allow LMS users to insert and retrieve required data of education activities' and 'Encourage academics and students to use LMS' are seen as dependent organisational success factors. Thus, to achieve effective education, HEIs should engage learners as active participants in their learning, which means giving learners opportunities that promote change in the learner’s conception of knowledge, as well as helping HEIs to build meaningful learning relationships between instructors and learners. This can be supported with findings of Santiago et al. (2020) who showed that effectiveness of LMS is based on how far it engages learners, provides interesting learning, and allows them to seek self-development proactively.
- Three organisational success factors for LMS implementation are to "necessary support to academics to produce digital content", "proper training programme for users based on their needs", and "increase the awareness level for academics and students". These are the linkage variables and have strong driver power as well as strong dependence. This can be supported with findings of Santiago et al. (2020), Solangi et al. (2018) and Juhary (2014). Thus, HEIs should provide proper digital content (in a standard technology format) to make learning processes more standard and easier to learn. This will lead to essentially needed collaboration between learners and instructors. Proper training and awareness are business necessities that help to develop instructors’ and learners’ skills to increase interaction with educational technologies.
- The fourth cluster of organisational success factors, such as "deep understanding of users' needs to facilitate education activities" and "top

management support" are at the bottom of the organisational success factors model, but have strong driving power. This can be supported with findings of Basak et al. (2016) and Phongphaew and Jiamsanguanwong (2018).

Further evidence of real-life validation of results comes from figure 5.11, the organisation aspect of ISM approach used. For all success in technology and human aspects, in real life is not possible without the top management support identified as driving success factor in figure 14. However, top support is useless in practice if top management does not understand the actual user needs. Interestingly, it may be different from institution to institution. Some faculty may have positive attitudes and may have tried and informally tested multiple technologies for teaching and learning purposes. Therefore, the management could find internal expert resources for both levels one and two in figure 5.12 and can lead to many successful examples in the institutions (Sangi, 2009). Similarly level three success factors (3,4 and 6) in figure 5.13 are good omens identified for preparation of any particular HEI to drive on the road to success.

ISM model, therefore, can be used by general institutions who have started to use or they are planning to use e-learning and LMS in their institutions. It gives them key information on driving and dependent variables in all three aspects; technology, human and organisation. They can use the model as a guideline and can compare to find any flaws in their planning. Success is what is required and is very difficult to achieve in most organisations. However, if complex relationships are worked out like illustrated in this example, it could help many to avoid mistakes in real-life situations. However, one has to be careful in selecting both experts and the use of this methodology for developing their own ISM as real-life situations may be different. For example, LMS which does not support all desired functions of instructor or learners may not have uniform good access or languages of instructions or subject matters differ from country to country or institution to institution. Some factors may not have explicit connectivity depending upon data obtained from the heterogenous experts.

6 A FRAMEWORK FOR THE DEVELOPMENT OF THE LEARNING MANAGEMENT SYSTEMS FOR HIGHER EDUCATION INSTITUTIONS

6.1 Introduction

Research objective five has been established as developing a comprehensive framework for the development of the LMS in the developing world. The case study of the Kingdom of Saudi Arabia (KSA) help higher education institutes (HEIs) bridge the implementation gap of LMS.

Based on the perceived initial framework (Chapter 4), the analysis of the current implementation of LMS in the KSA was obtained through surveys and interviews (Chapter 5). The quantitative part of the study demonstrated the general and overall perceptions of academics and students while the qualitative part explored the gap between the proposed implementation of LMS and reality (Chapter 5). The resultant output is the conception of this specific framework that might improve LMS in the higher education sector to facilitate education activities, increasing interaction between pedagogy and technology amongst HEIs.

The framework is based on the technology acceptance model (TAM) to address user attitudes towards LMS and the design reality gap (ITPOSMO) model to explore the gap between the purpose of implementation and the reality of an LMS. Interpretive structural modelling (ISM) is used to identify relationships among success factors that lead to improved LMS implementation. The framework examined the following development aspects: Technology aspect: proper technology infrastructure, clear educational service procedures, technical support provisions, technical integration between an LMS and other systems, the transference of traditional courses to e-courses and information accuracy for e-learning content. Among the human aspects examined were a clear vision focused on educational goals, the strengthening and standardisation of IT education resources, knowledge of all LMS aspects, a high level of computer skills, proper training programs and a high level of human competencies. The organisational aspects considered were a deep understanding of user needs, top

management support, the provision of necessary support to academics, the encouragement of academics and students to use an LMS and increased awareness. These were listed earlier in (Chapter 5). This chapter shall explain the evaluation stage of whole work in detail to improve the proposed framework. The Delphi method will be adopted as an evaluation tool for this study.

6.2 Design Reality Gap (ITPOSMS) Model Perspectives:

As indicated in the literature review, the design reality gap analysis enables HEIs to understand the potential failures in LMS. The analysis adheres to the seven ITPOSMO dimensions, identified in the literature review, and tested for in the results section. The framework's objectives regarding development of LMS are listed below.

Technological:

The technological dimension involves changes that affect information, technology and processes under the design-reality gap. The propositions for improvement include the following. First, there is a need for improvement in the provided technology infrastructure for effective LMS operation. LMS represent the apex of digital ecosystems (Abdullah and Ward, 2016), implying that there is a need for investment in the right technological infrastructure, including software and hardware components (Alghamdi and Bayaga, 2016). The improvements also extend to the learning strategies, whereby academic and teaching activities are improved to enhance their value to both the learners and the instructors. Second, it is necessary to ensure LMS information accuracy. Alenezi (2018) argues that the accuracy of the information on LMS is integral in reassuring instructors that the digital systems contribute positively to learning. Ultimately, the value of LMS is dependent on how well they complement and supplement the teaching and learning process (Alghamdi and Bayaga, 2016). Third, the HEIs ought to augment educational processes for effective LMS integration. Augmentation of the educational processes enables instructors to elevate the quality of learning on the digital and offline platforms (Alshammari et al., 2016). By so doing, the institutions can achieve optimal learning in the areas where LMS is utilised, as much as other areas where LMS lacks utility (Dash, 2020). Fourth, the HEIs

should enhance the technical support for educational technology tools that help academics and students perform academic activities. El Zawaidy, (2014) indicated that although some teachers and most of the learners display technical abilities in the use of LMS, these individuals must be trained on how to use the technologies. The architecture of LMS differs, with the invention of new modules and functionalities presenting challenges even to the most technically competent individuals (Gratz and Looney, 2020: Shenoy et al., 2020). Firth, there is a need for support to the transfer of traditional courses to e-courses through LMS. LMS facilitate the delivery of knowledge and skills that were previously done in the traditional models as indicated by (Ayas, 2006; Olson et al., 2011). This is why it is necessary for effective and successful migration of the traditional system onto the digital platforms to ensure continuity in learning. Finally, it is necessary to increase user utilisation of ICT materials (e.g., MS Office, virtual classroom, LMS) and ICT activities (e.g., online discussions, student communication and online examinations).

Humanity:

The human-related factors that contribute to the gaps between the design and the reality can be reduced through the following measures. First, strengthen HEIs and standardise IT resources for educational activities. The propositions to strengthen HEIs and standardize IT resources enables the institutions to focus on quality standards and enhance the capabilities of the institution (Olson et al., 2011). Second, it is imperative for the development of a clear vision and procedures for educational activities within HEIs. In line with the propositions by (Auer and Tsiatsos, 2019; Shenoy et al, 2020), the development of clear visions and process will make LMS a strategic investment by the institution. Third, improve the ICT skills of HEI staff to ensure they have the creativity and productivity required to handle LMS. Improvement in the skills and capabilities of the individuals in HEIs will solve the challenges associated with the implementation of the complex LMS systems, by both existing and incoming instructors (Amoah and Naah, 2020). Similarly, it will enable the institutions to respond to changes in the internal and external environment, including accommodation of complex challenges such as those presented by the Covid19

pandemic (Kaup et al., 2020). Finally, there is a need for enhancement of the ICT skills of academics and students, including technology competency development to improve user attitude towards LMS. The enhancement of the competence in IT-related skills is integral in enabling the learners and instructors to fully utilise the LMS (Basilaia, 2020).

Organisation:

Finally, the propositions for a reduction in the gap focus on organisational factors. First, there is a need for increasing the top management support to improve the teaching-learning process within HEIs by facilitating LMS implementation. Support from top management reduces the challenges facing institutions in adopting and implementing LMS within the institutions, especially since it is a labour and capital-intensive activity (Mobo, 2020). Due to the need for executive decision making in solving the endemic problems associated with digital technologies, top management support is integral. Second, it is imperative to ensure that HEIs understand user needs to facilitate educational activities. The needs of the users, including the instructors and learners, differ (Ibrahim, 2018; Al-Busaidi and Al-Shihi, 2009; Wang et al. 2012). However, the objectives of use are similar. As a result, a clear understanding of the needs of the users will enable the HEIs to achieve full potential. Third, there is a need to raise awareness levels of how important an LMS is within HEIs. Increased awareness about LMS is integral in explicating the potential benefits from these systems (Gratz and Looney, 2020). By so doing, it reduces the resistance to change, with the potential of enabling institutions with the ability to adopt all elements of the innovations (Basilaia, 2020). Finally, it is necessary to help HEIs encourage academics and students to use an LMS within their HEI. Past studies have indicated that some HEIs face challenges in adopting and implementing LMS (Auer and Tsiatsos, 2019; Selvaraj, 2019). However, through timely and effective assistance mechanisms, institutions that have not fully optimized the use of LMS can improve the efficiency and effectiveness of the systems in their learning institutions.

6.3 A Framework for the development of Learning Management Systems in Higher Education Institutes

The framework for the development of LMS for HEI is developed in this section. Based on the findings from the results chapter, the development of LMS that is customised to the needs of the HEIs in the country has to take into account a multiplicity of factors. At the meso-level, the adoption of LMS is dependent on the policy contributions of the ministry of education as well as those within the various HEIs. These policies are widely discussed in past studies, including (Auer and Tsiatsos, 2019), who indicated that the policies are designed to guide the stakeholders in appreciating the importance and characteristics of LMS within the learning environment. The presence of LMS policies at the high levels of decision making for HEIs is integral in removing the industry-wide barriers, as well as creating standards for use of LMS.

The LMS policies are integral in the identification and delineation of the requirements for the implementation of LMS in the various HEIs. The identification of the requirements includes the following. First, the requirements by technical services providers for IT services, most of who are involved in the projects for integrating LMS within the existing learning environment (Conley et al., 2020). The identification of these technical elements is integral in ensuring that all aspects of LMS are adopted and implemented as they should be, to ensure that the HEIs have the right systems in place. Second, the requirements of the university are integral components as well. Past research reiterates the need for adopting an LMS system that fits into the needs of the institution, based on its specialisations (Dash, 2020), as well as other requirements (Auer and Tsiatsos, 2019). Digital transformation is a complex process, which can be best understood from the functional perspective. As a result, the functions for which it is adopted by the institution are key in determining the framework (Brennan, 2020). Third, the requirements by the learners and instructors who are directly involved in the use of the institutions. Although past studies treat the learners and instructors are entirely different entities when it comes to the use of LMS (Shahzad et al., 2020), it is imperative to appreciate the fact that they are viewed as participating in the same learning environment. As a result, the barriers and

opportunities facing them are highly correlated. The considerations involve determining that the content which the instructors seek to deliver to the students are the right ones (Boboc and Koç, 2018), as well as the fact that instructors are capable of achieving similar or better outcomes in comparison to the achievements under the traditional systems (Almaiah et al., 2020). Ultimately, the primary concern is what instractors can migrate their teaching practices onto the digital platforms, without disrupting the learning process, even when the adoption of LMS is necessitated by unforeseen circumstances, such as the Covid19 pandemic.

The inputs from content providers are integral in ensuring that LMS contain the right materials based on the needs of the learners, according to the curriculum. Most of the emergent studies on the adoption of the LMS due to Covid19 restrictions indicate that due to the rapid nature of the changeover, and the inability to get the right content providers, they have faced challenges in using LMS (Auer and Tsiatsos, 2019; Basilaia, 2020). Although content providers are often viewed as external stakeholders, their involvement in the LMS design processes facilitates the integration of what the curricula dictate, to enable instructors to have access to LMS systems that have relevant content. After all, since not all instructors have the technical ability to design the content for LMS (Almaiah et al., 2020), and since not all instructors have the time and resources to create the required content on LMS (Shenoy et al., 2020), content providers play an integral role in the success of LMS.

Finally, at the basic level exists the determinants of success, based on the expectations and reality. The design reality gap is applied in the identification of the seven gaps, which are classified into three key dimensions, including organisation effects, the human effects and the technical effects. Based on the input by (Masiero, 2016), the possibility that the expectations from an LMS might vary from the achievements necessitates concerns that have to be taken into account. Within these three dimensions lies the formula for improving the parity between the expectations and the reality, to enable HEIs to achieve the full potential from LMS. Since the gaps are customised to the situations, the sub-

variables under the three components of the ITPOSMOs provide each institution with a pathway to enhancing the suitability of LMS for the intended purposes. The framework is as shown hereunder (figuer 6.1).

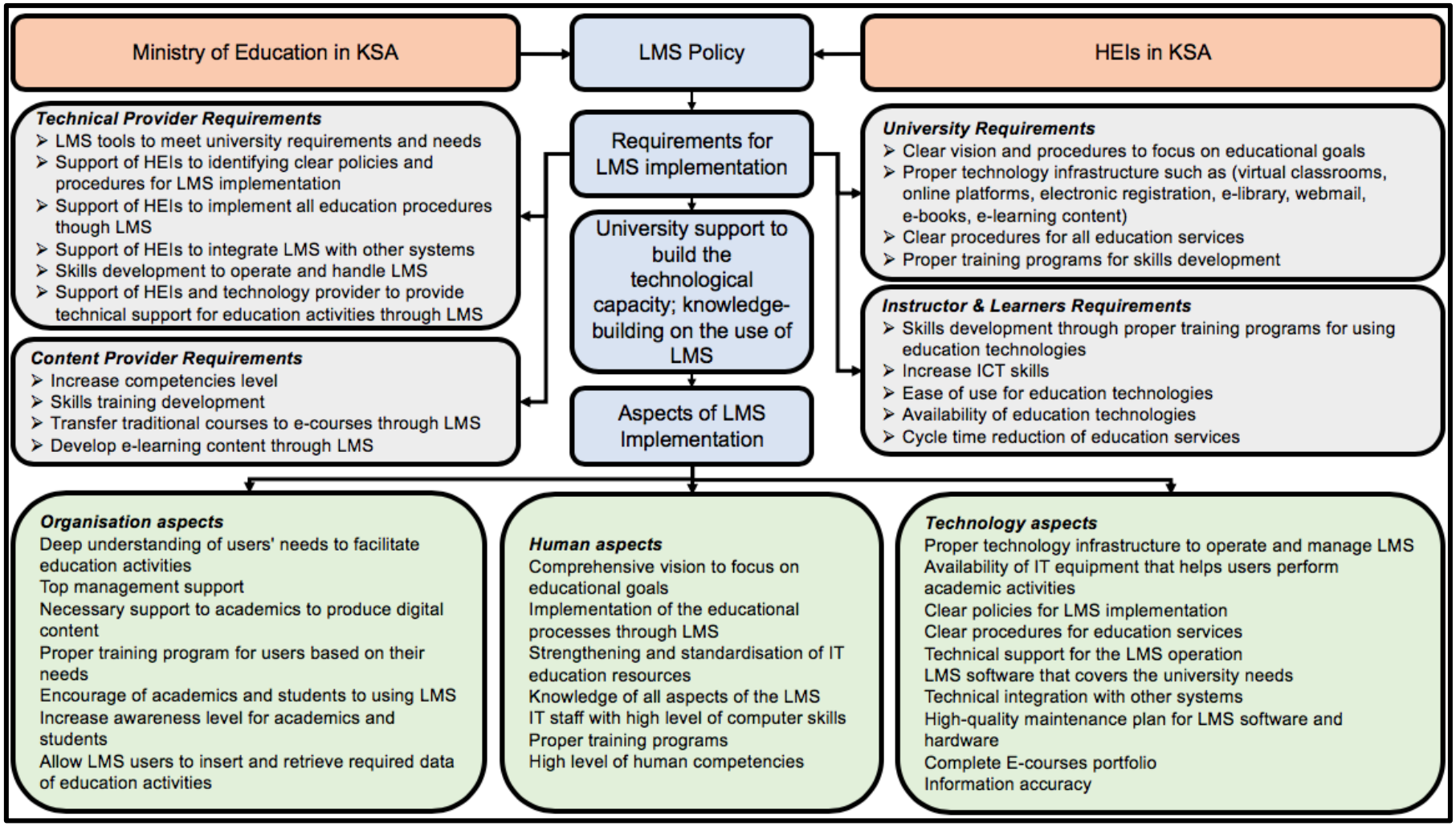

Figure 6.1: Framework for Development of LMS in KSA HEIs

6.4 Framework Evaluation

This section focusing on the issues involved evaluation that judged the construct validity of the proposed framework development for LMS. According to Okoli and Pawlowski (2004), the Delphi technique has proven to be a popular tool in information systems (IS) research. Dalkey (1969) defined the Delphi technique to help researchers to improve their findings by eliciting and refining group judgements. There are several advantages to adopting the Delphi method in evaluation stage, such as consensus building, future forecasting, ensuring the anonymity and confidentiality of responses and requiring less time for respondents to complete surveys (Skinner et al., 2015). Therefore, the Delphi method was used to evaluation the proposed framework development for LMS.

6.4.1 Procedure for Selecting Experts

This study identified two relevant categories of experts with important and valuable knowledge about research themes and questions: academics and practitioners. These experts may have different perspectives. Ten experts, most of whom had worked within HEIs, were contacted and given an explanation of the study's theme, aim, objectives and research questions. The researcher explained the procedures required for evaluation as well as the commitment required. Table 6.1 summaries each expert's background.

Table 6.1: Expert judgment who involved in evaluation

No	Disciplines or Skills		Organisation			Work experience		Expert Nationality
	Academics	Practitioners	Education Sectors	Higher education institutes	Education technology providers companies	At least 5 years for academic, education sector and higher education institutes	At least 7 years for practitioner and Education technology providers companies	
2	✅		✅			✅		International Expert
3	✅			✅		✅		Saudi Expert
4	✅			✅		✅		International Expert
5	✅			✅		✅		Saudi Expert
6		✅		✅			✅	Saudi Expert
7		✅		✅			✅	Saudi Expert
8		✅		✅			✅	Saudi Expert
9		✅		✅			✅	International Expert
10		✅			✅		✅	International Expert
11		✅			✅		✅	Saudi Expert

6.4.2 Evaluation of the developed framework

The proposed framework for the development of LMS in HEIs was evaluated with nominated experts from the field of e-learning implementation in KSA education sectors. Three focus groups with experts were interviewed for the evaluations. The first focus group contained education sector academics, the second contained HEI academics and the third was populated by education technology provider practitioners. The evaluation process included two rounds for each focus group.

First round: An email was sent to the experts asking for a review of the proposed framework, following the recommendation of Delbecq et al. (1975).

Second round: The researcher divided the experts to three different groups before arranging focus group meetings. At this point, the researcher discussed the proposed framework with the experts and focused on the purpose of LMS in HEIs, addressing stakeholder requirements, implementing LMS efficiently, success factors for LMS and the relationship between those success factors according to the ISM approach. The participants were asked to complete evaluation sheets as individuals by highlighting areas to include in, or exclude from, the proposed framework.

Table 6.2: Areas to be included/ excluded in the proposed framework

Areas for framework development		Expert's review									
Main areas	Sub areas	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10
Comprehensive	Improvement of the education environment in relation to facilitating the implementation of LMS	√	√	√	√	√	√	√	√	√	√
	Improvement of the pedagogical process through facilitating the implementation of LMS	√	√	√	√	√	√	√	√	√	-
	Improvement of the education environment that promotes learner-instructor interaction	√	√	√	√	√	√	√	√	√	√
	Provision to secure HEIs in terms of information systems failures	-	√	√	-	√	√	√	√	-	√
Effectiveness-Stakeholders	Improvement of stakeholders' involvement in LMS implementation	-	√	√	√	√	√	√	√	-	√
	Support from stakeholders' to identifying clear vision and procedures for education environment processes	√	√	√	√	√	√	√	√	√	√
	Provision on skills and competence development for IT staff to increase their productivity	√	√	√	√	√	√	√	√	-	√
	Improvement of LMS implementation according to HEIs requirements and needs	-	√	√	√	√	√	√	√	√	√
	Provision on awareness program to reduce resistance among academics and students in LMS implementation	√	√	√	√	√	√	√	√	√	√
Effectiveness - Aspects of LMS implementation	Provision of technology infrastructure for effective operation of LMS	√	√	√	√	√	√	√	√	√	√
	Improvement of the accuracy of LMS content	√	√	√	√	√	√	√	√	√	√
	Promote of academic activities through LMS implementation	√	√	√	-	√	√	√	√	√	√
	Provision on ICT skills and competencies	√	√	√	√	√	√	√	√	√	√
	Provision for standardization of IT resource in LMS implementation	√	√	√	√	√	√	√	√	√	√
	Enhancement of encouraging academics and students in LMS implementation	√	√	√	√	-	√	√	√	-	-
	Improvement of the combination of hardware and software for instructors and learners to facilitate educational activities	√	√	√	-	√	√	√	√	-	√

Table 6.2 illustrates the evaluation criteria's three main areas (comprehensive, effectiveness–stakeholders, effectiveness–aspects of LMS implementation). Generally, the experts indicated the findings of the current research and the proposed framework seemed to be for development of LMS within HEIs. However, improvements were offered to the proposed framework, according to their own understanding and experience of education sectors. All experts agreed that LMS implementation is fundamental and essential for HEIs, that it must be mentioned in the vision and within operational plans.

One expert highlighted that face-to-face interaction is always better, but that LMS can provide interaction access at any time. It is also quick and effective, providing a user-friendly and engaging platform for the learning process. Another expert added that LMS adoption had become a major requirement in the pedagogical process.

Stakeholder requirements were also discussed during focus group meetings. One expert indicated that allowing all the stakeholders to participate and offer suggestions was significant to ensuring the success of LMS implementation. Another expert recommended creating an awareness plan and using all available channels to provide it to end users.

Regarding LMS implementation aspects, all experts agreed that a failure phenomenon was not only related to the technology aspect, but that technologies and integration between them could handle organisation information related to core and supportive organisation processes. One expert emphasised that the IT team should be organised and that all support and operational procedures should be documented. Another expert stated that HEIs should provide continuous training courses and workshops promoting academic activities, skills and competencies while not considering students to be technologically informed due to smartphone or social media application use. Yet another expert emphasised that HEIs should continuously evaluate system effectiveness and development when needed.

6.5 Summary

This chapter related to the fifth objective and presented the proposed framework for the development of LMS. A thorough the aspects of LMS implementation include technology, humanity and organisation. The evaluation of the proposed framework, based on the Delphi method, was presented.

7 CONCLUSION AND RECOMMENDATION

7.1 Conclusion

The objective of this research was to a framework for development of LMS from information systems (IS) perspective that included technological, human and organisational aspects. The research conclusion is outlined in below bullet points:

- This research revealed that despite extensive resources being allocated by the KSA, LMS faced several barriers in terms of its aspects, leading to low usage among academics and students due to a lack of understanding.
- LMS enhances learning processes, increases communication between instructors and learners, improves decision making, permits better resource management for productivity improvement and reduces the cost and time spent by guiding HEIs towards practical solutions for improving educational processes.
- The conceptual framework represented combined theories and concepts from other areas of research. The structure of the conceptual framework was developed by integrating the ITPOSMO model and TAM to improve LMS in the KSA HEIs.
- A list of barriers influencing LMS in KSA HEIs was grouped according to aspect (i.e., technology barriers included information, technology and process; human barriers covered objectives, values, staff and skills; and organisational barriers encompassed management systems and structures as well as other barriers). The barriers were then analysed according to how often they were experienced during LMS implementation. The factors emphasised a lack of IT infrastructure to enable and facilitate process changes in KSA HEIs, hindering successful LMS and providing evidence for HEIs to adjust their view of LMS.
- Stakeholder requirements for LMS in KSA HEIs covers university, technology provider, content provider and user requirements. Success factors for LMS are based on the HEI requirements, which are determined through semi-structured interviews with top management, IT staff and e-learning staff.

- A comprehensive framework for the development of LMS, developed to address the LMS implementation gap, was developed in the context of KSA HEIs that already has significant resources allocated and faces low LMS use within HEIs despite high technology acceptance levels among academic and students.
- In this study, the framework for development LMS could help HEIs to achieve a high quality of education outcomes, develop users skills and capabilities and control technology procurement and support gaps. In this regard, e-learning is a way of learning where the individual utilising electronic technologies to access educational curriculum outside of a traditional classroom.

7.2 Review of the Research Objectives

This section presents an overview of how the aim and objectives of this research, defined in Chapter 1, have been accomplished. Table 7.1 outlines the main objectives achieved in this study.

Table 7.1: Research objectives

Object	How it has been achieved
To identify the requirements and needs for LMS in HEIs, focusing on defining and capturing the requirements and needs for LMS implementation in HEIs.	Essential LMS requirements in HEIs were identified by reviewing the research literature and initial data from the field study of LMS in the KSA. The researcher could extract and address more details about LMS from many countries by exploring available resources
To investigate the users' attitude towards the implementation of LMS using the Technology Acceptance Model (TAM)	To investigate user attitude, there was a need to understand how users accept and use an LMS, as well as analyse factors influencing user decisions about how they will use LMS by distributing questionnaires to both academics and students

Object	How it has been achieved
To identify and analyse the critical barriers for the implementation of LMS using the design-reality gap (ITPOSMO) model	To identify and analyse the barriers, there was a need to understand the barriers related to the effective LMS. Findings from semi-structured interviews regarding LMS were reviewed in relation to all ITPOSMO gaps. Barriers were grouped according to aspect: 1) technology barriers (information, technology, process); human barriers (objectives and values, staff and skills); and 3) organisational barriers (management system and structure, others)
To identify the Critical Success Factors (CSFs) for facilitating the effective implementation of LMS in HEIs using interpretive structural modelling (ISM) approach.	To identify CSFs, there was a need to understand the various factors influencing acceptance and utilisation of e-learning technologies based on HEI requirements. CSF developed for LMS, informed by the literature review, were determined through semi-structured interviews with top management, IT staff and e-learning staff.
To a framework for the development of LMS, which could help HEIs to bridge the implementation gap of LMS.	To develop the framework, there was a need to analyse LMS implementation in the KSA, which was revealed through surveys and interviews. The quantitative part of the study demonstrated general and overall perceptions of academics and students. The qualitative part of the present study was designed to explore the gap between the proposed LMS implementation and reality. The resultant output was the conception of a specific framework that might improve LMS implementation in the higher education sector, facilitating educational activities and increasing interaction between pedagogy and technology amongst HEIs.
To evaluate the proposed framework for the development of LMS.	The evaluation of the proposed framework was based on the Delphi method.

7.3 Review of the Research Questions

This section presents this study's research questions, which were assessed in the context of the research undertaken. Responses to the research questions are summarised in Table 7.2.

Table 7.2: Research question and review informed from the research

Research question	Review
What are the main characteristics of a framework that can be included to improve LMS in KSA HEIs?	There is a need to identify requirements. HEIs should create committees to plan LMS implementation with clear visions and procedures to focus on educational goals while also identifying implementation activities and required individual and organisational supporters. HEI top management should also develop LMS budgets and implementation plans.
What are the requirements for HEIs in KSA to implement LMS in their institutions?	The identified requirements fall into four themes. The framework represents basic requirements of LMS stakeholders, offering a transparent indication of how those requirements influence LMS implementation and addressing stakeholder requirements for KSA HEIs. The stakeholder requirements were developed by referring to published literature and data-gathering methodology relevant to the present research aims and objectives.
What is the gauge of technology acceptance exhibited by the HEIs in terms of attitude to the current use of LMS among institution users?	students and academics were more disposed to gain quick access to knowledge and information. Therefore, the concepts of e-learning, ICT, and LMS were handy tools providing students and academics with quick access to learning materials and reminders about upcoming assignments and projects. This may have positive implications, as such tools provide academicians with easy access to students in connection with their coursework and learning materials. Moreover, a majority of the students and academics expressed positive views about LMSs. Therefore, the provision of an LMS as a teaching modality can be improved and be considered applicable

Research question	Review
How have the barriers in KSA impacted on the successful implementation of LMS in HEIs?	The findings from the surveys and interviews were encouraging for LMS implementation, showing academics and students were flexible and open to implementation. However, there is still a gap between perception and reality in current LMS implementation. The interviews also indicated that the overall level of IT skills for university staff is moderate, earning a score was 3.23 out of 5. Satisfaction levels were moderate as well, with an overall score of 3 out of 5.

7.4 Contribution to Research Knowledge

First of all, this work was focused and conducted in the geographical region of the Kingdom of Saudi Arabia (KSA). The key source of originality here is that very few and scattered studies have been undertaken in KSA HEIs on the subject matter; not so compressive and/or using elaborated scientific methodology. Therefore, the main contribution of this research is that it has developed a framework for the development of LMS in KSA HEIs; taken into consideration a viewpoint of all stakeholders i.e., academics, students, technical provider and administration altogether. The combined perspective of all stakeholders is a very important and useful contribution.

The implementation of LMS using the Technology Acceptance Model (TAM) (Davis et al., 1989), to determine the extent of technology acceptance of academics and students. Another is it explored the gap between the purpose implementation of LMS and reality (Heeks, 2003). The results were reported in section 5.6.1 in the thesis. It is further enhanced by using Delphi technique to evaluate research findings and consistency. These are considered unique contributions to the research knowledge that could eventually help HEIs. It adds to the reliability of model correctness and consistency and could help save both effort and costs to future researchers working on new cases or re-engineering their existing educational; policies, practices, learning processes and/or

infrastructure. Success factors for the implementation of LMS and not specifically in micro-level activities were also part of the research study. In addition, interpretive structural modelling (ISM) was adopted in this study, which is a robust methodology for ranking and identifying relationships among success factors and discussing the managerial implications of this research (see section 5.6.4 for detail).

The contribution of this research may also benefit other institutes with similar background or communities. This research also can be used for new applications of LMS in a new HEIs to improve upon their approach in using technologies in their education. Investigation of how the academics and learners come to accept and use LMS in KSA would be helpful as well.

A combination of qualitative and quantitative data were collected in an effort to ensure the soundness of the conclusions of the study. The quantitative data, which were gathered from stakeholders in sampled population in KSA, could provide good guidance to implementors as well as new entrants in online. These data allowed the researcher to assess the attitudes of users towards an LMS and how they actually use it. The qualitative data provided information on the gap between the purpose of the implementation of LMS and reality. These data allowed the researcher to analyse the implementation gap within HEIs; further, they allowed the identification of the stakeholders' requirement matrix for HEIs, which may help HEIs success in their implementation of LMS, consequently narrowing the implementation gap by addressing user requirements towards implementation success.

7.5 Contribution to practitioner

LMS implementation practitioners in HEIs can also benefit from the findings of this research. The proposed Implementation framework could be used as a guideline for a significant part of the implementation plan or practitioners core activities checklist. It could help them to aim to achieve a high quality of education outcomes, develop users skills and capabilities and control technology procurement and support gaps. Additionally, they could learn how to increase interaction among instructors and learners, use learning methods, provide the

flexibility of time and place as well as the ease of access to a huge amount of information. It will, therefore, be used for better-facilitating education activities.

LMS in the Kingdom of Saudi Arabia has been seen with various barriers in relevant to adoption and implementation. In this study, therefore, created a comprehensive and evaluated framework for facilitating the practitioners. This framework could help decision-makers better resource management for successful implementation of LMS into HEIs.

Although LMS is widely adopted and implemented in several HEIs in developing countries, few researchers have focused on finding the implementation gaps and that explored in the context of real circumstances and the physical environment. This study is thus the first to seek to reduce barriers to LMS implementation in KSA HEIs using design reality gap (ITPOSMO) model.

It can be assumed that the barriers identified and their proposed solutions are thus tailored to meet the specific needs of KSA HEIs, including technology barriers (lack of IT infrastructure, incomplete functionalities and lack of integration); human barriers (lack of knowledge of the importance of e-learning, lack of expertise and competencies); and organisation barriers (organisational preparedness, unclear of requirements, lack of training, resistance and financial constraints). In addition to it, it helps to tap into all the benefits of new educational technology in their various colleges to avoid failure in their implementation. However, these are also very common barriers in other environments only the extent of each may vary from case-to-case basis and can be easily adjusted by practitioners.

7.6 Recommendations

To ensure successful LMS implementation, KSA HEIs should focus on effective learning environments, facilitate education activities, top management involvement and increased interaction between pedagogy and technology. Furthermore, now is the time for much needed to come out from the traditional way of learning and to adopt a new sophisticated method of learning with a faster speed and less time consumption. The findings of this study show the

weaknesses of LMS implementation. To ensure required IT staff skill levels, LMS implementation plans need reformulating to facilitate the desired educational activities. Some processes require reengineering, technology acceptance and training to reduce waste and ensure effective management across different deanships and departments, so that all academic and student experiences can be enhanced.

The final recommendation is for top HEI management seeking LMS implementation. HEI visions and mission statements should make it clear that providing the best education system to deliver education to the learners in the most efficient manner. They should identify various implementation activities and required individual and organisational supports needed for activity execution. Understanding user characteristics and online needs is essential to ensure that barriers are overcome, ensuring successful and continued LMS implementation.

7.7 Study Limitations

First, the results of this study are limited to HEIs, since KSA HEIs were explored and primary and secondary education were excluded. Due to the widespread adoption of LMS in other levels of education due to the Covid19 pandemic, it is necessary to determine whether the findings apply to other levels of learning.

Second, the discussion and analysis represent another research limitation. LMS implementation is focused only on a single institution of higher education—Al-Imam Mohamed bin Saud Islamic University. The absence of data and published reports on the other KSA HEIs represented additional study limitations, as did the lack of research on facilitating effective LMS implementation, preventing comparisons between the results of other investigators.

Third, the size of the sample represents another research limitation; difficulties in covering a wider sample of HEI because of time restrictions. Although the survey sample is considerably large, it pales in comparison with the total number of individuals enrolled in KSA HEIs.

Fourth, the present study revolves around facilitating LMS in the context of real circumstances, the physical environment existing in KSA HEIs that affects such

implementation, potential problems encountered by administrators colleges deanship of IT as well as deanship of e-learning in LMS implementation, identifying the barriers based on the ITPOSMO model, stimulate more positive attitudes in users towards LMS and determining if there is a relationship between IT users perceived usefulness, perceived ease of use, and attitude to use LMS based on the TAM. Therefore, the present study results can be considered as few preliminary forward steps in the effective implementation of LMS as an alternative approach to teaching and learning in KSA HEIs.

Fifth, the credibility of the combined ITPOSMO and TAM is limited only to the implementation of LMS at Al-Imam Mohamed bin Saud Islamic University. More research could be conducted to verify this credibility in other higher education technology contexts.

The relationship model among the identified success factors for improving LMS diffusion are limited to HEIs. Moreover, this research explained all three categories of technology, human and organisational success factors for improving LMS diffusion in HEIs. One thing needs to be noted that there exists a relationship between these three categories. This can be supported with findings of Basak et al. (2016), who revealed that human factors affect LMS implementation in higher education, such that these factors are further associated with organisational and technological factors. However, this relation between three categories has not been studied or examined in this research. Further, in this research, ISMs have not been statistically validated. Structural equation modeling (SEM), also commonly known as linear structural relationship approach, has the capability of testing the validity of such a hypothetical model. Therefore, the SEM approach can be extended to test and validity of ISM model. ISM is a supportive analytic tool for success factors for improving LMS diffusion.

7.8 Future work

This section emphasises areas worthy of further research. There is a need to confirm the findings of the present study, which could involve cooperation between developed and developing countries. The sample size should be large and varied, targeted to achieve comprehensive generalised results. This

research mainly focused on a single institution of higher education—Al-Imam Mohamed bin Saud Islamic University in the KSA. Future researchers should consider all HEIs by applying the study's framework to a larger sample. Future research could include a focus on general ICT implementation for teaching and learning. Additionally, increased usage and user experience could affect the collection of data from different groups. Moreover, In future research, however, it has been suggested that future research need to consider the association of technology, human and organisation success factors for gaining further valuable insight. In addition to it, It may be targeted to develop the initial model through Interpretive Structural Modeling (ISM) for success factors and then testing it using Sequence Equation Modelling (SEM).

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APPENDICES

Appendix A : Academics Survey Questionnaire

Please put a check (√) on the appropriate box.

Section 1: Demographic Characteristics Information

Question	Answer
Gender:	☐ Male ☐ Female
Your College is:	☐ Humanities & Social Sciences ☐ Administration Sciences ☐ Applied Sciences (e.g. engineering, computing& IT) ☐ Medical & Health Sciences ☐ Islamic Studies ☐ Other
Academic Rank:	☐ Professor ☐ Associate Professor ☐ Assistance Professor ☐ Lecturer ☐ Instructor
Work experience at the university:	☐ Less than 1 year ☐ from more than 1 year to less than 4 years ☐ from more than 4 years to less than 7 years ☐ from more than 7 years to less than 10 years

	☐ 10 years and more

Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat Agree	Strongly agree
1	2	3	4	5

Section 2: Perceived Easy to Use LMS

Question	1	2	3	4	5
Using LMS is easy for me					
Interacting with LMS will increase if it is clear and understandable					
It is easy to learn how to use LMS					
It will be easy to find learning resources with LMS					

Section 3: Perceived Usefulness of LMS

Question	1	2	3	4	5
My job performance will improve with LMS (ex. quality and accuracy of my academic work)					
My productivity will increase with LMS (ex. LMS reduces cycle time of educational processes)					

My effectiveness on my job will enhance with LMS (ex. your ability to create maximum value, in the minimum time and effort)					

Section 4: Attitude towards Using

Question	1	2	3	4	5
University administrators should give priority to LMS training in order to improve the ICT skills of faculty members					
LMS increases educational process in my university					
LMS facilitates educational process					

Yes	Probably yes	No
1	2	3

Section 5: University support to Use LMS

Question	Yes	Probably yes	No
I am likely to use LMS if I am provided the instructor led training			
I am likely to use LMS if the university provides good technical support			

Section 6: Barriers factors to use LMS

Which of the following barriers usually faced you while you using LMS (you can choice more than one option)

Question	
Information problems (ex. lack of resources data, information corruption or inconsistent)	
Technology problems (ex. Infrastructure issues, inappropriate choice of software and LMS is difficult to use)	
Process problems (ex. Conflict between user departments, lack of productivity and fail to underestimate of timeline)	
Objectives and value problems (ex. Lack of clear project focus leadership and deliverables, and failure to adapt to business change)	
Staff and skills problems (ex. Lack of skills to handle IT poor, personal skills, leadership styles and bureaucracy)	
Management systems and structure problems (ex. Lack of managing change properly, stakeholders' involvement and lack of resources and capabilities for education activities)	
Other problems (ex. vendor issues, finance issues and lack of end-users satisfaction)	

Please use the space below to write down any comments you have about your learning management system experience that was not covered in this questionnaire.

……

……

Appendix B : Students Survey Questionnaire

Please put a check (√) on the appropriate box.

Section 1: Demographic Characteristics Information

Question	Answer
Gender:	☐ Male ☐Female
Your Collage is:	☐ Humanities & Social Sciences ☐ Administration Sciences ☐ Applied Sciences (e.g. engineering, computing& IT) ☐ Medical & Health Sciences ☐ Islamic Studies ☐ Other
Education	☐ Diploma degree ☐ Bachelor's degree ☐ Master's degree ☐ Doctoral degree ☐ Other

Strongly Disagree	Somewhat Disagree	Neither agree nor disagree	Somewhat Agree	Strongly agree
1	2	3	4	5

Section 2: Perceived ease of use

Question	1	2	3	4	5
It is easy to use a virtual classroom through LMS					
It is easy to receive homework online through LMS					
It is easy to participate in online discussions through LMS					
It is easy to find information online through LMS					
It is easy to make video conferencing with students through LMS					
It is easy to make online academic consultations through LMS					
It is easy to make online examinations through LMS					

Section 3: Perceived usefulness to LMS

Question	1	2	3	4	5
LMS will improve my learning performance					
LMS will enable me to accomplish academic tasks more quickly					
LMS will enhance my effectiveness to do my academic tasks					

Section 4: Attitude Towards the Use of LMS

Question	1	2	3	4	5
University has enough resources for implementation LMS within their collages					
Using LMS is a good idea to apply within university					
Using LMS does not requires technical ability					
Using LMS will help me to obtain high grades					
LMS will help me to achieve the learning outcomes required for my studies					

Yes	Probably yes	No
1	2	3

Section 5: University support to Use LMS

Question	Yes	Probably yes	No
I am likely to use LMS if the university provides sufficient training			
I am likely to use LMS if the university provides good technical support			

Section 6: Barriers factors to use LMS

Which of the following barriers usually faced you while you using LMS (you can choice more than one option)

Question	
Information problems (ex. lack of resources data, information corruption or inconsistent)	
Technology problems (ex. Infrastructure issues, inappropriate choice of software and LMS is difficult to use)	
Process problems (ex. Conflict between user departments, lack of productivity and fail to underestimate of timeline)	
Objectives and value problems (ex. Lack of clear project focus leadership and deliverables, and failure to adapt to business change)	
Staff and skills problems (ex. Lack of skills to handle IT poor, personal skills, leadership styles and bureaucracy)	
Management systems and structure problems (ex. Lack of managing change properly, stakeholders' involvement and lack of resources and capabilities for education activities)	
Other problems (ex. vendor issues, finance issues and lack of end-users satisfaction)	

Please use the space below to write down any comments you have about your learning management system experience that was not covered in this questionnaire.

……

……

Appendix C : Interview Schedule

Q1. Explain the IT vision within your organisation, specifically to higher education learning?

Q2. How do you assess the level of IT skills within the university staff? Scale your answer (1-5)

Q3. What is the level of satisfaction of LMS within your university? Why? Scale your answer (1-5)

Q4. What are the main barriers that you face the implementation of LMS in your university?

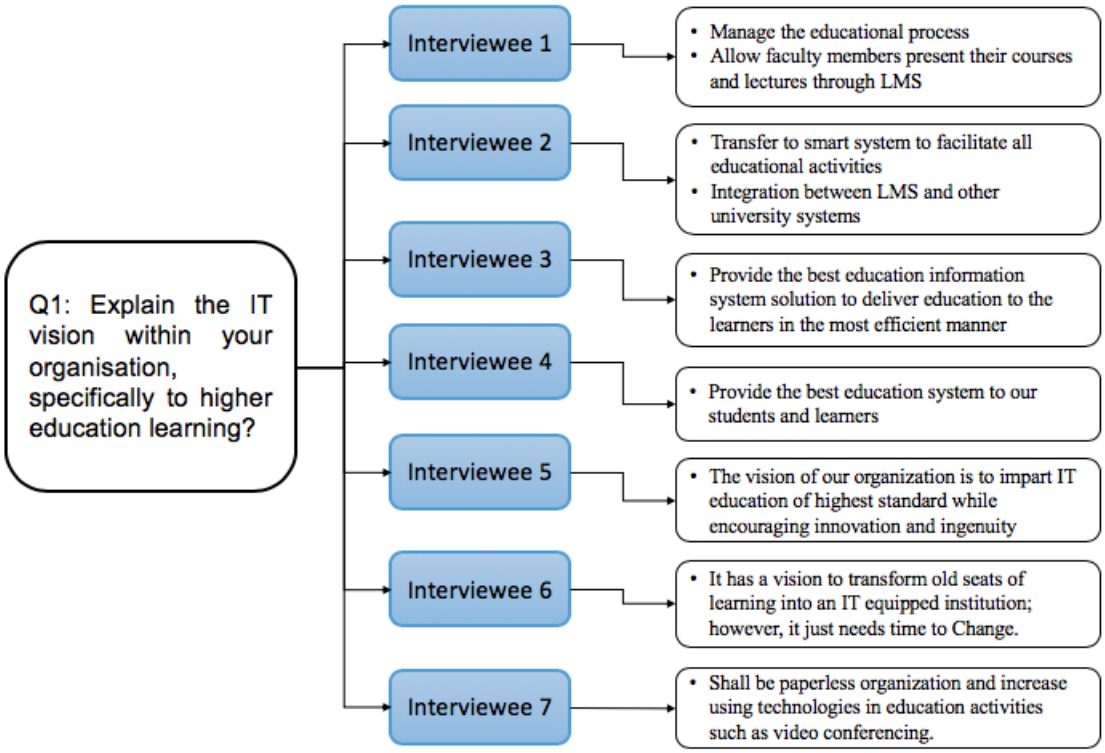
Q5. Are there overlaps between LMS in functions, outputs, design and objectives? Why? Ex. (students supposed to print out their transcript through LMS however only staffs' can do this action)

Q6. Do you have a project manager to guide the implementation process of LMS? from which department?

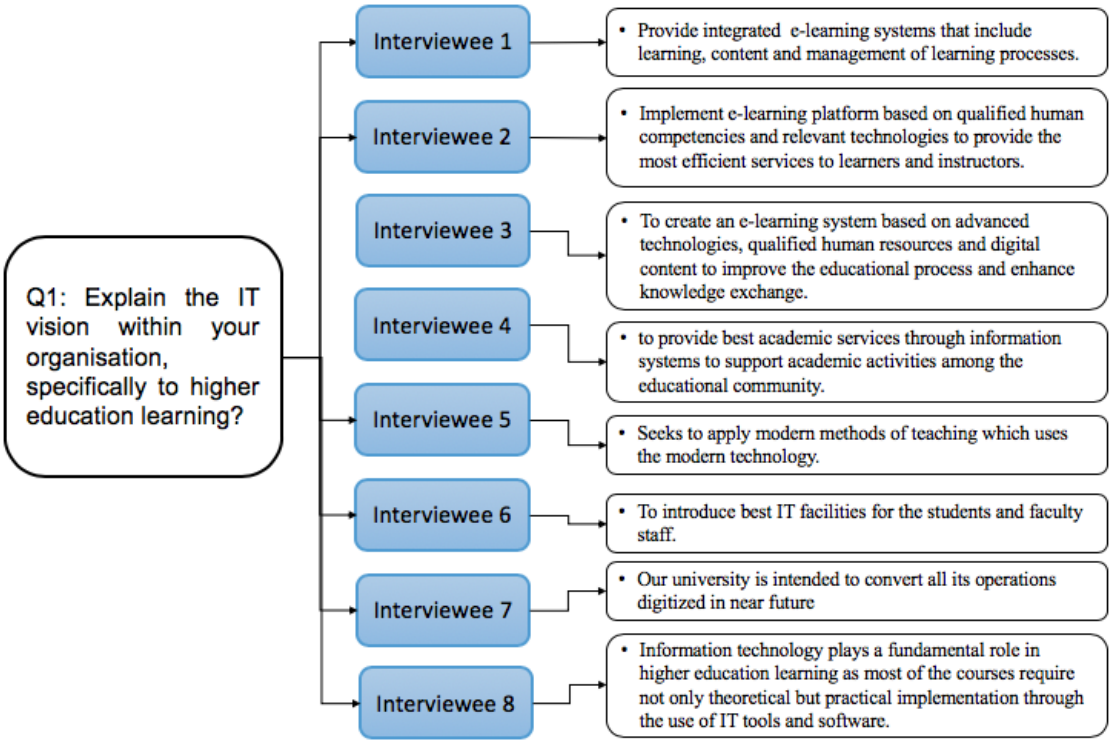
Q7. What are the major requirements for the LMS for your university?

Q8. How do you model learning management system stakeholders' cooperation for its successful implantation in your university?

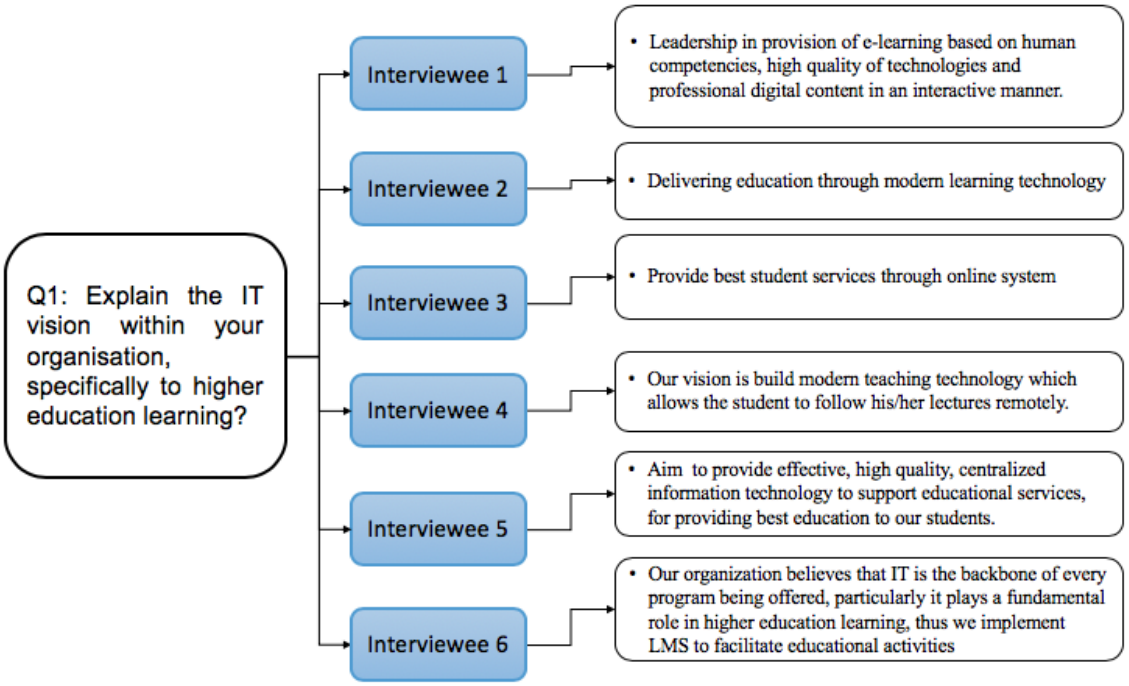
Interview Data



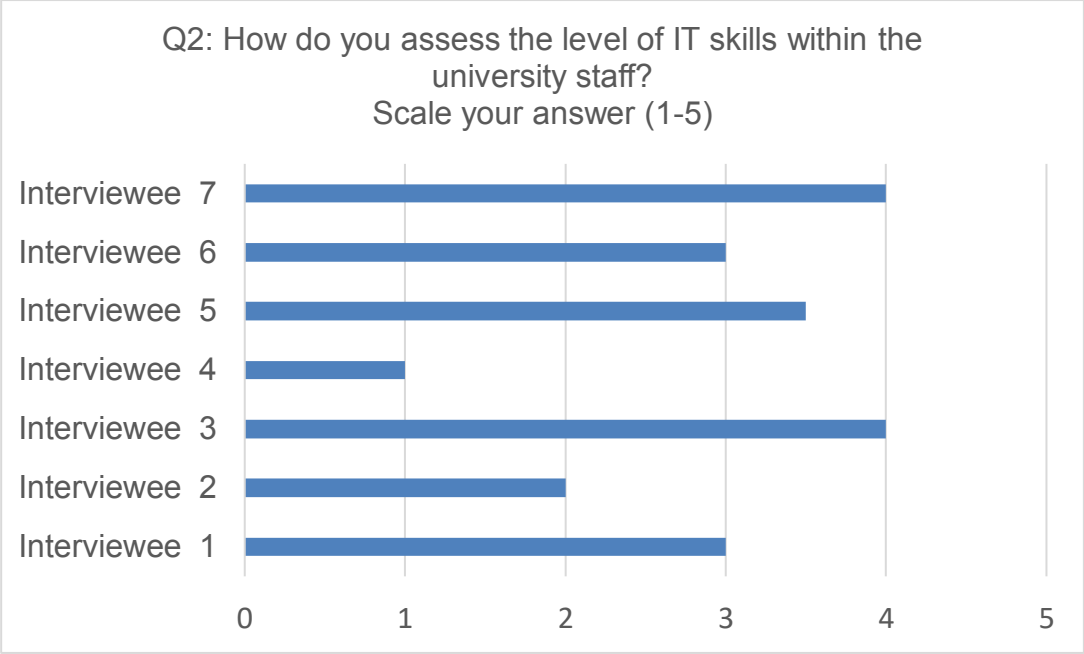
Question 1, administrator interview participants' answers



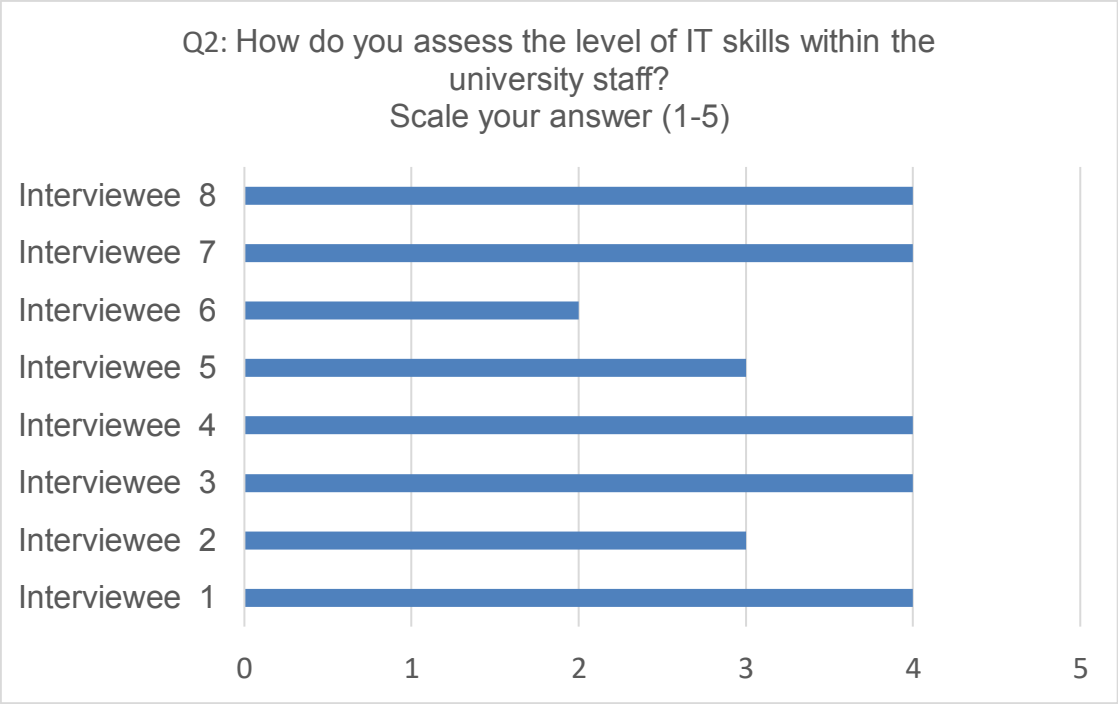
Question 1, IT personal interview participants' answers



Question 1, E-learning personal interview participants' answers



Question 2, administrator interview participants' answers



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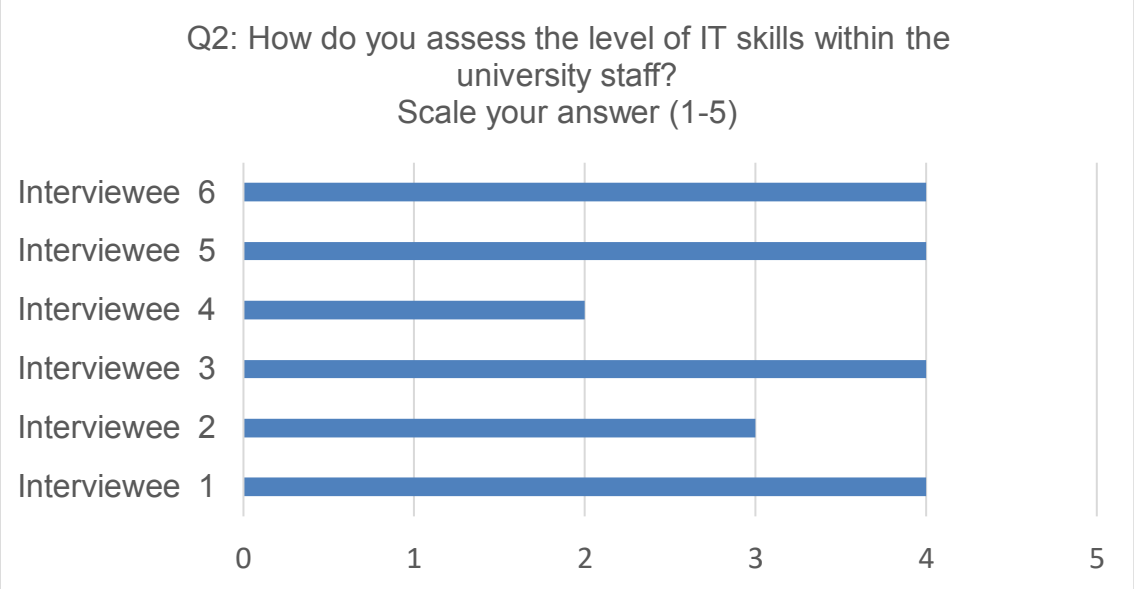

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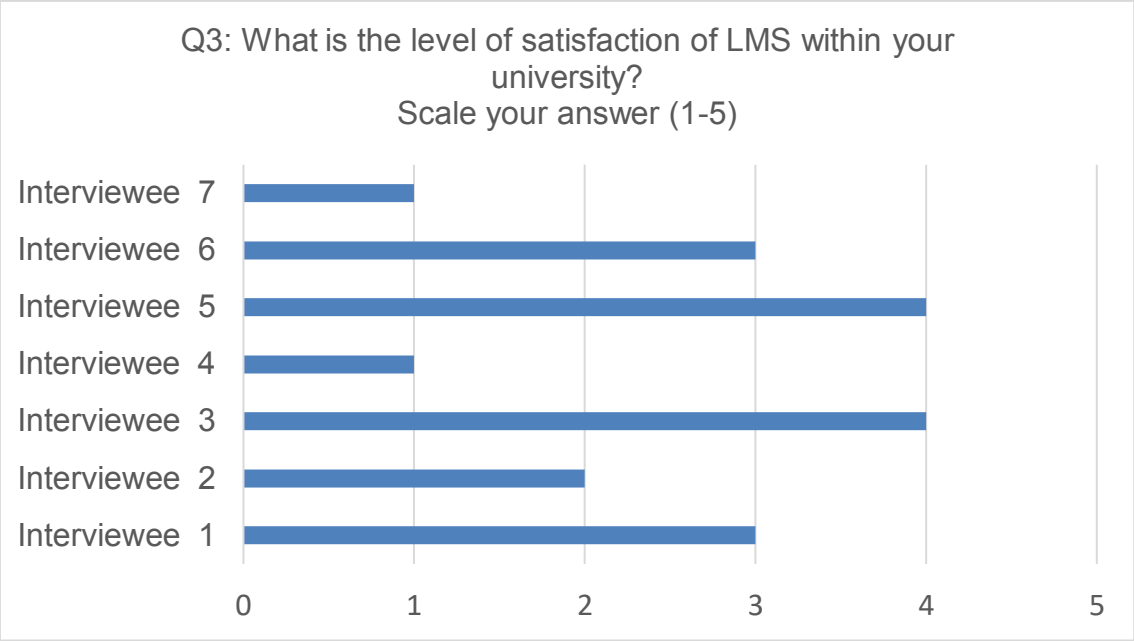
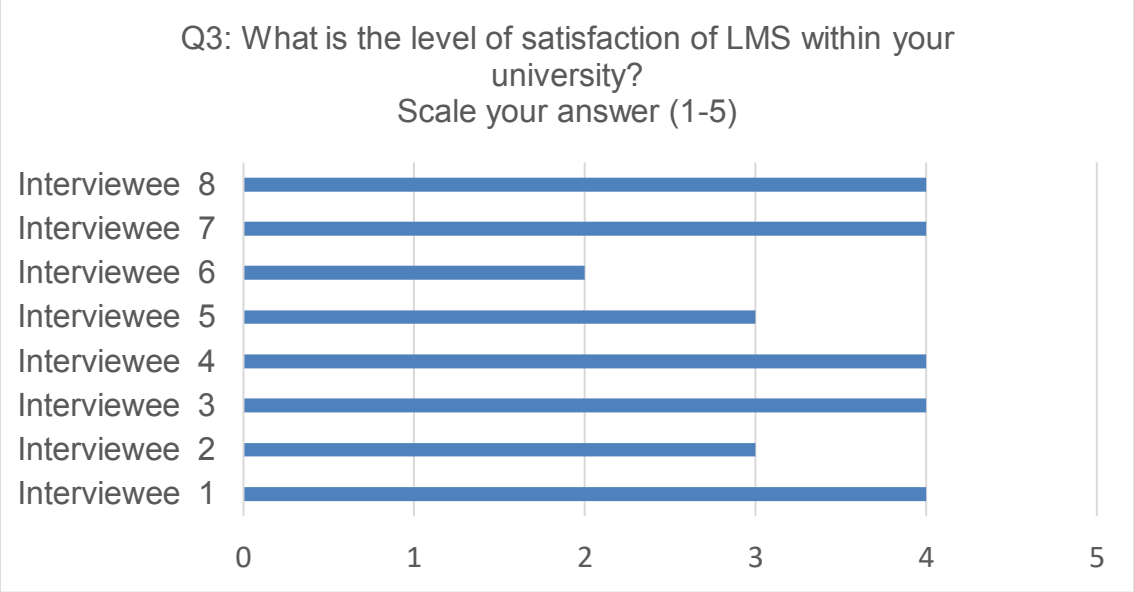
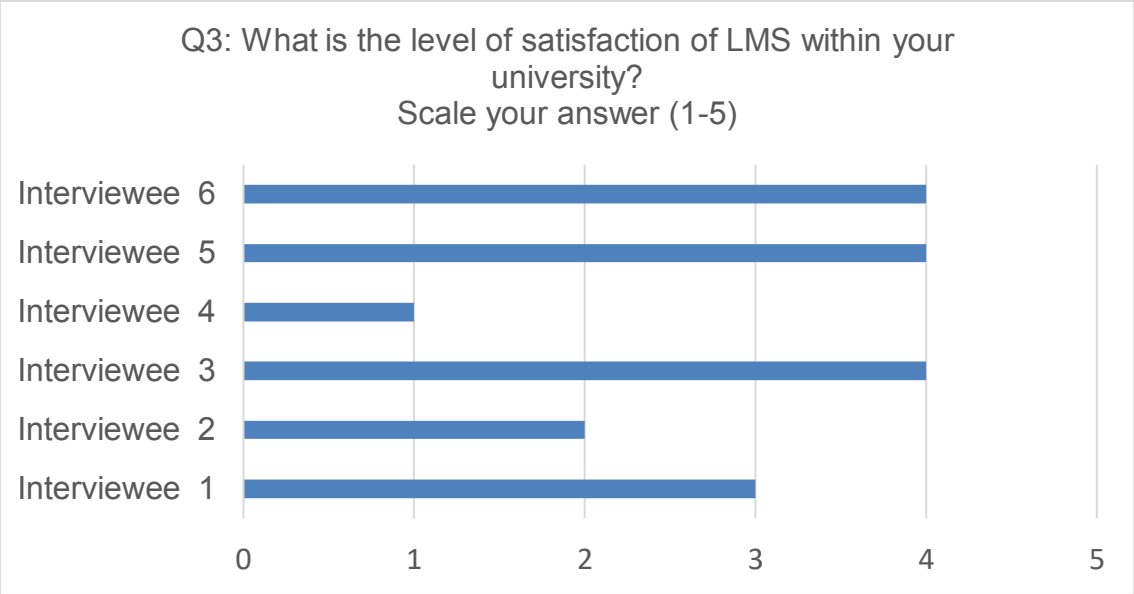


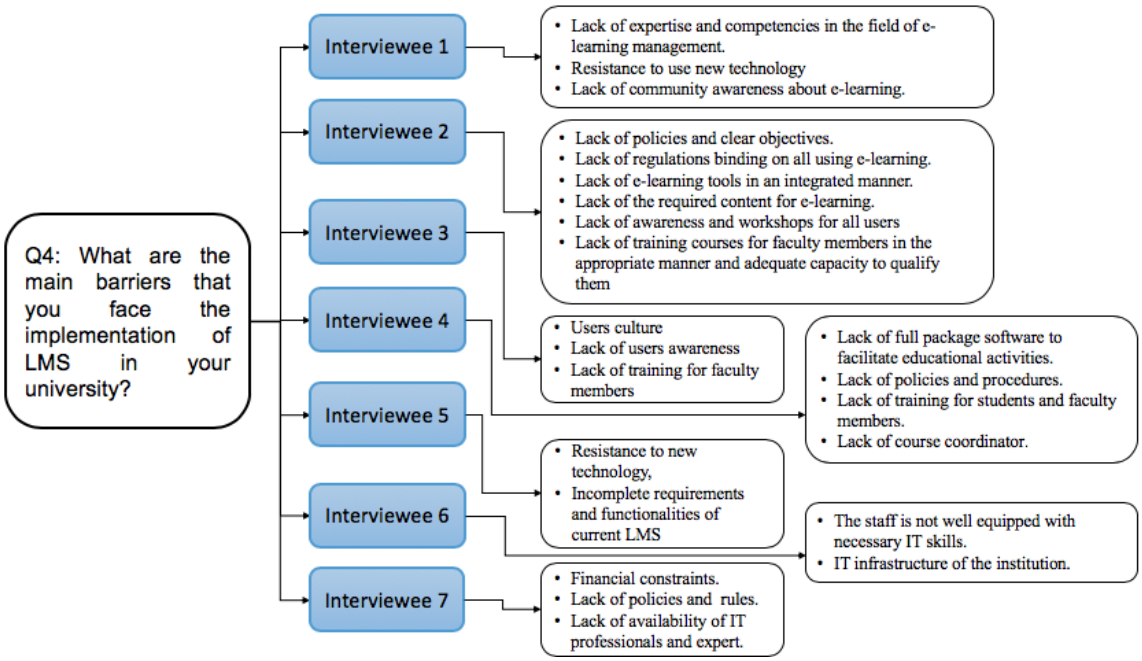
Question 3, administrator interview participants' answers



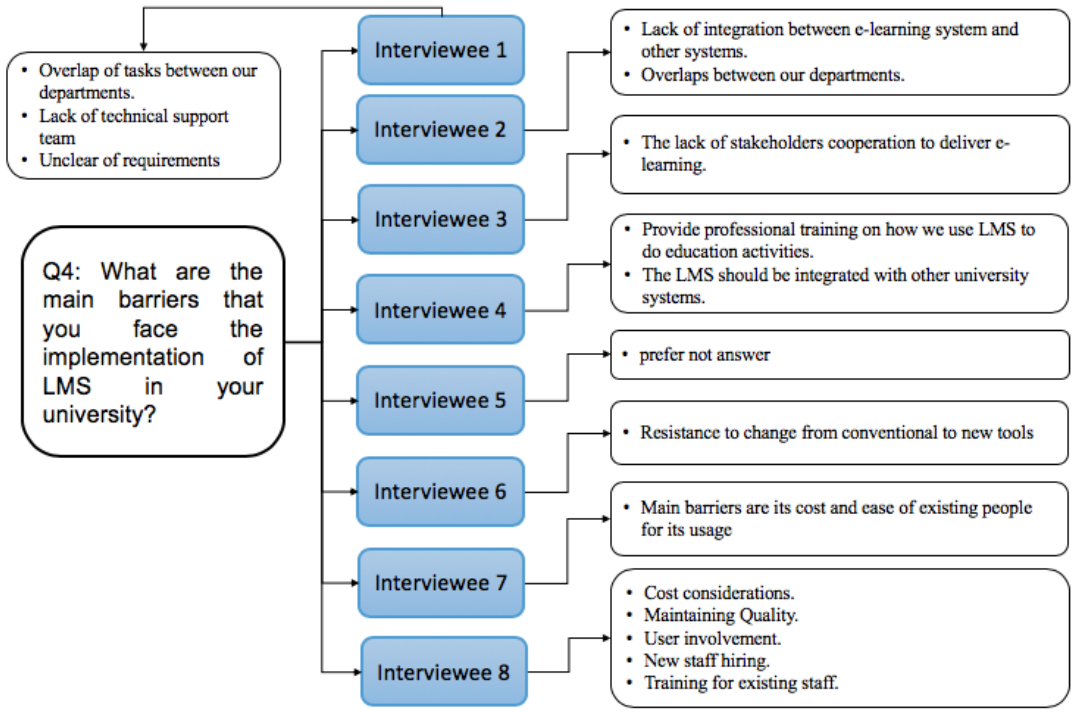
Question 3, IT personal interview participants' answers



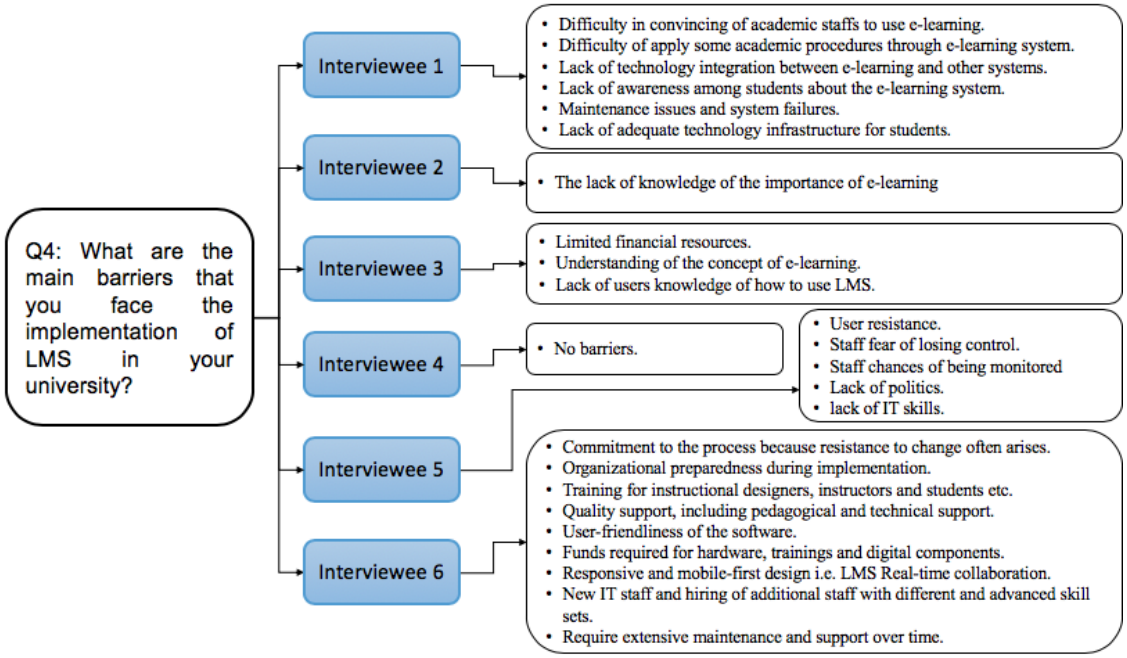
Question 3, E-learning interview participants' answers



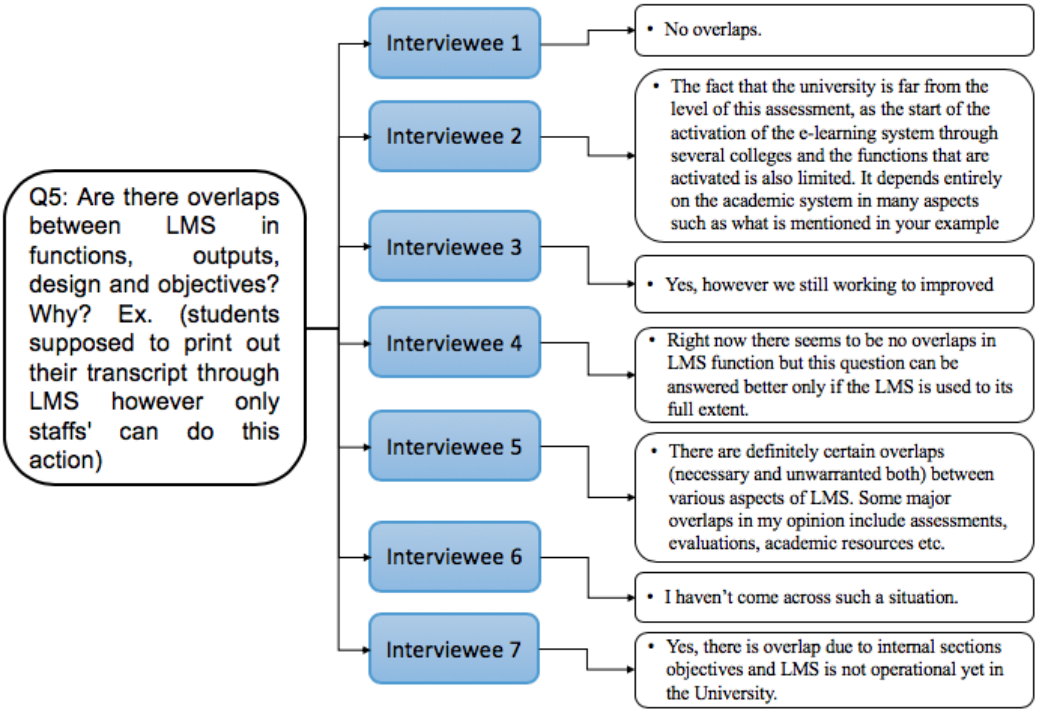
Question 4, administrator interview participants' answers



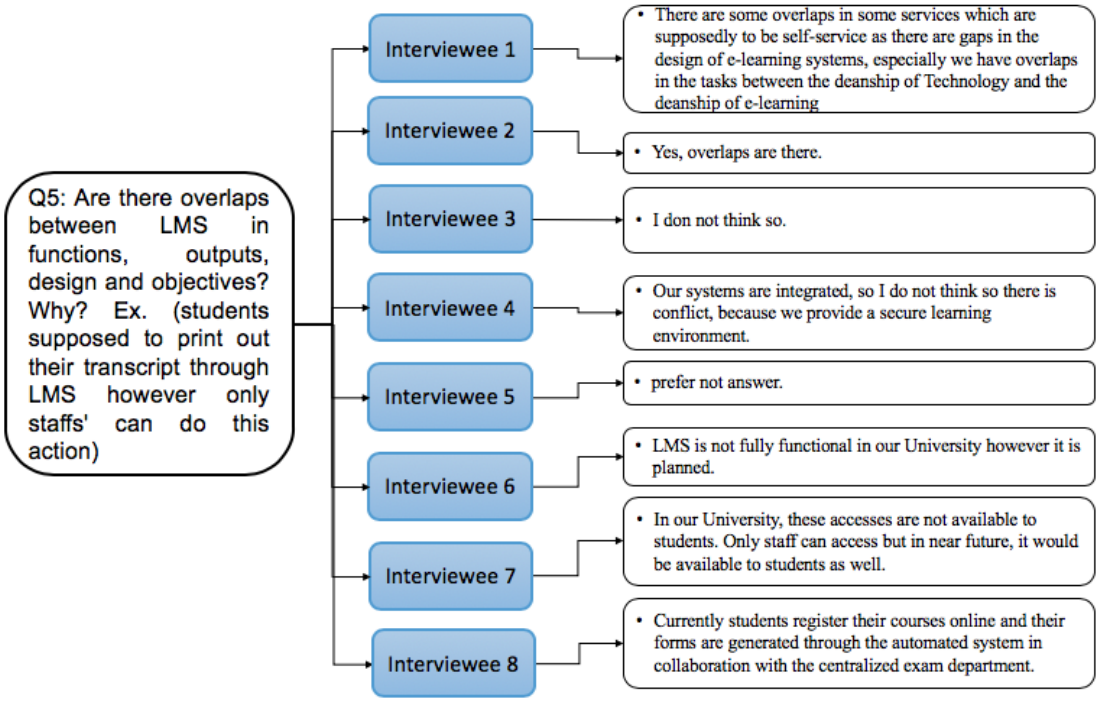
Question 4, IT personal interview participants' answers



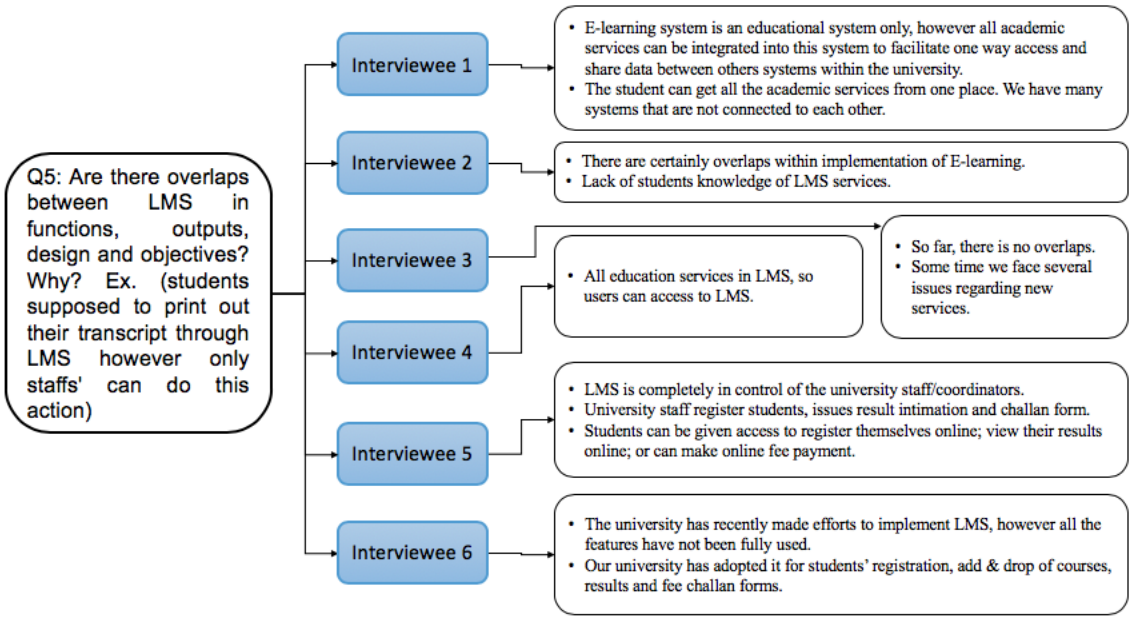
Question 4, E-learning interview participants' answers



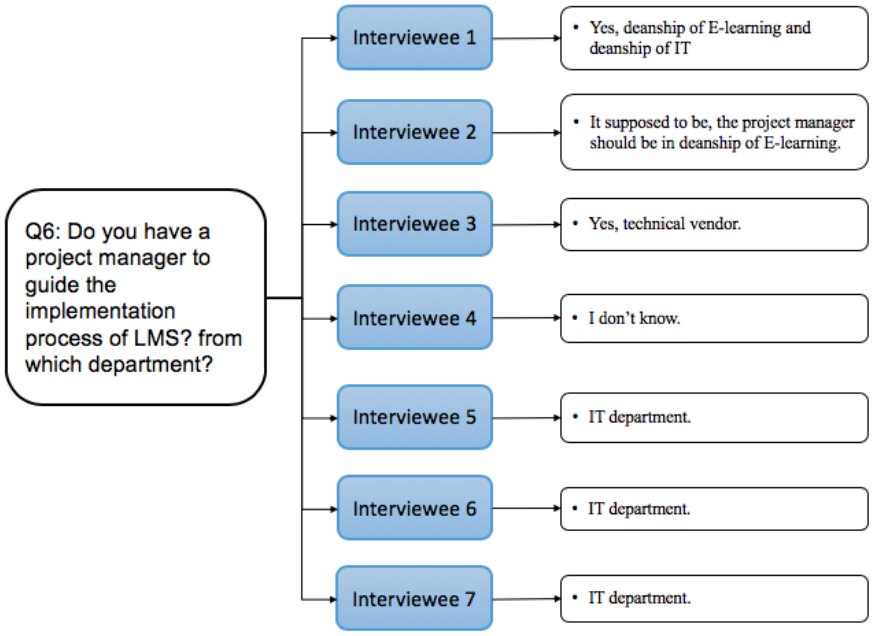
Question 5, administrator interview participants' answers



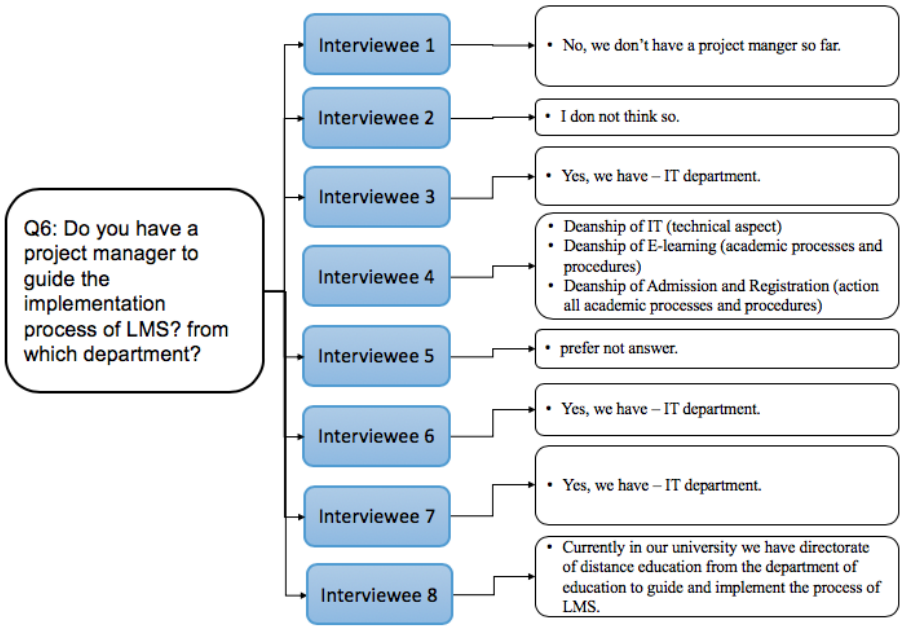
Question 5, IT personal interview participants' answers



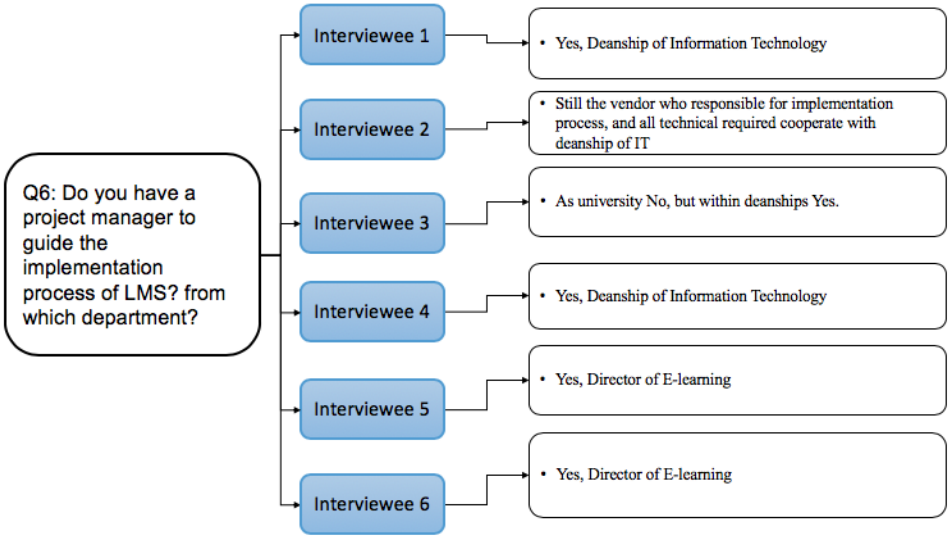
Question 5, E-learning personal interview participants' answers



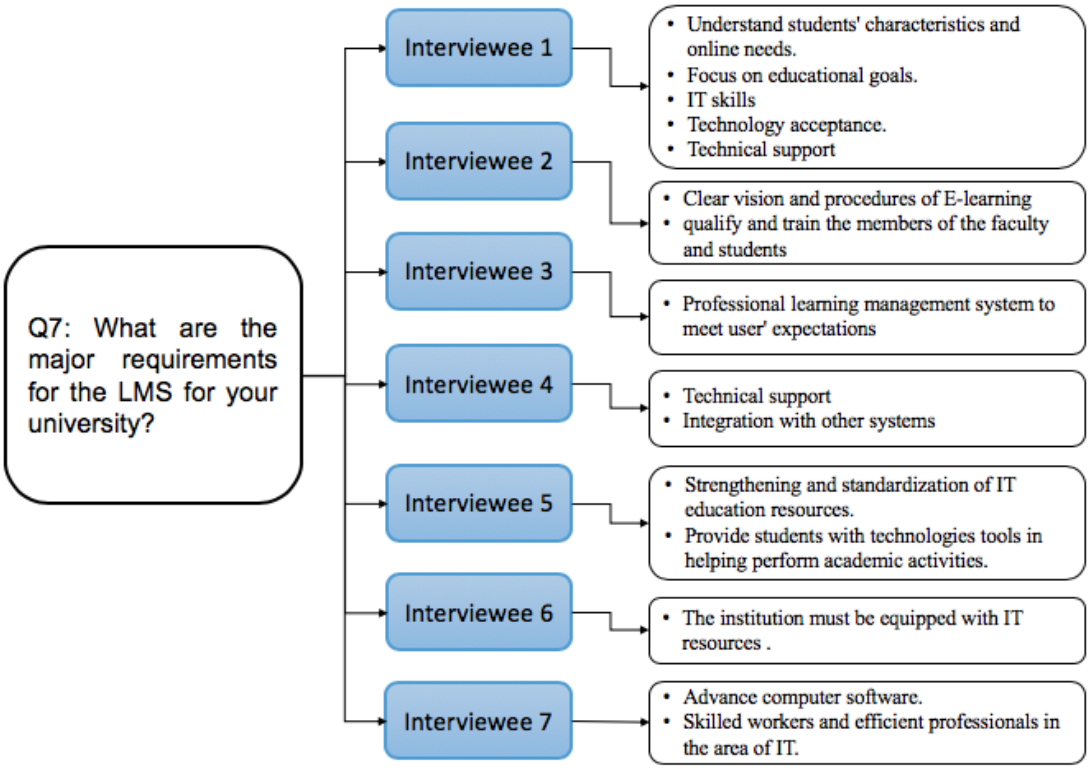
Question 6, administrator interview participants' answers



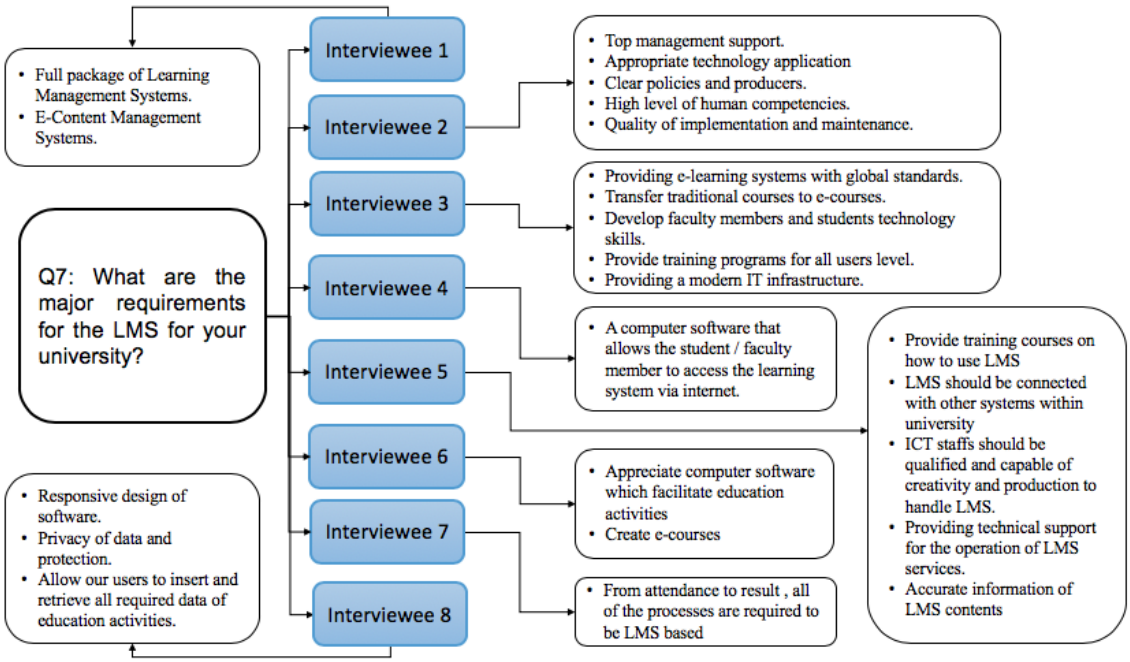
Question 6, IT personal interview participants' answers



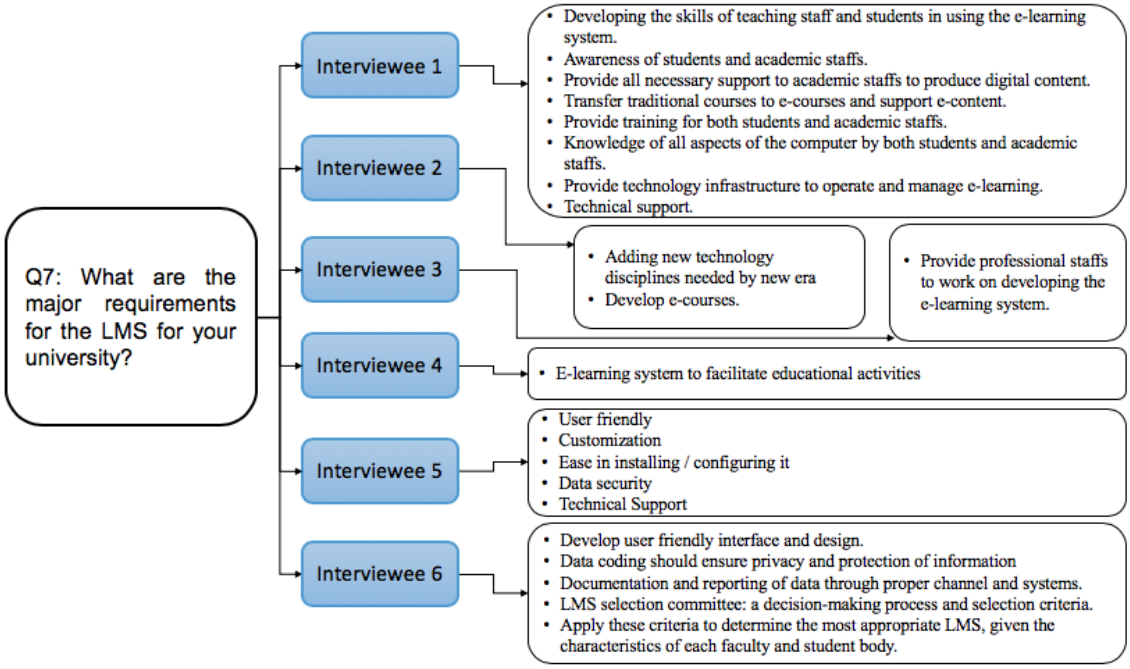
Question 6, E-learning interview participants' answers



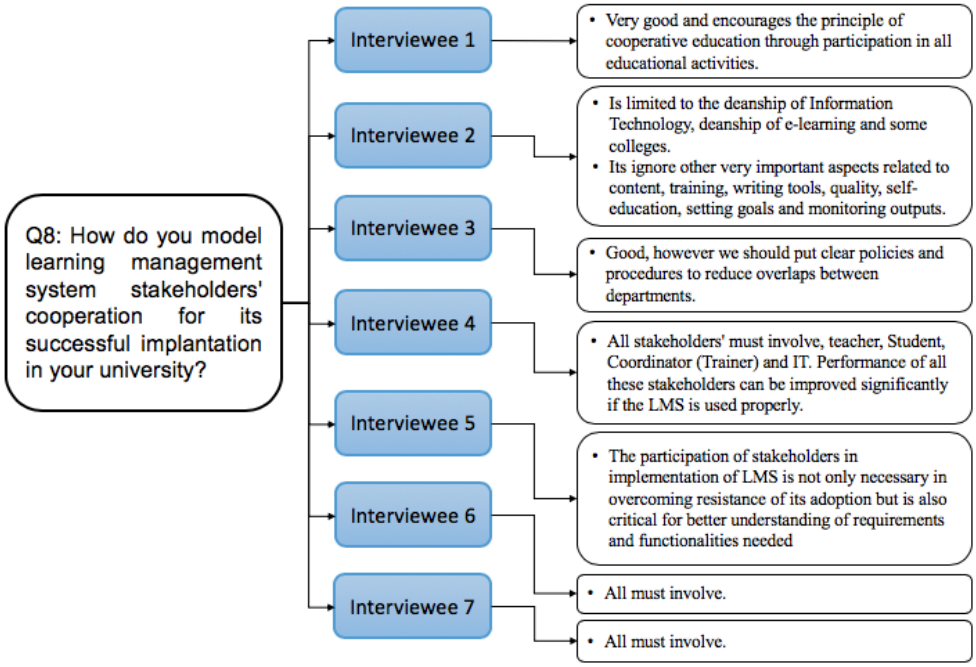
Question 7, administrator interview participants' answers



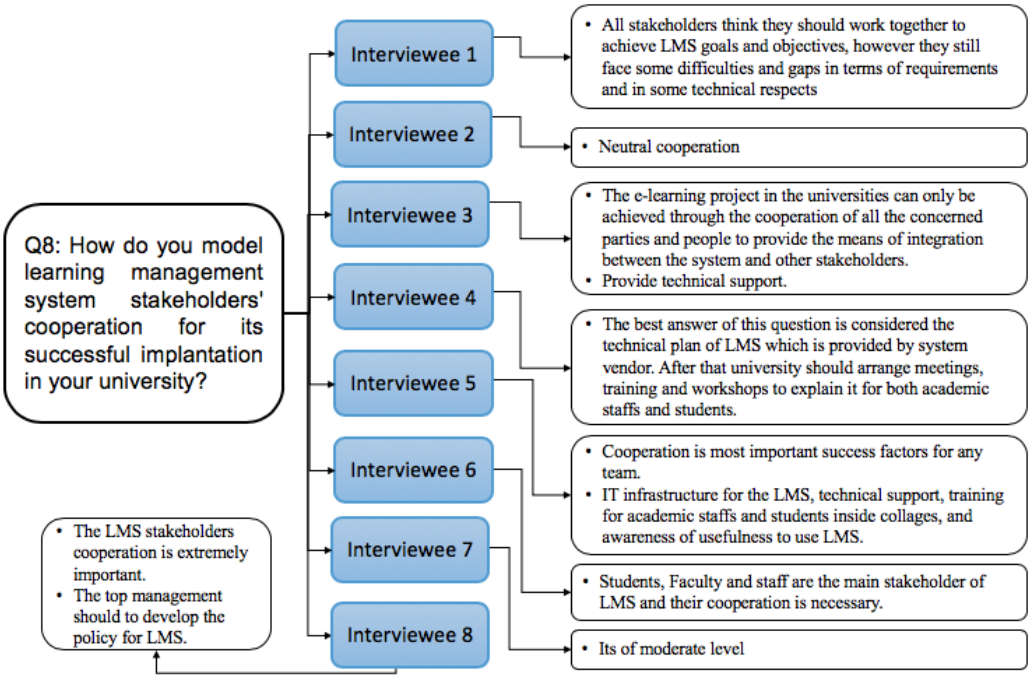
Question 7, IT personal interview participants' answers



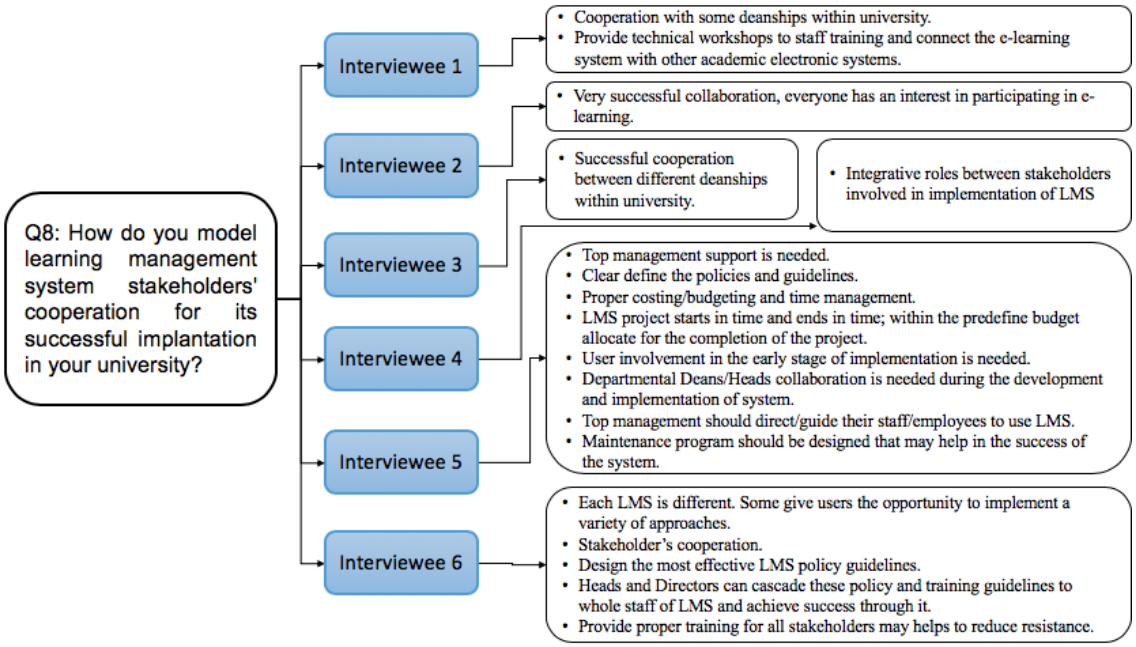
Question 7, E-learning personal interview participants' answers



Question 8, administrator interview participants' answers

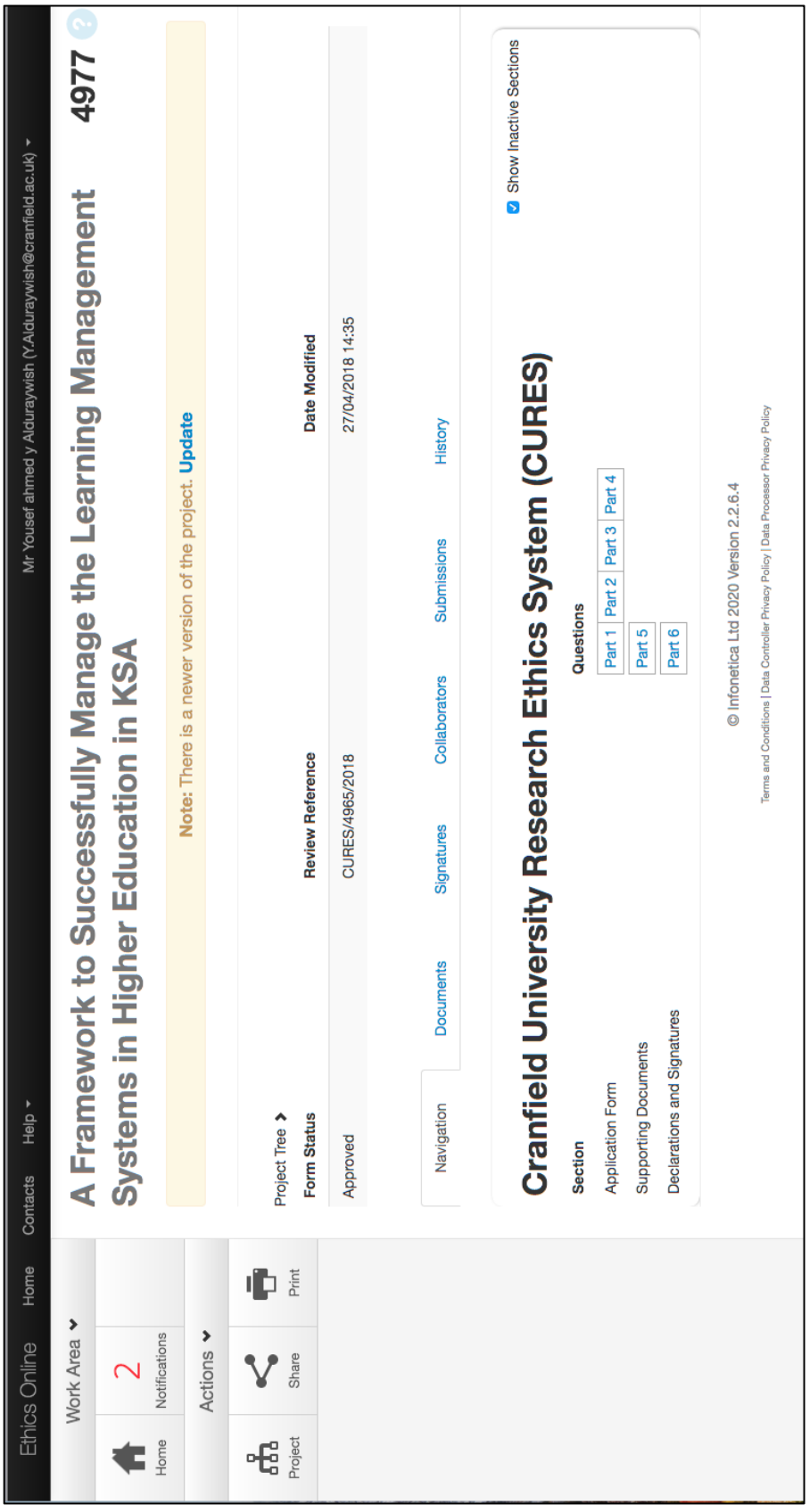


Question 8, IT personal interview participants' answers



Question 8, E-learning personal interview participants' answers

Appendix D : Research Ethics System



Appendix E : Approved by Al-Imam Mohamed bin Saud Islamic University to distribute questionnaires and conduct interviews

بسم الله الرحمن الرحيم

KINGDOM OF SAUDI ARABIA
MINISTRY OF EDUCATION
AL-IMAM MUHAMMAD IBN SAUD ISLAMIC UNIVERSITY
VICE-PRESIDENT FOR
GRADUATE STUDIES & RESEARCH

المملكة العربية السعودية
وزارة التعليم
جامعة الإمام محمد بن سعود الإسلامية
وكالة الجامعة للدراسات العليا والبحث العلمي

الموضوع: تسهيل مهمة الدارس: يوسف بن أحمد الدريويش

سعادة عميد تقنية المعلومات حفظه الله

سلام عليكم ورحمة الله وبركاته .. أما بعد :

فأشير إلى رغبة الدارس ب General Engineering and Mineral & Mining Engineering ب Cranfield University: **يوسف بن أحمد الدريويش** في إجراء دراسة بعنوان **"تصميم إطار مقترح لنجاح تطبيق نظام التعلم الالكتروني في قطاع التعليم العالي في المملكة العربية السعودية"** استكمالاً لمتطلبات الحصول على درجة الدكتوراه بنظم المعلومات.

ونظراً لأن موضوع البحث يتطلب إجراء دراسة ميدانية والحصول على بيانات علمية وإحصائية لذا آمل تسهيل مهمة مقدم الطلب/ يوسف بن أحمد الدريويش لتطبيق أداة الدراسة وتزويده بالبيانات اللازمة. **والله يحفظكم ويرعاكم.**

والسلام عليكم ورحمة الله وبركاته.

وكيل الجامعة
للدراسات العليا والبحث العلمي

د. محمود بن سليمان آل محمود

Appendix F : ISM Iterations

Technology Iteration 1

Success factor	Reach set	Antee Set	Inter set	Level
1	1,2,4,5,6,7,8,9,10	1,2,3,4,5,6,7	1,2,4,5,6,7	
2	1,2,4,5,6,7,8,9,10	1,2,3,4,5,6,7,8	1,2,4,5,6,7,8	
3	1,2,3,4,5,6,7,8,9,10	3	3	
4	1,2,4,8,9,10	1,2,3,4,5,6,7,8	1,2,4,8	
5	1,2,4,5,6,7,8,9,10	1,2,3,5,6,7	1,2,4,5,6,7	
6	1,2,4,5,6,7,8,9,10	1,2,3,5,6,7,8	1,2,4,5,6,7,8	
7	1,2,4,5,6,7,8,9,10	1,2,3,5,6,7	1,2,4,5,6,7	
8	2,4,8,9,10	1,2,3,4,5,6,7,8	2,4,8	
9	9	1,2,3,4,5,6,7,8,9	9	1
10	10	1,2,3,4,5,6,7,8,10	10	1

Technology Iteration 2

Success factor	Reach set	Antee Set	Inter set	Level
1	1,2,4,5,6,7,8	1,2,3,4,5,6,7	1,2,4,5,6,7	
2	1,2,4,5,6,7,8	1,2,3,4,5,6,7,8	1,2,4,5,6,7,8	
3	1,2,3,4,5,6,7,8	3	3	
4	1,2,4,8	1,2,3,4,5,6,7,8	1,2,4,8	
5	1,2,4,5,6,7,8	1,2,3,5,6,7	1,2,4,5,6,7	
6	1,2,4,5,6,7,8	1,2,3,5,6,7,8	1,2,4,5,6,7,8	
7	1,2,4,5,6,7,8	1,2,3,5,6,7	1,2,4,5,6,7	
8	2,4,8	1,2,3,4,5,6,7,8	2,4,8	2

Technology Iteration 3

Success factor	Reach set	Antee Set	Inter set	Level
1	1,2,4,5,6,7	1,2,3,4,5,6,7	1,2,4,5,6,7	
2	1,2,4,5,6,7	1,2,3,4,5,6,7	1,2,4,5,6,7	
3	1,2,3,4,5,6,7	3	3	
4	1,2,4	1,2,3,4,5,6,7	1,2,4	3
5	1,2,4,5,6,7	1,2,3,5,6,7	1,2,4,5,6,7	
6	1,2,4,5,6,7	1,2,3,5,6,7	1,2,4,5,6,7	
7	1,2,4,5,6,7	1,2,3,5,6,7	1,2,4,5,6,7	

Technology Iteration 4

Success factor	Reach set	Antee Set	Inter set	Level
1	1,2,5,6,7	1,2,3,5,6,7	1,2,5,6,7	4
2	1,2,5,6,7	1,2,3,5,6,7	1,2,5,6,7	4
3	1,2,3,5,6,7	3	3	
5	1,2,5,6,7	1,2,3,5,6,7	1,2,5,6,7	4
6	1,2,5,6,7	1,2,3,5,6,7	1,2,5,6,7	4
7	1,2,5,6,7	1,2,3,5,6,7	1,2,5,6,7	4

Technology Iteration 5

Success factor	Reach set	Antee Set	Inter set	Level
3	3	3	3	5

Human Iteration 1

Success factor	Reach set	Antee Set	Inter set	Level
1	1,2,3,4,5,6	1,2,3,4,5,6,7	1,2,3,4,5,6	
2	1,2,3,4,6	1,2,3,4,5,6,7	1,2,3,4,6	1
3	1,2,3,4,5,6,7	1,2,3,4,5,6,7	1,2,3,4,5,6,7	
4	1,2,3,4,5,6	1,2,3,4,5,6,7	1,2,3,4,5,6	
5	1,2,3,4,5,6,7	1,3,4,5,6,7	1,3,4,5,6,7	
6	1,2,3,4,5,6,7	1,2,3,4,5,6,7	1,2,3,4,5,6,7	
7	1,2,3,4,5,6,7	3,5,6,7	3,5,6,7	

Human Iteration 2

Success factor	Reach set	Antee Set	Inter set	Level
1	1,3,4,5,6	1,3,4,5,6,7	1,3,4,5,6	2
3	1,3,4,5,6,7	1,3,4,5,6,7	1,3,4,5,6,7	
4	1,3,4,5,6	1,3,4,5,6,7	1,3,4,5,6	2
5	1,3,4,5,6,7	1,3,4,5,6,7	1,3,4,5,6,7	
6	1,3,4,5,6,7	1,3,4,5,6,7	1,3,4,5,6,7	
7	1,3,4,5,6,7	3,5,6,7	3,5,6,7	

Human Iteration 3

Success factor	Reach set	Antee Set	Inter set	Level
3	3,5,6,7	3,5,6,7	3,5,6,7	3
5	3,5,6,7	3,5,6,7	3,5,6,7	3
6	3,5,6,7	3,5,6,7	3,5,6,7	3
7	3,5,6,7	3,5,6,7	3,5,6,7	3

Organisation Iteration 1

Success factor	Reach set	Antee Set	Inter set	Level
1	1,3,4,5,6,7	1,2	1	
2	1,2,3,4,5,6,7	2	2	
3	3,4,5,6,7	1,2,3,4,6	3,4,6	
4	3,4,5,6,7	1,2,3,4,6	3,4,6	
5	5,7	1,2,3,4,5,6	5	
6	3,4,5,6,7	1,2,3,4,6	3,4,6	
7	7	1,2,3,4,5,6,7	7	1

Organisation Iteration 2

Success factor	Reach set	Antee Set	Inter set	Level
1	1,3,4,5,6	1,2	1	
2	1,2,3,4,5,6	2	2	
3	3,4,5,6	1,2,3,4,6	3,4,6	
4	3,4,5,6	1,2,3,4,6	3,4,6	
5	5	1,2,3,4,5,6	5	2
6	3,4,5,6	1,2,3,4,6	3,4,6	

Organisation Iteration 3

Success factor	Reach set	Antee Set	Inter set	Level
1	1,3,4,6	1,2	1	
2	1,2,3,4,6	2	2	
3	3,4,6	1,2,3,4,6	3,4,6	3

4	3,4,6	1,2,3,4,6	3,4,6	3
6	3,4,6	1,2,3,4,6	3,4,6	3

Organisation Iteration 4

Success factor	Reach set	Antee Set	Inter set	Level
1	1	1,2	1	4
2	1,2	2	2	

Organisation Iteration 5

Success factor	Reach set	Antee Set	Inter set	Level
2	2	2	2	5