INTERFACE CHARACTERISTICS, PERCEIVED EASE OF USE, PERCEIVED USEFULNESS AND INTENTION TO USE UUM E-LIBRARY

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ABSTRAK

e-perpustakaan menyediakan kaedah yang sangat berkesan dan konsisten dalam mencari, mendapatkan maklumat dan hasrat untuk digunakan oleh pengguna. Kajian terdahulu dan senario semasa memberi penekanan terhadap ciri-ciri antara muka peranan e-perpustakaan dan dilihat menggunakan penggunaan niat untuk menggunakan e-perpustakaan. Sehubungan itu, dengan berlatar-belakangkan model TAM, kajian ini bertujuan untuk mengkaji pengaruh ciri-ciri antara muka e-perpustakaan iaitu terminologi, reka bentuk skrin dan navigasi terhadap pengaruh kemanfaatan dan pengaruh mudah guna yang membawa kepada hasrat menggunakan e-perpustakaan. Sampel kajian terdiri daripada 176 pelajar pasca siswazah di Universiti Utara Malaysia. Semua data dianalisis menggunakan *Statistical Package for Social Science* (SPSS). Keputusan menunjukkan bahawa kedua-dua pengaruh kemanfaatan dan pengaruh mudah guna mempunyai pengaruh yang signifikan terhadap hasrat untuk menggunakan e-perpustakaan UUM. Malahan, kajian ini secara empirikal menyokong pengaruh ciri antara muka terhadap pengaruh kemanfaatan dan pengaruh mudah guna serta kesan daripada pengaruh itu terhadap niat untuk menggunakan e-perpustakaan. Walau bagaimanapun, navigasi tidak mempunyai pengaruh signifikan terhadap pengaruh mudah guna e-perpustakaan UUM. Akhirnya, penjelasan mengenai implikasi dan batasan kajian serta dan cadangan kajian pada masa hadapan dinyatakan secara ringkas.

Kata kekunci: e-perpustakaan, ciri-ciri antara muka, pengaruh kemanfaatan, pengaruh mudah guna, hasrat.

ABSTRACT

An e-library provides highly efficient and consistent methods for search, retrieval of information, and intention to use by the users. Previous literatures and current scenario emphasis the role of interface characteristics of e-library, perceived usefulness, and perceived ease of use on intention to use of e-library. Therefore, drawing upon TAM model, this study aims to investigate the influence of interface characteristics of e-library namely terminology, screen design and navigation on the perceived usefulness and perceived ease of use which lead to intention to use of e-library. The sample consisted of 176 postgraduate students of Universiti Utara Malaysia. All data are analyzed using software of Statistical Package for Social Science (SPSS). The results indicated that both perceived usefulness and perceived ease of use had significant influence on intention to use UUM e-library. Further, this study empirically supported the influence of interface characteristics (e.g. terminology, screen design and navigation) on perceived usefulness. However, navigation was found to have insignificant influence on perceived ease of use of UUM e-library. Finally, the implications are discussed, and limitations of the study and future directions are briefly outlined.

Keywords: e-library, interface characteristics, perceived usefulness, perceived ease of use, intention.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

AHSGS	Awang Had Salleh Graduate School of Arts and Sciences
BI	Behavioral Intention
e.g.	For example
GSGSG	Ghazali Shafie Graduate School of Government
i.e.	That is
ICT	Information and Communication Technology
IT	Information Technology
IS	Information System
OYAGSB	Othman Yeop Abdullah Graduate School of Business
PC	Personal Computer
PEU	Perceived Ease of Use
PU	Perceived Usefulness
SPSS	Statistical Package of Social Science
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
UUM	Universiti Utara Malaysia

CHAPTER ONE
INTRODUCTION

1.0 Introduction

This chapter reflects an overview of the general aspects in this study. The chapter begins with background of the study, followed by the problem statement which describes the concerning issues of the study. The chapter also covers the research objectives, research questions, and scope and limitation of the study. Afterwards, the significance of the study along with the definition of key terms is highlighted. Finally, this chapter discusses the organization of the remaining chapters.

1.1 Background of the Study

The approach of the Internet has altered the way learning is done and how information is spread. The advanced education area is additionally encountering a phenomenal development rate. This pattern is to a great extent a consequence of new empowering advancements that have encouraged the virtual delivery of academic programs (Ramayah, 2006a). In this period of Information and Communication Technology (ICT), there is a requirement for understudies at different higher learning organizations to be more responsive and versatile to new technology. These understudies ought to have the capacity to comprehend the significance of new technology selection and misuse. Ramayah and Aafaqi (2004) detailed that when the appropriation propensity is ingrained in understudies from an early age, their responsiveness later on will be considerably more improved.

One of the easiest ways to introduce the adoption of new technology is through encouraging students to use online library or normally known as 'e-library' in doing their course work assignments (Ramayah & Aafaqi, 2004). The term 'e-library' has been associated with many connotations such as digital library, hybrid library, or virtual library (Yusoff, Muhammad, Zahari, Pasah, & Robert, 2009). According Ramayah (2006a), the new emerging technology that is the trend today is the use of the e-library to do research on a wider scale. Furthermore, as indicated by Chen (2010), online access to archives is ending up plainly progressively famous; the rise of the e-library has conveyed essential changes to the library undertaking. Correspondingly, e-library gives exceedingly proficient and steady strategies for the inquiry and recovery of data and for the fulfillment of clients' requests (Hsieh, Chin, & Wu, 2004). The rise of e-library gives chances to clients to get to an assortment of data assets (Yusoff et al., 2009).

The following are some of the principal advantages of e-library in comparison to traditional library: (1) resources are stored in a digital form are, therefore, easier to track; (2) the access to e-library collections is remote, fast, and fair; and (3) searching techniques offer increased flexibility and power to users (Barnett, 1998; Thong, Hong, & Tam, 2002).

Borgman (1999) recommended that digital libraries can be seen as electronic accumulations that are substantially wealthier in substance and more proficient in usefulness than databases or data recovery frameworks. A digital library can likewise be pictured as a PC (Personal Computer) based framework for putting away, obtaining, sorting out, hunting and appropriating advanced materials down end client

get to. It requires less space and the information can be made accessible through correspondence systems to anybody anyplace while encouraging ventures with speed (Sharma & Vishwanathan, 2001).

An e-library assists students in various ways including in doing their course work assignments more efficiently and faster. Through online libraries (information stored in online form), students can access and retrieve digitized e-journals and e-books without need to be physically available in libraries (Kim, 2010). Chen (2000) brought up that e-library utilizes the Internet to make and store gigantic measures of advanced media data. To fulfill the requests of library clients, e-library gives very effective and predictable strategies for the hunt and recovery data. Besides, e-library is the reconciliation of materials, gathering, data, administrations and operation (Chen, 1999). Ke (2000) reported that e-library are composed of three important factors; electronic collection, electronic operation, and electronic service. Besides that, the goal of e-library is to perform online all the functions of the traditional library, plus many more available in today's digital world (Deb, Kar & Kumar, 2003). Yet, in general, students overlook or underutilize digital resources (Hong, Thong, Wong, & Tam, 2002).

This has prompted uncommon changes in the arrangement of data administrations to clients and to the library calling itself (Deb, Kar, & Kumar, 2003). Libraries have encountered a move in center towards computerized designs for data assets (Shelburne, 2009). In this manner, the libraries are getting to be plainly enter achievement calculates the virtual scholastic condition (Cahoy & Moyo, 2003).

In order to encourage university students to use e-library, there is need to understand factors that influence the intention to use the available services of this online resource. TAM's model with an external variable (interface characteristics) was adapted in this study to investigate students' perception towards intention to use an e-library. This important for university administrators to know what factors influences the usage of e-library. Therefore, this study aims to investigate the postgraduate students' perception towards intention to use UUM e-library.

1.2 Problem Statement

To ensure the institution's progress and survival, the institutions of higher learning need to create the educational environment and experience significant alterations that have to be tackled in an excellent and well managed ways (Thompson et al., 2014). The ever-changing environment of higher-education places the greater strength of the institutions on their toes in the era of highly rivalry (Ziguras & Pham, 2014). The services that satisfied students in the preceding years might be divergent now, particularly in the era of modern technologies, knowledge, techniques and skills for the territory of their studies (Viberg & Gronlund, 2013).

According to Chee (2014), one of the major and structural alterations is the manifestation of unsullied requirements from distinct batches of students of different countries of the world. Students want and expectations in order to survive and be successful, while they stay in the esteemed institutions of higher learning (Knight, 2011; Knight & Morshidi, 2011; Lane, 2011). There is strong dearth to look into all these ambitions and desires of the students. This has caused to

institutions of higher learning to increase and develop their study environment and educational infrastructure and services through a variety of programs presented and offered for the international scholars (Lee, 2015; Marginson, 2011; McClelland et al., 2015; Viberg & Gronlund, 2013).

Currently, the students demand the highest quality of instructions as same or higher quality that they are expecting from any other established institutions in terms of cheaper cost, convenience and squat length of completion or stipulated time period (Canado, 2015; Demir, 2015; Ziguras & Pham, 2014). They would also evaluate the academic services rendered by the other competitors or particular institution academic services and a variety of facilities before making the decision of choosing for admission (Povey, 2014). One of the academic services which most important for student is e-library (Yusoff et al., 2009)

Because e-library provides a huge information database through its Malaysian Links, in-house resources, databases, etc. According Ramayah (2006a), students can have access to various local and international databases related to any imaginable field by accessing the likes of EBSCO Host, ProQuest, Science Direct, IEEExplore, Emerald, Inside Web, Springer Link, Global Market Information Databases, E-Theses and others. The university library can be termed as an e-library as it provides external online access to its collection of digital materials, and also provides the services of a conventional library while providing online access to information about its collections, e.g. through its own web page (Ramayah, 2006a).

Thusly, students can get to e-library from their separate school research centres or from outside the grounds by asking for a watchword from the Help Desk at the library. Agreeing Ramayah (2006a), at present the college has a large number of get to focuses to the e-library through the neighborhood which is associated with all workplaces and schools. Additionally, the college has actualized remote access to the college server for all understudies and staff. The main prerequisite is that the client registers with the Computer Centre and gets an ID and secret word to have the capacity to get to the framework utilizing remote gadgets. This makes access to the framework considerably less demanding without being settled to one place or position (Ramayah, 2006a).

Likewise, students are people who have grown up with access to PCs their entire lives, and along these lines are exceptionally happy with utilizing data from online sources (Zimerman, 2012). In like manner, cutting edge they incline toward and utilize online sources more than conventional written words (Lee, Paik & Joo, 2012). Among various online assets, they like to utilize effortlessly available web sources by means of web indexes as opposed to library sources (e.g. Haglund & Olsson, 2008; Kim & Sin, 2011). Be that as it may, those effectively available web sources are not really valid and solid. Past reviews asserted that assets given by scholastic libraries are more sound and precise than effectively open web data (Lee et al., 2012). Despite the fact that they see e-library assets to be more solid, regardless they like to utilize web indexes to rapidly discover data required for finishing their classwork (Connaway, Dickey, & Radford, 2011).

In the interim, universities have been putting a great many dollars in building usable e-libraries, yet examines have demonstrated that potential clients may in any case not utilize them (Thong et al., 2002). With every one of these assets put resources into creating frameworks and enhancing useful execution, e-libraries can even now stay unnoticed by students or be truly under-used despite their accessibility (Jamaludalin, 2004; Tay, Tan, Tan, & Ismail, 2004). The announcement that the e-library is truly underutilized depends on narrative confirmation accumulated by conversing with students and furthermore on two unpublished reports. The to start with, by Jamaludalin (2004) on the utilization of library assets, found that only 24 percent of the respondents utilized the online library as most were open to heading off to the physical library as a type of person to person communication. The second, by Tay et al. (2004) found that only 46 percent had involvement of utilizing the e-library. Once more, from this 46 percent of clients, 84 percent utilized the e-library not as much as once per week, which focuses to wastage of the administrations gave. Furthermore, the report by Sultanah Bahiyah Library, UUM (2017) also indicates the decreased percentage of students using e-library from 62.32 percentages to 58.89 percentages of total students for the years 2015 and 2016 respectively.

According to Liaw and Huang (2003), e-libraries have become one of the major web services due to the amount and great variety of information stored, which are experienced by a diverse population of users who have heterogeneous background, skills, and preferences. Considering how the interfaces of e-libraries can support different users to accomplish their tasks is important. As suggested by previous studies in information seeking (Blandford, Stelmaszewska, & Bryan-Kinns, 2001), matching the interface with users' preferences can help them to achieve their tasks in

a satisfactory way. Nevertheless, in general, e-libraries have a global approach in which the entire users are presented with the same interface, regardless of the diversity of users' preferences (Tella, 2011).

While there are various potential advantages to the e-library, it could in any case possibly be unnoticed or under-utilized by clients (Ramayah, 2006a, 2006b). In spite of the fact that the e-library has been elevated to different levels of clients, the goal among these understudies to keep utilizing such frameworks stays low (Chu, 2003). What's more, the acceptance–discontinuance irregularity, wherein clients suspend utilizing the e-library in the wake of having at first acknowledged it, happens regularly (Carlock & Perry, 2008). In spite of the fact that the underlying acknowledgment of the e-library is an essential initial move towards making e-library progress, real achievement requires proceeded with utilization; in any case, there is set number of looks into that has analyzed the e-library from the clients' point of view (e.g. Hsieh-Yee, 1996; Ramayah, 2006a, 2006b).

Along these lines, it is critical to inspect how clients see the value and simplicity of e-library use. It has been underlined that the estimation of IT advancement lays not such a great amount in the innovation itself, but rather in its compelling and productive use (Kremers & van Dissel, 2000; Lau & Woods, 2009). Past research has discovered that with the goal for clients to maximally use and appreciate the advantages of the e-library, IT advancement should first be fittingly acknowledged and utilized by its planned clients (e.g. Igbaria, Zinatelli, Cragg, & Cavaye, 1997).

Although educational institutions realize that it is important for students to use electronic resources by using e-library, they are still not able to make students utilize the e-library facilities provided by institution to its full potential (Ramayah & Aafaqi, 2004). In this manner, there is a need to comprehend clients' acknowledgment of the e-library and distinguish the elements that impact their expectation to utilize it. The estimation of clients' discernments (McMahon, Gardner, Gray, & Mulhern, 1999) and a comprehension of the components that advance the viable utilization of frameworks (Yi & Hwang, 2003) have turned out to be progressively imperative to IT assessment.

The target user group of an e-library is typically a group that comprises of countless who show a bigger variety in instructive and financial foundation in contrast with already contemplated client gatherings (Hong et al., 2002). Moreover, as an Internet-based technology, the use setting of the e-library is very extraordinary in contrast with that of remain solitary programming application. Thusly, because of the uniqueness of e-library, alongside its fluctuated group and its specific hierarchical setting, it is basic that the scientist looks at the acknowledgment of this unpredictable and new innovation.

Other than that, numerous analysts have discovered that a greater part of students, paying little heed to area, like to get to library assets on the web (e-library) (Brandt, 2008; Kelley & Orr, 2003; Liu & Yang, 2004). When investigating separation and conventional learners' utilization of libraries and data get to, Brandt (2008) announced comfort as the top component for 73% of students while picking a data source. As the development in online data looking for proceeds, alongside an

expansion in e-learning, bookkeepers must approach the requirements of virtual benefactors with a measure of inventiveness and cooperative exertion (Johnson, Trabelis & Fabbro, 2008). For instance, at the Athabasca University Library Digital Reference Center in Alberta, Canada virtual supporters may get to a computerized variant of the library's reference gathering, including chronological registries and catalogs, map books and maps, information and measurements, and lexicons and reference books (Johnson et al., 2008).

In tandem, this study suggests Technology Acceptance Model (TAM) as the most suitable model to explore the acceptance and behavioural intention to use UUM e-library. TAM is one of the most cited models that permit prediction of the process of user acceptance of information systems (Davis, 1989; Park, Roman, Lee, & Chung, 2009). The TAM has been utilized as a standard model to check a progression of speculated connections that are specific to the e-library utilization setting. The e-library, which is characterized by web-based technology, is a system with end users-virtual patrons-who will either accept or reject it as an information system. The TAM (Davis, 1989) establishes a user acceptance of information technology systems resulting from two constructs: (a) perceived usefulness (PU) and (b) perceived ease of use (PEU).

The model in this study proposes herein consists of three external variables, two belief variables and one dependent variable. Based on TAM, perceived usefulness (PU) and perceived ease of use (PEU) are the two key user beliefs affecting intention to adopt a technology. Therefore, the belief variables in this study are perceived usefulness and perceived ease of use. In addition, three external variables have been

established in this study as significant predictors of usability and usefulness of an information system which is known as interface characteristics (Ramayah, 2006a; Thong et al., 2002). Ramayah (2006a) stated that interface characteristics have significant association with usability and usefulness of an information system. Since interface characteristics enhance use of a digital library (Fox, Hix, Nowell, Brueni, Wake et al., 1993), thus its identification should be system specific (Jeong, 2011). According to Lindgaard (1994), interface characteristics comprise terminology, screen design and navigation. Thus, this study selects three indicators of interface characteristics namely terminology, navigation and screen design.

According Joo and Choi (2015), the heavy reliance on web search engines and easy-to-access sources for students can be problematic in an academic setting, where class assignments and research require a variety of credible and accurate sources. To motivate students to utilize more solid library assets, it is basic to comprehend the basic reasons of their choice of e-library assets (Joo & Choi, 2015). Comprehension of the variables related to the determination of online library assets is basic to think of procedures to build the library asset use by postgraduate students, who are a huge fragment of client gatherings in academic libraries.

There have been numerous library studies; be that as it may, a review devoted to deciding whether an establishment's e-library is addressing the necessities of students is not found in the writing (Tyler & Hastings, 2011). Most studies on the factors affecting e-library usage have been conducted in places other than Malaysia (e.g. Booker, Detlor & Serenko, 2015; Hassan & Sheik Ali, 2014; Joo & Choi, 2015; Rahmiati, 2017; Qutab, 2016). Malaysian research on the phenomenon under

investigation has indicated a paucity of research (e.g. Ramayah, 2006a) and that the Malaysian research only focuses on perceived ease of use. The novelty of this research lies in its offering a substantial finding to fill this knowledge gap.

Thus, this study presents a comprehensive investigation of interface characteristic factors that influence the selection of UUM e-library among postgraduate students. To be more specific, this study is to examine if intention to use on UUM e-library could be explained by three external variables pertaining to usefulness and ease of use.

1.3 Research Objectives

The general objective of this study is to investigate the influence of interface characteristics which are terminology, screen design and navigation) on the perceived usefulness and perceived ease of use of UUM e-library and the influence of perceived usefulness and perceived ease of use of UUM e-library on intention to use among UUM post-graduate students. Thus, based on those problem statements, the research objectives are as follows:

i. To examine the influence of perceived usefulness and perceived ease of use towards intention to use UUM e-library.

ii. To examine the influence of interface characteristics (terminology, screen design and navigation) on perceived usefulness of UUM e-library.

iii. To examine the influence of interface characteristics (terminology, screen design and navigation) on perceived ease of use of UUM e-library.

1.4 Research Questions

In line with the research objectives above, the key research questions to be addressed are as follows:

i. Do perceived usefulness and perceived ease of use influence the intention to use UUM e-library?

ii. Do interface characteristics (terminology, screen design and navigation) influence perceived usefulness of UUM e-library?

iii. Do interface characteristics (terminology, screen design and navigation) influence perceived ease of use of UUM e-library?

1.5 Scope and Limitation of the Study

This section discusses about the scope and limitation in this research. It is as follows:

1.5.1 Scope of the study

This research is conducted with respect to the postgraduate students' perception towards intention to use UUM e-library. UUM had been chosen to conduct this research because it has a quite big number of postgraduate students which consist of 7,814 students. An individual level is the unit of analysis for this study, which refers to UUM postgraduate students in which each individual's response is considered an independent data source. This study has chosen the method of systematic random sampling in order to collect the data.

Postgraduate students have adopted and continue to use the online information retrieval for their academic and research work at the expense of or without considering the importance and the quality of the traditional information centers as observed by the researcher. Kumah (2015) had observed that graduate students spent a lot of time at the Graduate Center searching the Internet rather in libraries. Similarly, it was observed that graduate students attributed research for a paper to searching for information online.

In addition, doctoral students are likely to utilize the resources (e-libraries) because their tasks are mainly research (Borgman, Smart, Millwood, & Leazer et al., 2005). Users whose main academic role is research, as a consequence, perceived the e-library as useful (Park et al., 2009). In fact, electronic resources enhance scholarly publications among doctoral students (Vakkari, 2008). On the other hand, the information consumption of undergraduate students is not as high as it is for postgraduate students. Subsequently, it is expected that academic tasks are also closely related to the utilization of e-library (e.g. Park et al., 2009; Hong et al., 2002; Li, 2009)

1.5.2 Limitation of the study

This research has several limitations. Firstly, this study has limited resources regarding the latest literature because there is not much study related to this topic especially in the area of online library lately. Secondly, the researcher also experienced difficulties during data collection process due to lack of commitment and cooperation to answer the questionnaire. The progress of gathering data was

quite time consuming since the questionnaire distributed to them might not be able to be answered. When some of the respondents reluctant to give cooperation to the researcher, it contributes to the limited return of responses. Thirdly, the study is conducted in a short period of time which happened in February to May 2017. Thus, researcher had a limited time to complete the literature review, apply the methodology, and gather and interpret the results.

1.6 Significance of the Study

The findings reported in this research are expected to be very useful and significant in several areas such as from practical perspective and theoretical perspective.

1.6.1 Practical Perspective

Concerning the findings of the factors that drive postgraduate students to undertake the UUM e-library, this study may give ideas and bring about recommendations for the library administrators related to adjustment and change needed in order to increase the chances of students opting for UUM e-library. They can better understand the factors that influence the intention of their students in selecting an e-library. Therefore, a few effective and impressive strategies can be suggested to entice library users to use UUM e-library.

Moreover, these findings should be valuable for library administrators to pursue corrective steps as needed to improve ease of use and usefulness to resources within the e-library environment. Results may help library administrators tending to

students' utilization of virtual library administrations and assets in the scholastic condition. Since students want to get to data on the web (De Rosa et al., 2006), student fulfillment with the e-library is vital. Further, the outcome from this study can be used by them to plan necessary improvement and enhancement to the system in order to increase satisfaction and intention in using UUM e-library.

Librarians may study the results when examining strategies for the development or improvement of e-library services and resources for students. Gaining a better understanding of the virtual patron experience may help librarians make informed decisions about how to integrate online library tools, inform strategic planning, and determine if the librarian is meeting the needs of virtual patrons. It is also expected that the outcome will help enhance usage of electronic resources through deliberate marketing strategies for electronic resources. This study explored which demographic factors that influence intention postgraduate students to use UUM e-library.

1.6.2 Theoretical Perspective

The findings of this study are important for future research in the field of e-library. It also helps in enhancing research on e-library and encourages more debates in this area. The outcomes of this research are also expected to contribute to the body of knowledge in higher learning institutions usage literature, especially in terms of adoption of e-library among the UUM students. In addition, it will provide administrative staffs, academicians and researchers with the current information on the usage and acceptance of e-library.

The findings produced in this study between perceived usefulness and perceived ease of use could be used as devices to get more valuable information about the importance acceptance of UUM e-library among UUM's students. Then, the findings produced will also show influences in intention to use when perceived usefulness and perceived ease of use been measured to user acceptance. This study would be a foundation for the research, and new variables which is not being identified in this study, may be explored in the near future. Moreover, the same testing approach could also be used on other university which might not have been probably tested. This is because the research scope is about students' acceptance of UUM e-library.

Furthermore, this study is the best way and will be beneficial for the researcher to apply all those theories that have been learned in class. Through this study, the researcher might gain knowledge and share her ideas and findings from this study. Lastly, it is hoped this research would increase the number of Malaysian empirical researches in actual e-library setting by using the TAM.

1.7 Definitions of Key Terms

In this study, several key terms are highlighted and definite. Each term is important in order to better conceptualize such as the following:

1.7.1 Intention to Use

Intention to use can be defined in the context of this study as a degree to which a student is willing to use the UUM e-library or the probability that a student will

participate in using the UUM e-library. According Fishbein and Ajzen (1975), intention to use defined as the strength of one's intention to perform a specified behaviour.

1.7.2 E-Library

In this study, e-library also known as electronic or online library referred as a digital library that requires technology to link the resources of many libraries and information services. It is also refer to library collections and materials provided in a digital format accessible remotely through the web, such as e-books, electronic journal articles, online magazines, dissertations and theses, course reserves, and digital archives.

1.7.3 Perceived Usefulness

In the context of this study, a perceived usefulness is defined as the student's assumption that the use of an UUM e-library system will enhance his or her job performance. Davis (1989) referred perceived usefulness as to the degree to which the user believed in using the technology may improve their work performance. According to Bhattacherjee (2001), an individual is more likely to continue usage when such usage is perceived to be useful.

1.7.4 Perceived Ease of Use

In the context of this study, a perceived ease of use refers to the degree to which a student believes that using the UUM e-library would be free of effort. Effort is a finite resource that a person may allocate to the various activities for which he or she is responsible (Radner & Rothschild, 1975). The easier it is for a user to interact with a system, the more likely he or she will find it useful (Thong et al., 2002).

1.7.5 Terminology

Terminology is the set of words, sentences, or expressions used in UUM e-library. In the use of e-library, a correct use of keywords is an important source of information (Ramayah, 2006a). The success of an e-library depends on clear and understandable terminology and its capacity to facilitate a use of the e-library (Jeong, 2011).

1.7.6 Screen Design

Screen design refers to the visual appearance or general attractiveness of the UUM e-library. To this end, certain screen design elements are considered to be desirable (i.e., links, a short hyperlink, a limited use of graphics, and short cuts) (Bernard, 1990). Screen design is also related to the arrangement of content in terms of layout, colour schemes, the formatting of paragraphs, icons, buttons, font sizes, and line spacing (Graham, Hannigan, & Curran, 2005).

1.7.7 Navigation

Navigation refers to the way of discovering what relevant files or databases exist and where they are located in UUM e-library. Navigation offers the users of a site easy access to information of interest, the ability to move around within the system, or the ability to access other sites (Ramayah, 2006a). Navigation features allow the visitors to a site easy access to information of interest, both internal and external to the site.

1.8 Organization of the Chapters

In this study, the research paper is divided into five chapters. The summary of each chapter is as follows:

Chapter 1 describes the background of the study and the study's research problem. Then, it outlines the research objectives, research questions and scope and limitation of the study. This is followed by the significance of the study and the definition of key terms. Finally, it presents the organization of the remaining chapters.

Chapter 2 contains the literature review which focuses on the previous research that is related to this study. The review presented in this chapter includes a discussion of the theoretical underpinning of the study, dependent variable, belief variables and external variables. In addition, it provides an explanation of the theoretical framework in this study. Moreover, this chapter states the hypotheses development.

Chapter 3 discusses the methodology employed in this study which includes research design, the population and sample of the study. Furthermore, it explains the development of the instrument and measurement of the variables. Other than that, data collection process and data analysis techniques are also discussed in this chapter.

Chapter 4 is devoted to the findings of this study. This chapter presents the profile respondents, descriptive analysis, summary of response rate, respondent profile and reliability analysis. In addition, it also presents the application of Independent Samples T-Test, ANOVA, and Multiple Linear Regression analysis technique through using of SPSS software (Version 19.0). Then, the results of the hypotheses are discussed. At the end of this chapter, a summary of the results is presented.

Last but not least, Chapter 5 recapitulates the study findings according to the result of data analysis based on research hypotheses of this study. Then, this chapter elaborates the contribution of the research. This chapter ends with the research limitations and recommendations for future research. It can be conclude that, this chapter gives the overall scenario regarding to the background of the research concern. Therefore, the literature review regarding to the previous research which relates to this current study will be discussed in the next chapter.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter reviews the numerous literatures that relates to the topic of research where behavioral determinants of theory acceptance model and intention to use UUM e-library would be explained in detail. This chapter begins with the reviews of the theoretical underpinning as the basis of this study. This review features the implementations of Technology Acceptance Model (TAM) in the extant literature. Then, it commences with the definition and conceptualization of variables and overview of the relationship between dependent variables and independent variables. This is followed by the research framework development. Finally, this study discusses the proposed hypotheses formulated.

2.2 Underpinning's Theory of Study

Human behavior is quite complicated to explain. That is why many of the researchers have been focusing on this issue as an attempt to understand people's behavior. Therefore, several previous studies used many approaches to predict intentions that are extensively used in consumer behavioral intention research. Several studies had been done in this regard which further led to the development of a model called belief, attitude, intention. This was the first step in the development of the Theory of Reasoned Action (TRA). This behavioural theory and model was first introduced by Ajzen and Fishbein in 1980 and extended by Ajzen in 1991 (Shih et al., 2011). Malhotra and Galletta (1999) noted that TRA is mostly studied in social psychology

and concerned with the determinant of consciously intended behavior. This model served as the foundation for explaining and predicting consumer behaviors.

The TRA focuses on attitudes toward behavior and subjective norm (Fishbein & Ajzen, 1975). The hypothesis is psychologically based and expects that people are discerning and will make deliberate utilization of data accessible to them. TRA basically contends that social behavior is roused by a person's state of mind towards executing that behavior. Hence, the change of behavior is a component of one's convictions about the results of the behavior and an assessment of the estimation of each of those results (Ji-Won Moon & Young-Gul Kim, 2001). To put it plainly, TRA suggests that individual beliefs impact demeanors, consequently, making intentions that will produce behavior. The TRA suggests that behavior comes about because of the arrangement of particular goals to carry on (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980). According to the TRA model, a person's performance of a specified behavior is determined by his or her behavioral intention (BI) to perform the behavior, and BI is jointly determined by the person's attitude and subjective norm concerning the behavior in question (Malhotra & Galletta, 1999).

Since the TRA does not explain non-volitional behavior, Ajzen (1991) developed the theory to include perceived behavioral control which consequently created the Theory of Planned Behavior (TPB). The TPB is designed to compensate for the TRA's chief flaw; a lack of consideration of volitional control (Gentry & Calantone, 2002). According to Gentry and Calantone (2002), the TPB assumes three independent determinants of intention as attitude towards behavior, subjective norm, and perceived behavioral control, which are related to three types of beliefs: behavioral, normative, and control. In TPB, behavioral control specifically influences

the goal to play out behaviour, and may straightforwardly influence behaviour in circumstances where the user expects to play out the behaviour, yet is kept from doing as such (Ajzen, 1985). Perceived behavioural control identifies with the degree to which the individual believes that she/he has control over individual or external variables that may encourage or compel the behavioral execution (Ajzen, 1991). The TPB underlying the exertion of TRA has been demonstrated effective in foreseeing and clarifying human conduct crosswise over different data advances (Ajzen, 2002, 1991).

Like the TPB, the TAM is also a derivative of the TRA. Unlike the other two general theories, the primary purpose of the technology-acceptance model is exactly what its name states. Davis (1986) designed it to specifically explain computer-usage behavior. Davis' TAM is much less general than the TRA, but because it incorporates findings from the information systems (IS) literature, it should be well suited for modeling computer acceptance (Gentry & Calantone, 2002). Despite, or because of, the specific nature of TAM, its use is becoming widespread in the diffusion of innovation literature (Gentry & Calantone, 2002). TAM is an adaptation of the TRA and was mainly designed for modeling of the acceptance of information technology by users (Davis et al., 1989). TRA is alleged to be a general theory of human behaviour, while TAM is more specific to information system usage (Mathieson, Peacock, & Chin, 2001).

TAM has however emerged as one of the most promising and influential models that have been used to explain the acceptance of technology systems better than TRA and TPB (Taylor & Todd, 1995a; Hu, Chau, Sheng & Yan, 1999; Malhotra & Galletta,

1999; Kowitlawakul, 2011). An examination of TAM and TPB has to a great extent inferred that TAM's capacity to represent change in aim to utilize or genuine utilize is about the same as TPB's (Mathieson, 1991; Taylor & Todd, 1995b). TRA then again is all the more generally utilized as a part of buyer conduct inquire about, while TAM is a particular reception of the Theory of Reasoned Action (TRA) display (Ajzen & Fishbein, 1980) to the investigation of IT use. It is a standout amongst the most compelling models broadly utilized as a part of the investigations of the determinant of IS/IT acknowledgment.

Numerous past reviews have received and created TAM, which was exactly appeared to have high legitimacy (e.g. Qutab, 2016; Yoon, 2016; Joo & Choi, 2015; Aharony & Prebor, 2015; Tella, 2011; Park, Roman, Lee, & Chung, 2009). TAM is likewise acclaimed for its stinginess and prescient power (Mathieson, 1991) which makes it simple to apply to various circumstances. The TAM is a particular model that has been created to clarify and foresee user computer usage behavior (Jeong, 2011). Thus, it is argued that TAM will also be useful in the predicting and explaining computer technology usage specifically focuses on e-library in Malaysia. Against this backdrop, this study applied the TAM and flow theory as theoretical frameworks in order to propose another model for disclosing users' intention to keep utilizing the e-library.

2.2.1 Proposed Research Model

The study employs Theory Acceptance Model (TAM) for the following three reasons. First, the TAM is effective and simple, and it provides an effective

explanation of the determinants of e-library acceptance. Generally, it is equipped for clarifying user behaviour over a wide scope of end-user technologies, and it is both stingy and hypothetically defended (Jeong, 2011). The TAM predicts IT acceptance by distinguishing the causal connections that exist among people's impression of an IT's usefulness, their view of an IT's ease of use, and their behavioral intention to utilize IT (Adams, Nelson, & Todd, 1992; Davis, 1989; Davis et al., 1989; Venkatesh & Davis, 1996). Moreover, discoveries that rise up out of the utilization of the TAM are straightforward and can be sent in framework necessity examination and other framework improvement stages (Jeong, 2011). These findings are basic in technology utilization settings and can be pervasively connected to take care of acceptance issues (Taylor & Todd, 1995a). With regards to both the adequacy and straightforwardness of the TAM and its wide appropriateness to various types of IT, this study applied TAM as a theoretical framework in the analysis of the variables that influence users' reception of e-library frameworks.

Second, the advantage of utilizing the TAM in the comprehension of e-library usage behavior is that it gives a structure to researching the impacts of outer factors on e-library use. A few reviews on TAM follow the influences of these variables on the beliefs and intention to use IT (e.g. Davis et al., 1989, Legris, Ingham, & Collerette, 2003). As per Taylor and Todd (1995a, 1995b) TAM aids the identification of the outside variables that significantly affects potential users' intention to use IT. In addition, in light of the fact that each use-belief has unmistakable roots and depends on an alternate arrangement of external variables, they autonomously give a fractional comprehension of clients' psychological procedures as they identify with e-library use (Lee, 2010). In this research, TAM offers an enhanced and more far

reaching comprehension of the psychological procedures and practices that correlate with e-library usage.

Third, as indicated by Jeong (2011) TAM can be utilized to study at the basic classifications of external variables that have significant effects on potential users' intentions to use the e-library. Previous research on the TAM has recognized two such categories of variables: (1) individual differences and (2) system characteristics (Hong et al., 2002). Experimental research has discovered critical connections between individual differences and users' intention to utilize IT (Agarwal & Prasad, 1999; Jackson, Chow, & Leitch, 1997; Venkatesh, 2000). On the other hand, system characteristics are recognized to be capable of influencing users' intention to adopt new ISs (Jeong, 2011). In the e-library sub-field itself, specific system features are believed to critically affect the usage of the e-library (Fox et al., 1993; Kling & Elliott, 1994; Park, 2000). Still, the procedures by which e-library acknowledgment is impacted by external variables, (for example, individual differences or interface characteristics) are not clear (Thong et al., 2002). Therefore, this study clarifies these procedures by adding of an external variable into the TAM, namely interface characteristics.

The TAM framework needs to be stretched if it is to be used to assess the intention to use e-library systems. A stretched version of the TAM with external variables known as interface characteristics was established in this study to investigate the users' acceptance of e-library systems (Ramayah, 2006a). The model is adapted to better explain the intention to use UUM e-library. Since the TAM is a generic model, the adapted model can be used as a point of reference for future research relevant to

technology system. Prior studies have documented the need to adapt the theory to better reflect the study setting (Ramayah & Suki, 2006; Taib, Ramayah & Razak, 2008). The proposed model is expected to assist in predicting the intention to use UUM e-library.

Numerous past research contemplates related with reception of the TAM have been directed and incorporated into library situations (Aharony & Prebor, 2015; Booker et al., 2012; Joo & Choi, 2015; Miller & Khera, 2010; Park et al., 2009; Qutab, 2016; Sheikhshoaei & Oloumi, 2011; Thong et al., 2002; Xu, Gan, & Yan, 2010; Yoon, 2016). Hence, it is important to lead inquire about that arrangements all the more seriously with postgraduate students' intentions to use UUM e-library. This help to measure the behavioral intention to use UUM e-library. This study is more interested in examining behavioral intention, perceived usefulness, perceived ease of use, terminology, screen design and navigation. Thus, it is expected that these variables will be a significant influence on the intention UUM e-library usage. The study focused on the following variables that relevant and significant to be studied in e-library. Next section will discuss on the TAM as underpinning theory of this study.

2.2.2 Technology Acceptance Model (TAM)

Of all the models discussed thus far, TAM is believed to be the most widely accepted and used among ISs researchers (Agarwal & Prasad, 1999). TAM focuses on individual acceptance of technology by using intention or usage as a dependent variable (Venkatesh, Speier, & Morris, 2002). TAM is designed to explain an entire situation or behaviour, with the idea that it would eventually be able to predict that

behavior (Hamutumwa, 2014). The theory of TAM was first introduced by F.D. Davis in 1986 and applied in North America. The use of TAM was increasingly stretched to other countries around the world (Sheikhshoaei & Oloumi, 2011). The model is believed to be very useful in predicting and explaining technology use in various situations (Dillon & Morris, 1996). It has also proved very successful in studies of users' adoptions of technology.

This model provides a basis of explaining the impact of variables such as beliefs and intentions using a technological application. The basis for TAM consists of two major constructs; perceived usefulness which is the degree to which a person believes that using a particular system would enhance his/her job performance, and perceived ease of use which is the degree to which a person believes that using a particular system would be free of effort (Davis et al., 1989). This model hypothesizes that system use is directly determined by behavioural intention to use, which is in turn influenced by users' attitudes toward actual use of the system and the perceived usefulness of the system. Attitudes and perceived usefulness are also affected by perceived ease of use (Taylor & Todd, 1995b). Against this backdrop, TAM is illustrated in Figure 2.1 below.

Figure 2.1
Technology Acceptance Model (TAM) by Davis et al. (1989)

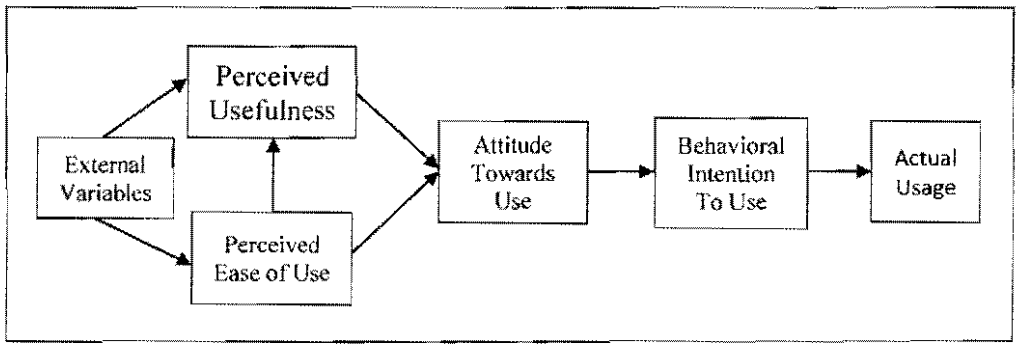


Figure 2.1 is the original TAM that was proposed by Davis, Bagozzi, and Warshaw (1989). This figure shows that both perceived usefulness (PU) and perceived ease of use (PEU) foresee the attitude to actual use of technology. Perceived usefulness (PU) also influences the user's behavioural intention (BI) in using technology. Intention to use also determines the actual use of technology (Malhotra & Galletta, 1999). Like TRA, TAM assumes that computer usage is determined by BI, though BI is viewed as being jointly determined by a person's attitude towards actual use of technology and perceived usefulness (Davis et al., 1989).

This was supported by Raaij and Schepers (2008), TAM was the first model to mention psychological factors affecting computer acceptance and the model assumes that both perceived usefulness and perceived ease of use of the new technology are central in influencing the individual's attitude towards using that technology and at the same time the individual's attitude is hypothesized to influence the behavioral intention to use a technology, finally relating to actual use.

Davis (1989) has additionally discovered that there is a connection between users' beliefs about a technology's usefulness and the attitude and the intention to use the technology. Nonetheless, perceived usefulness displayed a more grounded and more reliable association with usage than did other variables reported in the literature. What's more, an individual may embrace an innovation in the event that he or she sees it as advantageous, helpful and socially essential despite the fact that they detest utilizing the innovation (Saga & Zmud, 1994). In this manner, there may be a probability of an immediate connection between beliefs and intentions. Therefore, Davis et al. (1989), supported by Davis and Venkatesh (1996), further proposed that these beliefs both perceived usefulness and perceived ease of use are influenced by

external variables such as design characteristics, training, computer self-efficacy, user involvement in design, and the nature of the implementation process as shown in Figure 2.1.

According Hassan and Sheik Ali (2014), the majority of studies on digital library (e-library) adoption extended the hypothetical framework of the TAM model and examined several external variables that study TAM's major constructs; perceived usefulness and perceived ease of use. Therefore, in addition to these constructs, several external variables were found to affect the behavior intention to use e-libraries (Hong et al., 2002). Still, one external variable, that is more important in the context of developing countries and which most studies on e-library take for granted, is the impact of interface characteristics on e-library users (students) (Hassan & Sheik Ali, 2014).

Despite the fact that TAM was compelling in anticipating and clarifying technology acceptance in general, it does not have the specificity of users' sentiments on particular framework or technology. Due to this reason, researchers (e.g. Venkatesh & Davis 1996; Davis & Venkatesh, 2000) pursued vigorous validation and extension of the TAM under different environments to increase its explanatory power. Additionally, a number of modified TAM models (e.g., Chau & Hu, 2001; Horton, Buck, Waterson, & Clegg, 2001; Jiang, Shu, Klein, & Lin, 2000) were developed to address acceptance of new technologies and their industrial application.

Through the years, TAM was examined by researchers in various areas. Examples are; perceived system performance (Sun, 2012), perceived user resources (Mathieson et al., 2001), prior experiences with similar technologies (Agarwal & Prasad, 1999),

age and education (Agarwal & Prasad, 1999), e-learning (Aharony & Bar-Ilan, 2014; Calisir, Altin-Gumussoy, Bayraktaroglu, & Karaali, 2014; Amer, Ahmad, & Smedley, 2013), personal innovativeness (Aharony, 2013), tourism (Pantano & Corvello, 2014), libraries (Aharony, 2013; Booker et al., 2012; Jeong, 2011; Kim, 2010), and e-commerce (Liebana-Cabanillas, Sanchez-Fernandez, & Munoz-Leiva, 2014; Gefen & Straub, 2000). However, TAM research in the manner of e-library systems is still in its start, mostly in regard to the applicability of the TAM to e-library user acceptance (Xie, 2006; Yusoff et al., 2009). Additionally, as an Internet-based technology, the usage context of the e-library is fairly unlike in contrast to that of a stand-alone software application (Jeong, 2011). Thus, due to the distinctiveness of the e-library, with its wide-ranging community and its dedicated organizational context, it is imperative that the study examine the acceptance of this complex and new technology.

2.2.3 Previous Studies on TAM

The Theory Acceptance Model has been used in many researches and a variety of situations. Several researches performed in the USA and other countries using this model, and in particular, some uses of the model in the area of library and information science (Sheikhshoaei & Olouimi, 2011). Davis *et al.* (1989) were the founder of TAM and the theory of reasoned action in the USA. Later, they used TAM to study the potential factors influencing the acceptance and use of word processing software among 107 students. Their findings showed that the students' perceived usefulness of IT has a great and straight influence on their decision to use it, but that their perceived ease of use of the technology has fewer influence on this

decision. Their outcomes proposed that there are basic yet capable models of the determinants of user acceptance, with practical value for assessing frameworks and controlling administrative interventions aimed at improving the use of computer technology.

Most importantly, the majority of TAMs have been developed and modified in Western countries, particularly in Europe and South America (Kripanont, 2006). Thus, TAM research in the manner of e-library systems is still in its infancy, mostly in regard to the practicality of the TAM to e-library user acceptance (Yusoff et al., 2009; Xie, 2006). Past study in receiving TAM essentially examined individual behaviour to use new information systems and technology in library environments. TAM is utilized as a tool in the advanced library field to decide how users' behaviour influences their acknowledgment of e-libraries (e.g. Aharony & Prebor, 2015; Booker et al., 2012; Joo & Choi, 2015; Miller & Khera, 2010; Park et al., 2009; Xu et al., 2010; Yoon, 2016).

In relation to this study, Aharony and Prebor (2015) studied librarians' and information professionals' perspectives toward discovery tools, and established that the TAM, cognitive appraisals, openness to experience, and importance of discovery tool features affect respondents' satisfaction with discovery tools. Their further findings revealed that the fact that those respondents have higher computer skills enables them to perceive the discovery tools' advantages such as usefulness and ease of use. It indicated that if participants are challenged on the new technological platform, they would implement it and be satisfied with it, and vice versa; if they are threatened on a new technological platform, they will neither use it nor be satisfied

with it. Hence, library and information organization directors should make an effort and expose their employees to the advantages of discovery tools, hoping they would adapt it and thereby enhance individuals' use of the library's treasures.

In the study performed by Booker et al. (2012) clarified how information literacy instruction impacts business students' adoption of e-library assets. The investigation prototypical consisted of six constructs; amount of information literacy instruction, online library resource anxiety, online library resource self-efficacy, perceived usefulness, perceived ease of use, and the intention to use online library resources. They found that self-efficacy and anxiety were important antecedents to online library resource adoption. Then, a previous study by Joo and Choi (2015) explored multiple factors affecting undergraduate students' online resource selection. The study found that both usefulness and ease of use positively influenced the undergraduates' intention to use online library resources. Five resource quality constructs-accessibility, credibility, coverage, currency, and format-were also found to be determinants of online library resources' use intention. Previously, researchers suggested different dimensions of online resource quality in various areas (e.g. Rieh, 2002; DeLone & McLean, 1992; Arazy & Kopak, 2011; Stvilia et al., 2009), but few of them tried to empirically examine the effect of multiple aspects of resource quality quantitatively in the context of online library resources.

Further, Miller and Khera (2010) postulated some of the structures that communicate user acceptance of a digital library system implementation at agricultural universities in two developing countries; Kenya and Peru. They found that the TAM worked well in unfolding factors that affect the usage of e-libraries in developing countries, with

perceived usefulness as the primary predictor of intent in using this system. However, their study cannot ultimately address what causes variances in predictive power between sites. Thus, is that application of the TAM to IT application in developing countries must be guided more by the specificities of local settings than by the performance of the TAM in highly-developed countries.

In another review by Park et al. (2009) analysed the components that impact individuals' adoption and utilization of e-library system in the context of developing countries. They found that the library system's perceived ease of use had a significant impact on perceived usefulness, which ultimately prompted to intention to use. Further their findings identified the similarities and differences in significant predictors of the digital library's acceptance across countries and continents. Then, their study recommended that external variables that affect perceived ease of use and usefulness need to be considered as important factors in the process of designing, implementing, and operating digital library systems. Such deliberation will help to minimise the mismatch between system design and local users' realities, and further facilitate the successful adoption of e-library systems in developing countries.

In the same way, a study by Xu et al. (2010) built a structural model combining perceived usefulness, perceived ease of use, user satisfaction, and intention to use in e-library based on user cognition and TAM. Further, they added four dimensions; external environments, such as online environments and retrieval requirements; individual, such as retrieval and computer capabilities; system, such as system content and system function qualities; and a servicing factor. Their conceptual model is willing to be a reference to the better use of digital library. More other models

should be integrated to widen the thoughts, strength and verify this model, so as to guide the development of the digital library and enable users to use them efficiently.

In the recent study performed by Yoon (2016) was strongly support the TAM theory to comprehend user acceptance of mobile library applications among undergraduates in an academic library setting. Perceived usefulness, interactivity and perceived ease of use had significant effects on user attitude and intention to use mobile library applications. His study concluded that offers an understanding of mobile library app user behaviours, considering the rapidly changing environment of library services. As users' behaviours toward mobile library services become more complex, the proposed model could provide a basic approach to understand and improve mobile library app users and services. Relative investigation should be piloted to identify whether or not a difference exists between mobile library app users and non-users.

Similarly in Malaysia, the progression of the TAM is reserved well-informed with the latest development and diffusion of technologies in respective industries. The discussion will be divided into several areas of study, educational sector (e.g. Maslin, 2007; Ramayah, Jantan, & Aafaqi, 2003c; Ramayah, Aafaqi, & Ignatius, 2004a; Ramayah, Ignatius, & Aafaqi, 2004b; Lee & Lee, 2008) SME's sector (Jantan, Ramayah, & Chin, 2001; Ramayah, Siron, Dahlan & Mohamad, 2002b; Ramayah, Sarkawi, & Lam, 2003g; Ndubisi, Jantan, & Richardson, 2001), manufacturing environment (Ramayah & Lo, 2004; Aafaqi, Jantan, & Ramayah, 2003), and information technology / system (Ramayah & Jantan, 2003b; Ma'ruf et al., 2002, 2003; Ramayah et al., 2002a, 2003d, 2003e, 2003h).

In the education sector, Maslin (2007) observed TAM using student acceptance of e-learning technology. General, TAM was partly supported. Based on data collected from 122 university students, the utility of TAM for clarifying acceptance of e-learning technology was assessed. Her results disclosed that perceived usefulness is more important in determining intention to use the technology than attitude toward using. Another review by Ramayah et al. (2003c) examined the TAM incorporating motivational variables to explain Internet usage among students of institutions of higher learning. In addition, Ramayah et al. (2004a) stretched the use of TAM in forecasting e-library usage with the aid of self-efficacy. Whereas Ramayah et al. (2004b) used the TAM model to describe PC use among students of a private institution of higher learning. Then, Lee and Lee (2008) cited the potential of online learning as a tool to improve the education and training system and its value will not be realized if users still cannot accept online learning as a learning tool. Thus, to utilized and explored the online learning, TAM is very useful for research in an online learning context to predict the attitude, intention and usage of the system.

In the SME sector, Jantan et al. (2001) conducted a study to comprehend numerous issues that influence PC acceptance among small and medium sized companies. Moreover, Ramayah et al. (2002b) used the TAM to study technology usage amongst owners/managers of SME's. Then, Ramayah et al. (2003g) used the TAM to assess the acceptance of web-based supply chain management among SMEs. Their study was stretched to comprise the controlling effect of self-efficacy on the acceptance of web-based supply chain management among SMEs. Ndubisi et al. (2001) also verified the applicability of TAM for forecasting entrepreneurs' technology usage and found it to be valid.

In the manufacturing environment, TAM was used by Ramayah and Lo (2004) to describe the use of Enterprise Resource Planning (ERP) system among the managers of manufacturing firms in the northern region of Malaysia. Aafaqi et al. (2003) further observed at the chronological effect on the relationship posited by the original TAM model to measure the constancy of TAM over time. As a result, they found that the TAM relationship remains stable even with the passage of time thus signifying that TAM can also be used in longitudinal study.

Furthermore, Ramayah and Jantan (2003b) and Ma'ruf et al. (2002, 2003) used the TAM to describe Internet shopping among the Malaysians. Ramayah et al. (2003d, 2003h) on the other hand used the TAM model to describe the Internet usage occurrence among the Malaysian public. Ramayah et al. (2003e) simulated the TAM to comprehend the openness of Malaysian consumers in the E-banking sector. Rather than accepting the TAM model as it is, Ramayah et al. (2002a) claimed that the TAM model will produce different results for users and non-users of Internet banking and have shown that there is an opportunity of minimizing the relationship when the 2 groups are used as a whole. This finding is interesting in the Malaysian environment where the technological maturity is still something tough to attain.

All the researches cited above supported the TAM model in predicting and explaining use of or the intention to use a particular technology in the several broad areas described above. There is a general agreement that perceived usefulness is fundamentally connected with technology use. A person who finds a specific technology useful will utilize a greater amount of the technology when contrasted with someone else who discovers it not valuable. Then again, most research finds

perceived ease of use is useful in foreseeing perceived usefulness; frequently it is not to essentially narrate to usage or intention to use (Ramayah & Jantan, 2004).

Studies have discovered various external variables that can act as antecedents (e.g., prior experience, education, interface characteristic etc.) to these two constructs (perceived usefulness and perceived ease of use) in attempts to improve the predictive power of the expanded TAM; some were found to be significant and some were not. Thus, Ramayah and Jantan (2004) decided that particularly in the Malaysian environment perceived usefulness is the driver to any technology acceptance and this has to be undertaken to enhance usage among individuals.

2.3 Behavioral Intention

In this study, behavioral intention is essential factor understanding behavioral willingness before a specific behavior is adopted (al-Jabari, Othman, & Nik-Mat, 2012). According Fishbein and Ajzen (1975) behavioral intention indicates the expression induced during the actual behavioral process. This expression point out whether a particular behavior will be adopted or not. Behavioral intention is a requisite process in any type of actual behavior. It is a decision made previous to the adoption of behavioral intention (Fishbein & Ajzen, 1975). Based on Malhotra and McCort (2001), gaining a greater thoughtful of consumers' behavioral intentions for predictive purposes has been a primary concern for marketing researchers. The strength of behavioral intention capability to predict behavior has induced most researchers to explore and model the antecedents of the behavioral intentions of consumers.

In the context of this study, behavioral intention can be defined as a degree to which a student is willing to use the UUM e-library or the probability that a student will participate in using the UUM e-library. While there are various potential advantages to the e-library, it could in any case possibly be unnoticed or under-utilized by clients (Ramayah, 2006a, 2006b). In spite of the fact that the e-library has been elevated to different levels of users, the intention among these students to remain using such systems remains very small (Chu, 2003). What's more, the acceptance–discontinuance irregularity, wherein users suspend utilizing the e-library subsequent to having at first acknowledged it, happens as often as possible (Carlock & Perry, 2008). Although the first acceptance of the e-library is an important first step towards attaining e-library success, actual success needs sustained usage; however, there is a little of study that has examined the e-library from the users' perspective (Hsieh-Yee, 1996; Ramayah, 2006a, 2006b).

Along these lines, it is essential to inspect how users perceive the usefulness and ease of e-library usage. It has been underlined that the estimation of an IT development lays not such a great amount in the technology itself, but rather in its compelling and productive use (Kremers & van Dissel, 2000; Lau & Woods, 2009). Previous research has found that in order for users to maximally utilize and enjoy the benefits of the e-library, IT innovation must first be appropriately accepted and used by its intended users (Igbaria et al., 1997). Subsequently, there is a need to comprehend users' acceptance of the e-library and recognize the elements that influence their intention to use it.

The measurement of users' perceptions (McMahon et al., 1999) and an understanding of the factors that promote the effective use of systems (Yi & Hwang, 2003) have turned out to be progressively critical to IT assessment. Based on the same basis, learning objects can only make a difference if they are accepted and used by the learners; hence, it is imperious to conduct study that recognizes the underlying factors and underlying relationships that affect learners' behavioural intentions to use an e-library system. Understanding the factors that affect users' intentions to continue using the e-library will not only assist e-library developers in scheming popular content, but they will also help teachers and systems design strategies that are more likely to increase the use of the e-library.

For effective utilization of an information system such as e-libraries, user's acceptance is needed (Igbaria et al., 1997). According to Jeong (2011), the study of determinants that influence users towards use, acceptance and rejection of an information system, always enhance system utilization. Similarly, Zha et al. (2015) asserted that students' behavioural intensions have significant effect on adoption of e-libraries. Besides that, Thong et al. (2002), Vaidyanathan et al. (2005), and Park et al. (2009) have studied the potential factors affecting the acceptance of e-libraries among users using the TAM.

In the study made by Thong et al. (2002), three features for system interface and three organizational variables and three personal differences (fundamentally external factors) were recognized, which would affect the perceived usefulness, the ease of use and the decision to use IT in this field. The results also demonstrate that both perceived usefulness and perceived ease of use are the significant factors in users'

acceptance of e-libraries. Then, a study conducted by Vaidyanathan et al. (2005) showed that five systematic and individual factors - search function; terminology, relevance, design and display, and reliability were reflected as external factors which have significant effects on perceived ease-of-use and perceived usefulness of e-libraries which in turn have a significant effect on individual user acceptance.

In the investigation made by Park et al. (2009) the factors that influence people's adoption and use of a e-library system were observed and the applicability of the Technology Acceptance Model (TAM) in the context of developing countries was tested. Using data from a survey of 16 institutions in Africa, Asia and Central/Latin America, a path analysis exposed that perceived ease of use of the library system had a significant impact on perceived usefulness, which ultimately prompt to behavioural intention to use. Furthermore, their investigation observed the likenesses and variances in the significant predictors of e-library acceptance across countries and continents. Additional, their study recommended that external variables that affect perceived ease of use and usefuluess should be considered as important factors in the process of designing, applying and functioning e-library systems. Thus, intention to use in the context of this study refers to a student's readiness to use the UUM e-library which is predicted by of two important belief factors namely perceived usefulness and perceived ease of use.

2.4 Review of Belief Variables

According to TAM, two particular beliefs, perceived usefulness and perceived ease of use, are primary relevance for computer acceptance behaviour. According

Rahmiati (2017) perceived usefulness states that people will tend to use a technology when the technology is believed can enhance the performance of their jobs. Thus, if one believes that the digital library is useful then he will use it. While the perceived ease of use is defined as the extent to which a person believes that a technology is easy to use. If someone believes that using digital library do not require a significant efforts then he will use it. These two constructs beliefs have identical functions. A user finds it will be easier to use something useful. Therefore, a system designer must be able to improve the usability of a system by adding functional capabilities on the system or make it easier to use in order to benefit from the system can be realized. A system that cannot be used or difficult to operate may not be utilized by the user. Therefore, the beliefs variables are proposed in this study are perceived usefulness and perceived ease of use.

2.4.1 Perceived Usefulness

Davis (1989) referred perceived of usefulness as to the degree that the user believed in using the technology may improve their work performance. Perceived usefulness means users' perception of system effectiveness. It indicates that how much utilization of an information system enhances performance (Park et al., 2009). It shows user's intentions to adopt an information system (Hong et al., 2002). According to Bhattacherjee (2001), an individual is further expected to endure usage when such usage is perceived to be useful. Other than that, learner perceived of usefulness in online learning system was defined as the perception of degree of improvement in learning effect due to the acceptance of a system (Sun, Tsai, Finyer, Chen, & Yeh 2008).

Within the organizational context, a system that is high in perceived usefulness is one that the user believes will have a positive use-performance relationship (Yusliza et al., 2009). In fact, IS adoption research suggests that a system may not be received well if it does not help people perform their work (Nysveen, Pedersen, & Thornbjomsen, 2005). The final cause that users feat e-libraries is that they find the systems useful to their information needs or search tasks (Hong et al., 2002).

Perceived usefulness is operationalized as the degree to which an individual believes that using a particular system would improve his or her job performance. Users' intention to use an information technology is expected to be significantly affected by their perceived usefulness of the system (Davis et al., 1989). In the context of this study, perceived usefulness is defined as the student's belief that the use of a UUM e-library system will improve his or her learning presentation.

Previous researcher such as Davis (1993) established that usefulness has significant effects on user's intention to utilize information systems. Further, Kai-Yu (2015) asserted that usefulness of a digital library is a significant indicator of students' attitude towards adoption of e-library services. Similarly, Hu et al. (1999) stated that usefulness has links with utilization of an information system. In addition, Hsiao and Tang (2015) stated that usefulness significantly affect the adoption of e-library services. Hence, it is assumed that users utilize the e-libraries because of its perceived usefulness i.e. users are more likely to utilize a digital library if it is useful.

2.4.2 Perceived Usefulness and Intention to Use

The vital reason that users use e-libraries is that they discover the systems useful to their information needs or search tasks (Hong et al., 2002). Past researches (Ndubisi et al., 2001; Ramayah et al., 2004; Ramayah & Aafaqi, 2004; Ramayah, Ignatius, & Aafaqi, 2002; Ramayah, Sarkawi, & Lam, 2003) have shown that perceived usefulness influences computer usage directly. Moreover, prior e-library studies (Goh & Liew, 2009; Hong et al., 2002; Thong et al., 2002) have also shown that perceived usefulness directly affects the behavioral intention to use e-library systems.

In another study by Maslin (2007) examined that PU is more significant in shaping intention to use than attitude towards using. In agreement with what TAM postulates, PU was found to have a significant influence on students' intention to use the technology, that is, it is in accordance with Davis (1989) who found attitude towards using was at best a partial mediator of the effect of PU on intention to use, and that it added little causal explanatory power. In similar vein, a study by Liaw (2008) showed that perceived satisfaction and perceived usefulness were predictors of learners' behavioral intention to use e-learning and perceived usefulness was the biggest contributing factor and it support the flow of model structure in the TAM theory.

In relation to this study, a study performed by Miller and Khera (2010) predicted that perceived usefulness would has a positive effect on intent to use e-library. It is also related to research by Xu et al. (2010) showed that perceived usefulness positively influences the active intention to use digital library services. Sheikhshoaei and

Oloumi (2011) concluded that perceived usefulness has an effect on the attitude toward librarians' IT acceptance. Besides, Kim (2014) distinguished that positive relationships exist between perceived usefulness and intention to use in mobile library services.

Chang (2013) suggested that perceived usefulness as performance expectancy. He established that with the help of mobile library apps to find university libraries' data, users can expand their work performance. Therefore, their use intention is stronger. Therefore, based on this earlier research, this study assumes perceived usefulness to positively affect the behavioural intention to use UUM e-library systems. Thus, consistent with previous studies, this study hypothesizes the following:

H_1: Perceived usefulness has significant influence on the intention to use UUM e-library

2.4.3 Perceived Ease of Use

Davis (1989) referred perceived ease of use as to how effortless he or she perceives using the technology in the future. Effort is a limited resource that a person may assign to the numerous activities for which he or she is answerable (Radner & Rothschild, 1975). All else being identical, a submission perceived to be easier to use is more likely to be accepted by the users. On the other hand, Chang and Tung (2007) stated perceived ease of use is a degree of how effortless a person when they believe in using a specific system especially the online learning system. When

the application of the e-library is perceived to be easier to use, it is more likely to be accepted by the users.

Perceived ease of use in an online learning system was defined as learner's perception of how easy it is in adopting the online learning system (Sun et al., 2008). It refers to views regarding the use of an information system i.e. system is easy and requires minimum efforts to use (Thong et al., 2002; Miller and Khera, 2010; Jeong, 2011). The easy use enhances performance (Jeong, 2011) and prompts to the notion that information system is useful (Davis, 1993). In the context of this study, a perceived ease of use refers to the extent to which a student believes that the use of a UUM e-library system will be effortless.

Selim (2003) had applied TAM theory to assess university student's acceptance of course website as an effective learning tool and the result showed that perceived ease of use and perceived of usefulness of course website proved to be the key determinants of the acceptance and usage of course website as an effective and efficient learning technology. According to Kai-Yu (2015), asserted easy use of a digital library is a significant indicator of students' attitude towards adoption of e-library services. According to Thong et al. (2002), easy uses directly and indirectly influence users' intentions of using a digital library.

Regarding adoption of e-library services, Hsiao and Tang (2015) stated that easy use and significantly affect the students' adoption of e-library services. However, in another study Hsiao, Tang and Lin (2015) posited that perceived ease of use is more influential than perceived usefulness to determine students' acceptance or rejection

of a digital library. The prior researchers established that easy use has significant effects on users' intentions of using an information system (Cho et al., 2009). Thus, users are more likely to utilize a digital library if it is easy and useful. According to Hong et al. (2002), digital library is a multifaceted information system. Users will not utilize the resources of a digital library if it is not useful or hard to use. Thus, to circumvent the poor use of a digital library it should be easy to use and useful.

2.4.4 Perceived Ease of Use and Intention to Use

This study has also suggested that a perceived ease of use positively affects the behavioural intention to use e-library systems (Goh & Liew, 2009; Hong et al., 2002; Ramayah, 2006a) and that it indirectly acts on the behavioural intention to use e-library systems via the facilitating effect of perceived usefulness. Thong et al. (2002) also did a study on digital library acceptance in Hong Kong and found that perceived ease of use was an important forecaster of intention to use a digital library. In a study on e-libraries, Ramayah and Aafaqi (2004) and Goon et al. (2005) also found that perceived ease of use influenced e-library usage.

In similar vein, a study by Joo and Choi (2015) also revealed that perceived ease of use positively influence use intention toward online library resources among undergraduates' students. Further, a positive association between perceived ease of use and intention to use has been established in mobile library services (Kim, 2014). Additionally, Sheikhshoaei and Oloumi (2011) found that perceived ease of use has an influence on perceived usefulness and attitude to use for librarians' IT acceptance.

Previous investigations have proved that a perceived ease of use both directly (Chang & Tung, 2008; Lau & Woods, 2009; Lee, Yoon, & Lee, 2009; Ramayah et al. 2002, 2004a, 2004b) and indirectly (Chang & Tung, 2008; Chiu, Lin, Sun, & Hsu, 2009; Cho et al., 2009; Lau & Woods, 2009; Lee, 2010) impact intention via the perception of increased usefulness. Extensive e-library systems research over the course of the past decade has demonstrated a significant effect of perceived ease of use on the intention to use e-library systems. Thus, consistent with previous investigations, this study hypothesizes the following:

H_2: Perceived ease of use has significant influence on the intention to use UUM e-library.

2.5 Review of Interface Characteristics Variables

Davis et al. (1989) observed that the core constructs of TAM, PU and PEU are influenced by a number of external variables such as system features and user characteristics. There are also other outside variables that affect the usage of a system (Hamutumwa, 2014). The aim is therefore to adopt TAM and extend it so that it includes additional key determinants such as perceived usefulness and usage intention constructs (Venkatesh & Davis, 1996).

Earlier studies have confirmed TAM to have a relatively simple structure but similar descriptive control as more sophisticated models, such as the theory of reasoned action and the theory of planned behaviour (Davis et al., 1989; Mathieson, 1991; Taylor & Todd, 1995a). The main purpose of TAM is to predict the intention to

apply information systems by measuring users' perceptions of the system's usefulness and ease of use. Moreover, TAM suggests that the effects of external variables on usage intention are mediated by these perceptions. Therefore, by utilizing TAM as a theoretical framework, the study able to investigate the impact of external variables on intention to use e-library.

Numerous researchers such as Davis (1993), Park et al. (2009), Miller and Khera (2010), Jeong (2011), Koch et al. (2011), Rahman et al. (2011) and Sheikhshoaei and Oloumi (2011) categorized external variables such as interface characteristics, system characteristics, organizational contexts and individual differences (Thong et al., 2002).

In a review of the behavioural issues with using interactive systems, Miller and Thomas (1999) identified interface characteristics as a major component of effective man - computer interaction. Their finding is not limited by the nature of user tasks under consideration and is applicable to general users of interactive computer systems. The particular interface characteristics covered in their study include dialogue style and screen displays. Regardless of the specific functions that an interactive system performs, interface characteristics are always relevant to users' adoption behaviour because users access an information system through its interface.

Further, Thong et al. (2002) stated that system characteristics demonstrate the relationship of information systems with an organization. It facilitates access to information without hindrance (Wilkinson et al., 2004). The system characteristics directly affect the use of an information system (Jacobson & Fusani, 1992; Davis,

1993). In a study performed by Hong et al. (2002) used three indicators of system characteristics namely relevance, system quality and library assistance.

Organizational context is another category of external variables that is increasingly recognized as a vital determinant of e-libraries success (Davies, 1997). Although an abundant study has been conducted on the technical development of e-libraries, organizational context can also influence the usage behaviour (Thong et al., 2002). For example, according to Thong et al. (2002) the same e-library can be very successful in one university, but hardly used in another. A potential reason could be that in the successful university, the students can easily access the system from any computer on campus. While in the unsuccessful university, the e-library is only accessible from a limited number of designated machines. Another possibility is that the electronic collections in the successful e-library are more relevant to the courses offered in the university. Thus, Thong and friends examined three determinants of individual differences in his study are system accessibility, system visibility and relevance.

Finally, individual differences can also influence the intention to use digital libraries. According to Williams et al. (2008), individual differences indicate disparity among persons that differentiate them from others in a specific situation. Numerous researchers have established the significant association of individual differences with adoption of technologies (Khan et al., 2013). For example, Borgman (1999) stated that individual differences play useful role towards effective performance and usage of digital libraries. Barry and Squires (1995) suggested that technology usefulness should be evaluated according to users' perception and not only on the basis of its

effectiveness. Conversely, Matusiak (2012) stated lack of perception of usefulness among students and teachers decrease or limit adoption of digital libraries. According to Qutab (2016), three determinants of individual differences were examined in his study are computer self-efficacy, knowledge domain and English literacy.

Against this backdrop, this study proposes interface characteristics as external variables. According to Ramayah (2006a), interface characteristics means of interactions between the system and its users. Many systems feature user interface, for example, mice, icons, and menus, which are particularly aimed to increase usability (Davis et al., 1989; Parikh & Verma, 2002). As of now, there are numerous emerging interfaces (e.g., gesture recognition, eye tracing and head tracing). According Jeong (2011), interface characteristics are significant to the improvement of the user-interface, which decreases the effort of using a particular technological tool.

A great interface design, such as, a design with control tool bars, exhibits the functions of a system in a comfortable ready-at-hand manner (Cho et al., 2009). Furthermore, interface characteristics provide alternative methods for users to access a given function and increase the perceived usefulness of the system itself (Branscomb & Thomas, 1985; Saade & Otrakji, 2007). The quality of interface characteristics substantially accounted to the usability of an e-library, and non-users often refer it as a main reason for not using electronic information retrieval systems (Fox et al., 1993).

Similarly, interface characteristics connect users with an information system (Ramayah, 2006a) to increase system usability (Davis, 1993) and enhance usefulness (Saade & Otrakji, 2007). Since interface characteristics enhance use of a digital library (Fox et al., 1993), thus its identification should be system specific (Jeong, 2011). It connect users with an information system in terms of usability i.e. interface features enhance usability of digital libraries (Fox et al., 1993). The feature of well-designed interface make IS significant and simple to utilize (Thong et al., 2002).

Numerous researchers such as Thong et al. (2002) and Jeong (2011) established the significant effects of interface characteristics on usefulness and usability of an information system. It connects users with an information system in terms of usability i.e. interface features enhance usability of digital libraries (Fox et al., 1993). The feature of well-designed interface make IS significant and simple to utilize (Thong et al., 2002). As revealed by Hong et al. (2002), interface characteristics were found to be significant predictors of perceived ease of use of digital libraries. Further, Ramayah (2006a) stated that interface characteristics have significant association with usability and usefulness of an information system. In addition, in developing countries the success of information systems (aka digital libraries) depends on how the system is customized from the user's perspective because it is users who will, at the end, decide if it is functional and successful (Park et al. 2007).

The previous researchers reported three indicators of interface characteristics consist of screen design, navigation and terminology (Jeong, 2011; Lindgaard, 1994). In e-library systems, these three interface characteristics were found to be determinants of a perceived ease of use (Ramayah, 2006a, 2006b; Thong et al., 2002) and perceived

usefulness (Hong et al., 2002). Therefore, this study proposes that terminology, screen design and navigation as an external determinants of perceived usefulness and perceived ease of use.

2.5.1 Terminology

According to Lindgaard (1994), terminology refers to the set of words, sentences, or expressions that are applied in a particular IS. McClements and Becker (1996) recommend that when online, regardless of whether utilizing websites or databases, the utilization of correct keywords is imperative to give information. Terminology clarity enhances the perceived ease of use of e-libraries by serving efficient communication of system instructions and feedbacks to users (Thong et al., 2002). Besides that, efforts must be carried to match the system's vocabulary with users' language to attain terminology clarity. Technical terms and jargon are to be averted. If needed, technical terms should be attached by clear explanations. Talja et al. (1998) asserted that one main problem with the e-library is unsuitable used jargon.

In the utilization of ISs, a right use of keywords is an imperative source of information (Ramayah, 2006a). Terminology is essential to a user's capacity so as to accurately and clearly understand descriptions, instructions, and search results in an e-library (Hong et al., 2002); nevertheless, there is normally a gap between the terminology of the e-library providers and the vocabulary of the users. Utilization of terminology is unsuitable for instance jargon is one of main problem of e-library systems and reduces the benefits that the e-library can offer to its users (Thong et al., 2002). The issue of terminology is closely related with the success of an e-library.

The success of an e-library depends on clear and understandable terminology and its capacity to simplify utilization of the e-library.

2.5.2 Screen Design

According to Ramayah (2006a), screen design refers to the visual appearance or general attractiveness of the site. McClements and Becker (1996) propose that desirable design elements are links connecting all a site's pages to the home page, identifying graphics on each page, a short hyperlink, links, and restricted utilization of graphics, short cuts and user testing. Rettig (1996) also recommends that factors usually considered in connection print sources, for example logic of organization, authority of the information provider, comprehensiveness of treatment, range of search capability and availability are also associated to perceived ease of use. Moreover, Todd and Benbasat (1992) and Lim et al. (1996) claimed that the way information is performed on the computer screen is also capable of affecting the user's information search strategies and achievement.

Prior studies have found that given the same content, the way the information is presented on the screen is capable of influencing users' information search strategies as well as performance (e.g. Lim, Benbasat & Todd, 1996; Todd & Benbasat, 1992). In the context of digital libraries, it not only matters what do we put on the screen, but also how. For example, graphical user interfaces were found to enable richer interaction with users in both information retrieval systems (Hu, Ma & Chau, 1999b) and digital libraries (Liu et al., 2000). The way that information is organized on the screen can impact the users' interaction with digital libraries beyond the effect of the

information content. For instance, too many alignment points will make scanning difficult, while poorly depicted buttons and icons can create confusion and misunderstanding. In contrast, a well-organized and carefully designed screen can help the users to scan the screen and identify the relevant information more easily.

In other related studies, Hu et al. (1999) and Liu et al. (2002) stated that graphical user interfaces were found to enable richer interaction with users in both retrieval systems and digital libraries, but in previous study by Goon et al. (2005) was found that screen design was not a determinant of perceived ease of use. These contradictory findings could be due to the fact that the respondents in the study by Goon et al. included both part time and full time students. The majority were part time students, distance learners and graduate students who may not be very particular about screen design as they do have not much choice, being away from the main campus.

2.5.3 Navigation

Navigation refers to the way of discovering what relevant files or databases exist and where they are located (Lindgaard, 1994). Navigation offers the users of a site easy access to information of interest, the ability to move around within the system, or the ability to access other sites (Ramayah, 2006a). As the information storage structure in systems becomes more complicated, users can easily become lost in their efforts to navigate such information-intensive systems (Dillon, 2000). This disorientation is likely caused by the management of a heavy cognitive load that has a complex structure and few unique landmarks (Marchionini, Plaisant, & Komlodi, 1998).

A problem frequently experienced by users as they try to locate digital information is disorientation (Dillon, 2000). As the amount of information increases rapidly, the structure for storing the information becomes more complicated. Users can easily get lost in information-intensive systems, such as digital libraries, while trying to retrieve information from them. The cognitive load necessary to navigate a conceptual space with a complex structure and few unique landmarks is the major reason for disorientation (Marchionini et al., 1998).

Hence, endeavours have been made to enhance the navigation of various kinds of information systems in order to overcome this problem (Basara, Burgin, Ryan & Trummel, 1986), the World Wide Web (Dieberger, 1997; Smith, Newman & Parks, 1997), and digital libraries (Payette & Rieger, 1998). By providing navigation aids or increasing the amount of unique landmarks, digital libraries can make it easier for the users to follow the logical flow and conduct more efficient information search.

2.5.4 Terminology and Perceived Usefulness

In relation to this study, the recent study by Jeong (2011) found that terminology has not significant impact on perceived usefulness of the e-library usage. It is also related to research by Rahmiati (2017) who found that the terminology was weakly predicted perceived usefulness of intention to use online library among students. Nevertheless, even though terminology has not yet been identified as a strong predictor of the perceived usefulness of an e-library, it has also been found to be a unique factor among users' evaluation of the e-library system (Hill et al., 1997). It is reported in a study by Qutab (2016) which explained that his finding is not in line

with the findings of the past studies. He revealed that terminology had positively influenced on perceived usefulness of digital library. Thus, consistent with Qutab research, this study hypothesizes the following:

H_3: Terminology has significant influence on perceived usefulness of the UUM e-library.

2.5.5 Screen Design and Perceived Usefulness

A good screen design can create a comfortable virtual environment where users can easily identify functional groups and navigation aids, freely move around and scan search results, and make more efficient searches (Hong et al., 2002). In the context of e-library systems, a study by Rahmiati (2017) approved that good screen design have significant predictor of a perceived usefulness. It indicated good screen design helped user to find usefulness of digital library and interact with the system more easily. Based on the previous studies, this study expects screen design to have a positive impact on perceived usefulness of an e-library system. Thus, it is hypothesized that:

H_4: Screen design has significant influence on perceived usefulness of the UUM e-library.

2.5.6 Navigation and Perceived Usefulness

This study proposes that navigation will positively affect the perceived ease of use of e-library systems. A recent study performed by Qutab (2016) found that navigation has significant effect on perceived usefulness which is explained a variance of 57% in usefulness. Therefore, this study hypothesized that:

H_5: Navigation has significant influence on perceived usefulness of the UUM e-library.

2.5.7 Terminology and Perceived Ease of Use

Previous studies have found that among three separate interface characteristics, terminology was the most influential factor, and, moreover, it was found to be a strong predictor of a perceived ease of use (Hong et al., 2002; Jeong, 2011; Ramayah, 2006a, 2006b; Thong et al., 2002). In a past study conducted by Goon et al. (2005) found that terminology clarity was positively associated to perceived ease of use on e-library acceptance among postgraduate students in Malaysia. In similar vein, previous study (Qutab, 2016; Hassan & Sheik Ali, 2014; Jeong, 2011; Ramayah, 2006a) also found that terminology applied on the digital library interface has a positive impact on its perceived ease of use. Therefore, it is hypothesized that terminology clarity will have a positive influence on perceived ease of use. Nonetheless, in light of the studies above, the following hypothesis was proposed:

H_6: Terminology has significant influence on perceived ease of use of the UUM e-library.

2.5.8 Screen Design and Perceived Ease of Use

In the context of e-library systems, most studies have found that screen design is a significant predictor of a perceived ease of use (Rahmiati, 2017; Jeong, 2011; Ramayah, 2006a; Thong et al., 2002; Hong et al., 2002). A study conducted by Ramayah et al. (2004) where the majority of respondents were postgraduate students, proved that good screen design enhance perceived ease of use. Moreover, Hassan and Sheik Ali (2014) also found that screen design has much effect on the perceived ease of using digital library. Therefore, it is hypothesized that screen design will have a positive impact on perceived ease of use.

H_7: Screen design has significant influence on perceived ease of use of the UUM e-library.

2.5.9 Navigation and Perceived Ease of Use

Earlier research on e-library systems has found that navigation has a small but significant effect on the perceived ease of use of e-library systems (Ramayah, 2006a, 2006b; Thong et al., 2002). According Qutab (2016), navigational aids make it easier for users to follow the logical flow of information and conduct more efficient searches in an e-library system. Navigation assists in the easy use of an information system and makes it useful. A study by Qutab (2016) revealed that effect on

perceived ease of use is significant which is explained 64% of variance in the easy use, indicating navigation with the largest effect on digital library. Consequently, this study proposes that navigation will positively affect the perceived ease of use of e-library systems. Thus, it is hypothesized that:

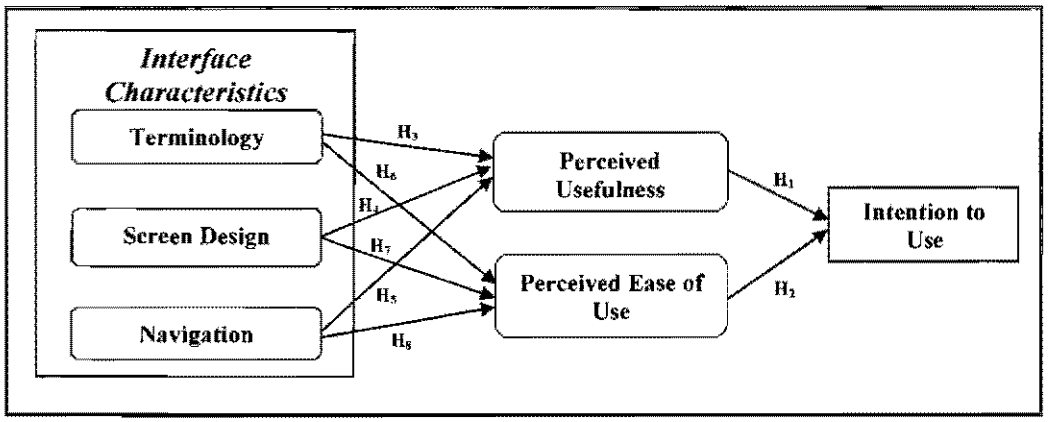
H_8: Navigation has significant influence on perceived ease of use of the UUM e-library.

In the next section, the research theoretical framework will be discussed, followed by the research hypotheses development.

2.6 Proposed Theoretical Framework

The theoretical framework is the conceptual model of how one theorizes or logically plausible relationship between several factors or matters that have been identified as important for the study area (Sekaran, 2003). This is supported by Welman, Kruger and Mitchell (2005) stated that a theoretical framework enables the researcher to hypothesize or propose as well as to test the relationship between the variables involved in order to expand the understanding of the related research area of study. The TAM was used as a baseline model to verify a series of hypothesized relationships that are particular to the e-library usage context. Therefore, theoretical frameworks are often used to provide the context for literature review, research design, data collection, and analysis and discussions of research studies. Based on approach of literature review, the schematic diagram for the theoretical framework is shown in Figure 2.2 below:

Figure 2.2
Theoretical Framework of Intention to Use UUM e-Library



Based on Figure 2.2 above, the research framework in this study was adapted from Jeong (2011). The proposed theoretical framework herein consists of three independent (external) variables, two belief variables, and one dependent variable. The three independent variables are known as interface characteristics. Interface characteristics include terminology, screen design and navigation. The two belief variables that have been tested in this study include perceived usefulness and perceived ease of use. This study selected the intention to use UUM e-library as dependent variable. The focus of this study is to identify the effect of interface characteristics on perceived usefulness and perceived ease of use, and the subsequent intention to actually perform the behaviour.

2.7 Research Hypotheses Development

A hypothesis is a logical relation that estimated a relationship between two or more variables expressed in the form of statements that can be tested (Sekaran, 2003). In other words, after identifying the important variables in the research area and establishing the relationships among the variables through the development of a

theoretical framework, the variables need to be tested whether there exist significant relationships or not. Therefore, there are three general hypotheses were built that need to be tested related to the objectives of this study, which are:

H_1: Perceived usefulness and perceived ease of use have significant influence towards intention to use UUM e-library.

H_2: Terminology, screen design and navigation have significant influence on the perceived usefulness of the UUM e-library.

H_3: Terminology, screen design and navigation have significant influence on the perceived ease of use of the UUM e-library.

2.8 Summary

This review of the related literature presented a discussion on the dependent variable that is intention to use e-library. The review also discusses the belief factors and external factor that can influence the intention to e-library usage. The literature reviewed work as a good basis for developing a model to measure the factors that affect the behavioral intention.

Consequently, this study intends to fill the gap in the body of literature concerning the effects of consumers' intention to use UUM e-library. This study contributes to the very scarce literature linking interface characteristics on focusing e-library. Moreover, even though a number of researches have been conducted in this area, there are still many variables remain unexplored in determining the behavioral intention to use and the relationship between intention and actual usage behavior.

Thus, one of the objectives of this study is to add to the rare literature related to intention of potential e-library consumers, particularly for postgraduate students in UUM.

CHAPTER THREE
METHODOLOGY

3.1 Introduction

This chapter will elaborate on the study's research design. This is followed by the population and sample of the study. Then, this study discusses the sampling method, questionnaire design, variables and measurements, as well as the data collection procedure. This chapter ends with a discussion of the data analysis method used in this study.

3.2 Research Design

An appropriate research design is essential to determine the type of data, data collection technique, and sampling methodology; in order to achieve the research objectives (Burns & Bush, 2002). This study employs a cross-sectional survey design. Survey design is a good way of measuring the relationship between variables. Since this study is concerned with how variables are associated, the quantitative research is used. Quantitative research is also found to be more appropriate for this study to explain a phenomenon or a certain characteristics in the culture (Sekaran, 2003). Quantitative research is about collecting numerical data to explain a particular phenomenon and particular questions that seen immediately suited to being answered by using the quantitative method (Sekaran & Bougie, 2010). Quantitative research is used because results that will be acquired from this study are based on a large sample sizes that are representative of the population (Sekaran, 2003).

Meanwhile, the descriptive study is use to determine the relationship between the variables used in the research and as mentioned by Sekaran and Bougie (2010) descriptive study is undertaken to describe the characteristics of the variables of interest in the study. This research is undertaken in UUM and it was specifically focus to postgraduate students in terms of gender, age, race, citizenship, program and school of study, experience in using computer and frequency of using UUM e-library. Descriptive studies will help to understand the characteristics and help the researchers to describe the relevant aspects of interest from an individual or organization. Moreover, questionnaires and computer software such as SPSS version 20 will be used to collect and analyse the numerical data needed.

3.3 Population and Sample of the Study

Population is defined as the total category of subjects which is the focus of attention on a particular research project. The population in this study is the postgraduate students of Universiti Utara Malaysia (UUM), Sintok. An individual level is the unit of analysis for this study, which refers to UUM postgraduate students in which each individual's response is considered an independent data source.

UUM postgraduate students are chosen as the study sample due to their maturity, using UUM e-library experience and thus able to make decisions needed for this study. Other than that the postgraduate students were exposed in using the UUM e-library as compared to undergraduate students. Therefore, this study expected the

respondents are aware and alert to use UUM e-library. There are certain criteria that respondents need to fulfill before answering the questionnaire which are:

i. samples should be studying in Universiti Utara Malaysia (UUM), Sintok.

ii. samples should be active postgraduate students.

iii. samples are users to the UUM e-library.

3.3.1 Sample Size

Malhotra (2004) defined that a sample size refers to the numbers of elements to be included in the study. Large sample gives more reliable results than smaller samples. Therefore, choosing the right sample size is definitely important because a reliable and valid sample can enable a researcher to analyze the results from the sample under investigation.

This study was carried out through survey approach. Based on the information from the Department of Academic Affairs of UUM (2017), UUM has about 7,814 postgraduate students which consist of 3,952 from Othman Yeop Abdullah Graduate School of Business (OYAGSB), 2,827 from Awang Had Salleh Graduate School of Arts and Sciences (AHSGS) and 1,035 from Ghazali Shafie Graduate School of Government (GSGSG) as stated in Table 3.1.

Table 3.1
Statistics of UUM Postgraduate Students

School	Number of Students
Othman Yeop Abdullah Graduate School of Business (OYAGSB)	3952
Awang Had Salleh Graduate School of Arts and Sciences (AHSGS)	2827
Ghazali Shafie Graduate School of Government (GSGSG)	1035
Total	**7,814**

Source: Department of Academic Affairs of UUM (2017)

According to Table 3.2 below provides that summary generalized scientific guideline for sample size decisions, therefore the sample size of this study is 364 based on a given population. In Sekaran (2003), Roscoe (1975) stated that the rules of thumb for determining sample size, which are; (1) sample sizes larger than 30 and less than 500, are appropriate for most research; (2) where samples are to be broken into sub-samples (male/ female, juniors/ seniors, etc.), a minimum sample size of 30 for each category is necessary; and (3) in multivariate research (including multiple regression analyses), the sample size should be several times (preferably 10 times or more) as large as the number of variables in the study.

Table 3.2
Sample Size for a Given Population Size

N (Population Size)	S (Sample Size)	N (Population Size)	S (Sample Size)
3000	341	6000	361
3500	346	**7000**	**364**
4000	351	8000	367
4500	354	9000	368
5000	357	10000	370

Source: Krejcie and Morgan (1970) as quoted in Sekaran (2003)

3.3.2 Sampling Method

This study has chosen systematic random sampling. Systematic sampling is a type of probability sampling method in which sample members from a larger population are selected according to a random starting point and a fixed periodic interval. This interval, called the sampling interval, is calculated by dividing the population size by the desired sample size. Systematic random sampling techniques are generally used when the population is heterogeneous, or dissimilar, where certain homogeneous, or similar, sub-populations can be isolated (strata). This technique is most appropriate when the entire population from which the sample is taken is homogeneous.

A systematic sample from each stratum is taken in a number proportional to the stratum's size when compared to the population. These subsets of the strata are then pooled to form a random sample (Sekaran & Bougie, 2013). Therefore, the population of UUM postgraduate students has been divided into three stratums or schools including OYAGSB, AHSGS and GSGSG. The sample size of each stratum in this technique is proportionate to the population size of the stratum when viewed against the entire population. This means that the each stratum has the same sampling fraction. Thus, the sample size of each school in this study is shown in Table 3.3 on the next page.

Table 3.3
The Sample Size of each School

School	Population Size	Proportion (%)	Sample Size
Othman Yeop Abdullah Graduate School of Business (OYAGSB)	3952	50.6	184
Awang Had Salleh Graduate School of Arts and Sciences (AHSGS)	2827	36.2	132
Ghazali Shafie Graduate School of Government (GSGSG)	1035	13.2	48
Total	**7814**	**100**	**364**

After the total number of UUM postgraduate students for each school has been identified, the samples in the school were chosen by systematic random sampling, so that all postgraduate students in the school would be included in the sample. In a systematic random sample, individuals are chosen at every 18^{th} from the postgraduate's master and Ph.D list to prevent a bias that would negatively affect the validity of the result of the experiment. This technique can reduce the appearance of bias in the distribution of questionnaires as well as in decision making. After the sample has been identified, then the questionnaires will be distributed by e-mail based on the proportion of the samples as in the Table 3.3 above.

3.4 Questionnaire Design

The method chosen in this study was self-administered questionnaires. According to Sekaran (2000), the questionnaires are the most useful as a data collection method when large numbers of people are to be reached in different geographical regions. Furthermore, questionnaires are a popular method of collecting data because researchers can obtain data fairly easily, and the questionnaire responses are easily coded. Self-administered questionnaire is appropriate to be used for this study due to the following; 1) it is a relatively cheaper method that can enhance the response rate

2) there are no sensitive questions involved in the study; 3) the questions are pretty straightforward and easy to understand; 4) the scale used is easy to understand and manage; and 5) brief and clear written instructions were given (Sekaran, 2003).

The questionnaires distributed to respondents who are postgraduate students of Universiti Utara Malaysia (UUM). The questionnaire was written in English languages. The questionnaire was divided into two sections. The first section (Section A) includes eight (8) questions based on the demographic information of the respondents. Demographic information that involved in Section A is gender, age, race, citizenship, program and school of study, years of experience in using computer and frequency of UUM e-library usage. Nominal scale will be used to measure the demographic factors involved because it is more appropriate and mutually exclusive.

While in the second section (Section B) will determine the perception of UUM postgraduate students towards UUM e-library usage which is consists of 21 items. In Section B, the respondents are required to rate their level of agreement with statements using a five-point Likert scales ranging from "strongly disagree" (1) to "strongly agree" (5). Overall, the questionnaire instrument used in this study consists of 29 items, including the demographic items comprise 8 items and perception respondents towards intention to use UUM e-library comprise 21 items. Please refer Appendix A (Questionnaire) for detail information.

3.5 Measurement of the Variables

There are five variables which consist of behavioral intention, perceived ease of use, perceived usefulness, terminology, screen design and navigation tested in this study. By the way, these entire construct were adapted from Jeong (2011), Thong et al. (2002), Hong et al. (2002) and Davis (1989). These scales have been validated and high reliability reported for each. Table 3.4 below shows the measurement of the variables which involved in this study.

Table 3.4
Measurement of the Variables

Variables	Operational Definition	Items	Number of Question	Source
Behavioral Intention	A degree to which a student is willing to use the UUM e-library or the probability that a student will participate in using the UUM e-library.	1. I intend to continue using UUM e-library in the future. 2. I will continue using UUM e-library in the future. 3. I will regularly use UUM e-library in the future. 4. I intend to increase my use of UUM e-library in the future.	4 items	Jeong (2011)
Perceived Usefulness	The degree to which a student believes that using the UUM e-library system may improve his or her learning performance.	1. Using UUM e-library would improve my learning performance. 2. Using UUM e-library would enhance my effectiveness in my learning. 3. Using UUM e-library would increase my learning productivity. 4. I find that UUM e-library is useful in my learning.	4 items	Davis (1989)
Perceived Ease of Use	The degree to which a student believes that using the UUM e-library would be free of	1. Using to use UUM e-library is easy for me. 2. My interaction with UUM e-library is clear and understandable.	4 items	Hong et al. (2002)

	effort.	3. It is easy for me to become skilful at using UUM e-library. 4. I find that UUM e-library is very easy to use.		
Terminology	A set of words, sentences, or expressions used in UUM e-library.	1. I understand most of the terms used throughout UUM e-library. 2. The use of terms throughout UUM e-library is consistent. 3. UUM e-library provides terms that are easy to understand.	3 items	Thong *et al.* (2002)
Screen Design	The visual appearance or general attractiveness of the UUM e-library site.	1. UUM e-library commands are well depicted by buttons and symbols. 2. The layout of UUM e-library screens is clear and consistent. 3. Fonts (style, colour, and saturation) are easy to read on-screen.	3 items	Thong *et al.* (2002)
Navigation	The way of discovering what relevant files or databases exist and where they are located in UUM e-library.	1. It is easy to navigate UUM e-library site. 2. In UUM e-library, I can easily navigate to where I want. 3. UUM e-library system's directions and navigations are clear.	3 items	Thong *et al.* (2002)

3.5.1 Behavioral Intention

Behavioral intention is the main objective of this research, which indicates the respondent's subjective probability that he or she is willing to use the subject in the future (Fishbein & Ajzen, 1975). In this study, the intention to use refers to the strength of the student's intention to accept of UUM e-library usage.

The construct of behavioral intention is developed by Thong et al. (2002). However, these items were adapted by Jeong (2011) for the purpose of this study towards the e-library. The construct of behavioral intention was operationalized on a five-point Likert scale format, ranging from '1' "strongly disagree" to '5' "strongly agree" with five self-rating items. Meanwhile this construct was measured based on four items which are "I intend to continue using UUM e-library in the future", "I will continue using UUM e-library in the future", "I will regularly use UUM e-library in the future" and "I intend to increase my use of UUM e-library in the future".

3.5.2 Perceived Usefulness

Perceived usefulness is a degree of a person who believed that using an online learning system will enhance his or her job performance (Chang & Tung, 2007). In this study, perceived usefulness of intention to use UUM e-library is defined as the student's assumption that the use of an UUM e-library system will enhance his or her learning performance.

The construct of perceived usefulness was developed from Davis (1989) study. Therefore, these items were adapted by Davis (1989) related to this study. It consisted of four self-rating items on a five-point Likert scale format, ranging from '1' "strongly disagree" to '5' "strongly agree". Meanwhile this construct was measured based on four items which are "using UUM e-library would improve my learning performance", "using UUM e-library would enhance my effectiveness in my learning", "using UUM e-library would increase my learning productivity" and "I find that UUM e-library is useful in my learning".

3.5.3 Perceived Ease of Use

Davis (1989) referred perceived ease of use as to how effortless he or she perceives using the technology in the future. On the other hand, Chang and Tung (2007) stated perceived ease of use is a degree of how effortless a person when they believe in using a particular system especially the online learning system. Perceived ease of use in an online learning system was defined as learner's perception of how easy it is in adopting the online learning system (Sun et al., 2008).

However, in this study, the perceived ease of use is the degree to which a UUM postgraduate student believes that the use of the UUM e-library will be effortless. When the application of the e-library is perceived to be easier to use, it is more likely to be accepted by the students.

The construct of perceived ease of use was measured with five self-rating items from Davis (1989) study. For the purpose of this study, these items were adapted by Hong et al. (2002) on a five-point Likert scale format, ranging from '1' "strongly disagree" to '5' "strongly agree". Meanwhile this construct was measured based on four items which are "using to use UUM e-library is easy for me", "my interaction with UUM e-library is clear and understandable", "it is easy for me to become skilful at using UUM e-library" and "I find that UUM e-library is very easy to use".

3.5.4 Terminology

According to Lindgaard (1994), terminology refers to the words, sentences, and abbreviations used by a system. In this study, terminology is a set of words or expressions used in the UUM e-library. Clear terminology increases the perceived usefulness and perceived ease of use of UUM e-library by providing effective communication of system instructions and responses to students.

The construct of terminology in this study was adapted from Thong et al. (2002). It consist of three self-rating items on a five-point Likert scale format, ranging from '1' "strongly disagree" to '5' "strongly agree". This construct was measured based on three items which are "I understand most of the terms used throughout UUM e-library", "the use of terms throughout UUM e-library is consistent" and "UUM e-library provides terms that are easy to understand".

3.5.5 Screen Design

Screen design refers to the visual appearance or general attractiveness of the site. In the context of this study, screen design is the way information is presented on the screen. Good screen design increases the perceived usefulness and perceived ease of use of UUM e-library by providing effective communication of system instructions and responses to the students.

The construct of screen design in this study was adapted by Thong et al. (2002). It consisted of three self-rating items on a five-point Likert scale format, ranging from

'1' "strongly disagree" to '5' "strongly agree". This construct was measured based on three items which are "UUM e-library commands are well depicted by buttons and symbols", "the layout of UUM e-library screens is clear and consistent" and "fonts (style, colour, and saturation) are easy to read on-screen".

3.5.6 Navigation

Navigation refers to the way of discovering what relevant files or databases exist and where they are located (Lindgaard, 1994). In this study, navigation refers to a site easy access to information of interest, the ability to move around within the system, or the ability to access other sites. Navigation clarity increases the perceived usefulness and perceived ease of use of UUM e-library by providing effective communication of system instructions and responses to the students.

The construct of navigation was operationalized with a three self-rating items and developed by Thong et al. (2002). Therefore, these items were adapted by Thong et al. (2002) into this study. Each item is accompanied by a five-point Likert scale format, ranging from '1' "strongly disagree" to '5' "strongly agree". Meanwhile this construct was measured based on three items which are "it is easy to navigate UUM e-library site", "in UUM e-library, I can easily navigate to where I want" and "UUM e-library system's directions and navigations are clear".

3.6 Data Collection Method

In this study, primary data were collected to address the research objectives. According to Zikmund (2002) primary data is the first-hand data communication and interaction with the representative sample of the population. This study decides to distribute questionnaires by electronic mail (e-mail). This was supported by Selwyn and Robson (1998), concluded that using e-mail as a research tool potentially offers researchers many advantages such as easy access to world-wide samples, low administration costs (both financially and temporally) and its unobtrusiveness and 'friendliness' to respondents.

A list of students was generated from the Department of Academic Affairs (HEA) of UUM. The list included names, matric numbers and e-mail addresses for the population of 7,814 postgraduate students enrolled in at least one online course during the February 2017 session. Then, a systematic random sampling method was employed in which 364 questionnaires were distributed to postgraduate students at OYAGSB, AHSGSAS and GSGSG by e-mail with assistance UUM Information Technology (UUMIT). The questionnaires responses (survey) have been conducted over a period of three weeks began on the 23rd March to 14th April 2017. Of the 364 questionnaires, 176 were received, which yielded a response rate of 48.4%.

Reliability is the degree to which measures are free from error and therefore yield consistent results (Zikmund, 1994). According to Sekaran (2000), the reliability of a measure indicates the extent to which the measure is without bias and hence offers consistent measurement across time and across the various items in the instrument.

Reliability is a measure of the internal consistency and stability of a measuring device. Internal consistency is the degree in which the items or questions about the measure consistently assess the same constructs. Each question should be aimed at measuring the same thing. Reliability analysis is done to improve the level of reliability of the survey instruments.

In this study, the reliability analysis has been done for all independent and dependent variables. Result of reliability test confers with pilot test and to be found significant with the coefficient reliability of cronbach's alpha. In order to predict the scale reliability for each factor, cronbach's alpha coefficient must be counted for each indicated factor.

According to Cavana et al. (2000), if possible, a questionnaire should be piloted with the reasonable sample of respondents who come from the target population or who closely resemble the target population. Therefore, pilot test has been done before conducting the research in order to determine the reliability of the instruments. A pilot study is important to be conducted to ensure the research instrument used is consistent and reliable. Consistency explains how the elements measuring a concept hold together as a set of instruments. Internal consistency of measures is assessed by using the cronbach's alpha reliability coefficient. According to Sekaran (2003) reported that cronbach's alpha is a reliability coefficient that reflects how well the items in a set are positively correlated to one another. In a nutshell, any reliability coefficient is in the range of 0.7 is acceptable and if 0.8 and above are considered good. In other words, the closer cronbach's alpha is to 1 the higher is the internal consistency reliability.

The pilot test was facilitated to 30 respondents of UUM students to make sure that prospective respondents understand the content in the way intended by the researcher. Over a period of one week, 30 valid surveys are completed, with additional comments duly noted for improvement of the questionnaire design. All 30 questionnaires are analyzed by using SPSS program to determine the reliability (Cronbach's alpha) of the independent and dependent variables. The result of the reliability analysis and the values of cronbach's alpha are stated in Table 3.5 below.

Table 3.5
Cronbach's Alpha Values for Reliability of the Variables

Variables	Number of Items	Cronbach's Alpha Values	
		Pilot Study (n=30)	Actual Analysis (n=176)
Intention to Use	4	0.879	0.937
Perceived Usefulness	4	0.821	0.863
Perceived Ease of Use	4	0.813	0.868
Terminology	3	0.843	0.855
Screen Design	3	0.801	0.838
Navigation	3	0.812	0.832

The result of the pilot test in Table 3.5 above indicates that cronbach's alpha for intention to use, perceived usefulness, perceived ease of use, terminology, screen design and navigation are 0.879, 0.821, 0.813, 0.843, 0.801 and 0.812 respectively, which means that all variables are said to be reliable and considered good. According to the result gathered, the cronbach's alpha values for all variables are close to 1 which indicates that this data has higher reliability of internal consistency (Sekaran, 2003). Therefore, the research instrument in this study is consistent and reliable and thus further distribution of questionnaires should have been done in order to gain the information needed.

The results for actual analysis of reliability in Table 3.5 shows that cronbach's alpha values for intention to use, perceived usefulness, perceived ease of use, terminology, screen design and navigation are 0.937, 0.863, 0.868, 0.855, 0.838 and 0.832 respectively, which means that all the variables are also said to be reliable. Since the values of cronbach's alpha are more than 0.8, therefore the strength of association is considered very well. As a result, the instrument used in this study is consistent and stable as presented in Appendix B (Reliability Analysis).

3.7 Normality of the Data

In multivariate research, Hair et al. (1998) suggested that normality of data is perceived as fundamentally one. The assumption of normality is a prerequisite for many inferential statistical techniques (Coakes & Steed, 2007). If the variation from the normal is sufficiently large, all resulting statistical tests are invalid because normality is required to use the F and t statistic (Hair et al., 2006). There are a number of different ways to explore this assumption, namely, histogram, stem-and-leaf plot, boxplot, normal probability plot, Kolmogorov-Smirnov statistic and Shapiro-Wilk statistic and Skewness and Kurtosis.

The normal distribution is particularly important because it provides the underlying basis for many of the inferences by researcher who collect data using sampling. Therefore, in this study, the researcher has been conducted a normality test to make sure the normality of the distribution and checking for outliers. For the purpose of this study, all the independent variables were tested by using SPSS to ensure no violation of normality assumption using the explore procedure under SPSS. Through

the normality test, the outliers were removed from the analysis. According to Hair et al. (2007), an outlier is a respondent that has one or more values that are distinctly different from the values of others respondents. Outliers also can impact the validity of the researcher's findings. Thus, this study eliminated the specific respondents to avoid distorting or misrepresenting the findings. Therefore, after removing the outliers, the results for normality can be accessed using the graphical analysis and statistical test of normality.

In this study, the first medium to acknowledge the normality of the data is using the graphical analysis. According to Hair et al. (2006), the most reliable approach to measure the normality of the data under graphical analysis is using the normal probability plot, which compares the cumulative distribution. The normal distribution forms a straight diagonal line and the plotted data values are compared with the diagonal. If the distribution is normal, the line representing the data distribution closely follows the diagonal. Based on Appendix C, almost all the data distributions are plotted closely follows the diagonal in the normal Q-Q Plot. Thus, it can be concluded that the data used in this study did not interrupt the normality assumption for the inferential analysis.

The second medium to assess the normality of the data is using the statistical test of normality. Normality also can be assessed to some extent by obtaining Skewness and Kurtosis values. According to Hair et al. (2006), a simple procedure for this test is based on the Skewness and Kurtosis values which available from the SPSS program. Skewness and Kurtosis are the most popular ways used by many researchers for describing the shape of the data distribution. Skewness and Kurtosis refer to the

shape of the distribution and are used with interval and ratio level data. Values for Skewness and Kurtosis are zero if the observed distribution is exactly normal (Coakes & Steed, 2007) as stated in Table 3.6. Then, values above or below zero denote departures from normality. Coakes and Steed (2007) also state that positive values for Skewness indicate a positive skew, while positive values for Kurtosis indicate a distribution that is peaked (leptokurtic). Negative values for Skewness indicate a negative skew, while negative values for Kurtosis indicate a distribution that is flatter (platykurtic).

Table 3.6
Values for Skewness and Kurtosis in Normality Test

Variables	Skewness Values	Kurtosis Values
Intention to Use	0.003	-0.922
Perceived Usefulness	-0.115	-0.898
Perceived Ease of Use	0.073	-0.498
Terminology	0.104	-0.845
Screen Design	0.560	-0.717
Navigation	0.101	-0.191

Based on Table 3.6, all of the values for Skewness and Kurtosis within the range +1 to -1, generally is accepted where means are zero. This result indicated that the data set has not violated the assumption of normality. Thus, it is shown that all variables are normally distributed. Overall, an inspection of the data revealed that there is no serious violation of the basic assumptions.

3.8 Data Analysis

After data collection, data processing was done before running the data analysis. Data processing involved steps such as coding the responses, data screening and selecting the appropriate data analysis strategy for hypothesis testing. Data screening was performed to identify data entry errors and to examine how appropriate data meets the statistical assumptions which involve missing data, treating outliers and descriptive statistics of variables. Missing data is an essential step before testing the collected data. It is considered a vital part before data analysis since data is often riddled with mistakes and data entry errors which could completely mess up the analysis result. Missing data refer to cases where valid values of one or more variables are entered by mistake or are not available for data analysis, especially in a multivariate analysis (Hair et al., 2006).

This study employed the Statistical Packages for Social Science (SPSS) software for both descriptive and inferential statistic. Descriptive statistic is used to interpret data in general, while inferential statistic is used for the purpose of hypothesis testing. Before that, the normality testing and outliers of data will be tested. Data collected can be analyzed using the inferential analysis through Independent Samples T-Test, Analysis of Variance (ANOVA) and Multiple Linear Regression.

3.8.1 Descriptive Statistics

This technique presents a description of the overall responses obtained, and at the same time, it was used to examine the data for erroneous entries. Frequency

distributions were obtained for all the personal data or classification variables. This analysis gives a clear meaning of data through frequency distribution, mean and standard deviation which is useful to identify differences among groups, for all the variables of interest, for instance the interval-scaled variables.

The frequencies computed to determine the percentage of the respondents' profile in terms of gender, age, race, citizenship, program and school of study, years of experience in using computer and frequency of UUM e-library usage. In order to measure the level of all variables, the mean score for each variable were computed as well as the standard deviation. The standard deviation is also important in indicating the level of each variable and also to point out the distribution of the score of the mean. According to Hair et al. (2007), the standard deviation describes the spread or variability of the sample values from the mean. If the value of standard deviation is small, therefore the responses in a sample distribution of number fall very close to the mean.

The test of differences is used in order to achieve the first research objectives in this study which is to investigate the differences of intention to use UUM e-library according to demographic factors (gender, age, race, citizenship, program and school of study, years of experience in using computer and frequency of UUM e-library usage). Therefore, for the purpose of this study, test of differences is conducted through the analysis of Independent Samples T-Test and One Way Analysis of Variance (ANOVA).

i. Independent Samples T-Test

This study used Independent Samples T-Test to compare the means of two independent groups. According to Coakes and Steed (2007), the Independent Samples T-Test is appropriate when the participants in one condition are different from the participants in the other condition. Before undertaking the T-Tests analysis, there are certain assumptions need to be evaluated because the accuracy of test interpretation depends on whether assumptions have been violated (Coakes & Steed, 2007). The generic assumption underlying of t-test are scale of measurement, random sampling and normality.

For the purpose of this study, independent samples t-test is applied in order to achieve the first objective hypothesis in terms of gender, citizenship and program of study. This test is applied to examine whether there are significant differences between (a) gender; (b) citizenship; and (c) program of study towards the intention to use UUM e-library.

ii. One-way Analysis of Variance (ANOVA)

A One-way Analysis of Variance (ANOVA) is an appropriate analysis to compare the means of more than two groups of independent variables. ANOVA is one of the inferential analysis tests that carry out to test if any of few variables mean are different from each other. ANOVA tests only provide information on whether there is a significant difference or not between group means being compared. If there are differences, ANOVA do not inform state which group mean is higher and which is

lower. To determine which mean is higher or lower, Post Hoc test should be conducted. The item statistics commonly used to test the Post Hoc is Tukey HSD. Before performing a One-way ANOVA test, certain requirements must be satisfied, namely, the data of distribution are normal and the data has the same variance (Coakes & Steed, 2007). This is to validate that all compared groups are originated from the same population.

In this study, an ANOVA analysis is conducted to examine whether there are significant differences between respondents' demographic (age, race, school of study, years of experience in using computer and frequency of UUM e-library usage) towards the intention to use UUM e-library.

iii. Multiple Regression

In order to achieve the second, third, and fourth research objectives, the use of regression for subsequent analysis is appropriate. The multiple linear regressions is used in the hypothesis to determine whether the independent variables explain a significant variation in the dependent variable; whether a relationship exists and set the mathematical equation relationship relating the independent and dependent variables (Malhotra, 2004). According to Coakes and Steed (2007), the result of regression is an equation that represents the best prediction of a dependent variable from several independent variables.

Thus, multiple regression analysis was used to establish the influence of interface characteristics (e.g. terminology, screen design and navigation) on the perceived

usefulness and perceived ease of use of UUM e-library and the influence of perceived usefulness and perceived ease of use of UUM e-library on intention to use. According to Coakes and Steed (2007), there are four main assumptions underpinning the use of regression which are (i) ratio of cases of independent variables; (ii) outliers; (iii) multicollinearity; and (iv) linearity, normality and homoscedasticity.

The interpretation of the regression analysis is based on the unstandardized coefficients (B) and R square (R^2) which provides evidence whether to support or not to support the hypotheses stated above. The R^2 obtained in the multiple regressions indicated the percentage of variance in the dependent variable that can be explained by the independent variables. The multiple regression analysis helps to understand how much of the variance in the dependent variable is explained by a set of predictors.

3.9 Conclusion

This chapter has discussed the details of the approaches adopted in this study. The measurements of the constructs were developed from the past literature and researches. This research made use of survey instruments to provide additional insight into these findings. The results of reliability analysis have shown that the questionnaire used was reliable and valid to assess the perceived usefulness, perceived ease of use, terminology, screen design and navigation and intention to use UUM e-library. Both descriptive and inferential analyses were used to analyze the data. All the steps starting from collecting the data until the tools to analyze the data

were discussed in this chapter. The next chapter would be the continuation of this chapter, which are findings of the data analysis.

CHAPTER FOUR
DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents the result of data analysis. There are four sections in this chapter. This chapter begins with the response rate. Secondly, it presents descriptive statistics analysis to describe the profile of the respondents. Then, it follows with the level of the variables. Finally, it ends with the results of hypothesis testing.

4.2 Response Rates

According to the sample size, a total of 364 questionnaires were distributed for data collection purposes. Out of 364 questionnaires distributed, 176 responses were received resulting in a response rate of 48.4%. According to Roscoe (1975) cited from the book written by Sekaran (2003), it is recommended that the sample size is greater than 30 and less than 500 are applicable to most studies. In addition, the previous research performed by Zainol, Shaari and Ali (2008) had obtained less than 100 questionnaires but still valid for conducting the analysis. Therefore, a total of 176 are sufficient for this research.

4.3 Profile of the Respondents

The respondents participated in this study consist of the UUM postgraduate students at OYAGSB, AHSGSAS and GSGSG. The respondents' profile was analyzed by using descriptive statistics analysis. Descriptive Statistics is conducted to explore the

data and describes the observations or an overview of the sample data collected. As shown in Table 4.1, the profile of the respondents covers the aspect of gender, age, race, citizenship, program and school of study, years of experience in using computer and frequency of UUM e-library usage.

Table 4.1
Profile of the Respondents

Items	**Category**	**Frequency (N=176)**	**Percentage (%)**
Gender	Male	77	43.7
	Female	99	56.3
Age	21 – 25 years	6	3.4
	26 – 430 years	56	31.8
	31 – 35 years	59	33.5
	36 – 40 years	26	14.8
	41 years old and above	29	16.5
Race	Malay	106	60.2
	Chinese	13	7.4
	Indian	8	4.5
	Others	49	27.8
Citizenship	Malaysian	127	72.2
	Non-Malaysian	49	27.8
Program of study	Master	91	51.7
	Ph.D/ DBA	85	48.3
School of study	OYAGSB	99	56.3
	AHSGSAS	44	25.0
	GSGSG	33	18.8
Experience of computer usage	3 – 4 years	2	1.1
	5 – 6 years	3	1.7
	7 – 8 years	13	7.4
	9 – 10 years	34	19.3
	> 10 years	124	70.5
Frequency of UUM e-library usage	More than once a day	19	10.8
	About once a day	30	17.0
	2 or 3 times a week	59	33.5
	About once a week	52	29.5
	About once in two weeks	16	9.2

Based on the Table 4.1 above, a total of 176 postgraduate students were involved in this study. 56.3% of them were female while the rest were male students (43.7%). The majority of the respondents were between 31and 35 years old (33.5%), followed

by the 26 and 30 years (31.8%) and above 40 years (16.5%). Then, it followed by respondents were between 36-40 years (14.8%), while the rest were between 21 and 25 years (3.4%). In addition, of the 176 students surveyed, 60.2% were Malay; nearly 27.8% were other than Malay, Chinese and Indian (Arabian, Indonesian & Nigerian), and the rest were Chinese (7.4%) and Indian (4.5%). In terms of citizenship, 72.2% of them were Malaysian and the remaining 27.8% were non-Malaysian.

Furthermore, as for program of study, 51.7% of the respondents were enrolled in the master program, while the rest were enrolled in Ph.D/ DBA program. Further, majority of the respondents were from OYAGSB (56.3%). Then, it followed by AHSGSAS (25%) and GSGSG (18.8%).

With regards to experience of computer usage, mostly respondents had experience of using computers with 70.5% having had more than 10 years of experience. Then, it followed by 19.3% of them had 9 to 10 years' experience, 7.4% of them had 7 to 8 years' experience, 1.7% of them had 5 to 6 years' experience and the remaining (1.1%) had 2 to 4 years' experience in using computer.

When this study tried to find out the experience of students with UUM e-library, it found out mostly the students use e-library about 2 or 3 times a week (33.5%), followed about once a week (29.5%) and about once a day (17%). Then, students utilize more than once a day is almost 10.8% while the rest were utilize e-library about once in two weeks (9.2%).

4.4 Descriptive Analysis

Descriptive statistics include the minimum and maximum value, means, range, standard deviation and variance for the interval scaled variables. This analysis has been used to analyze the level of intention, perceived usefulness, perceived ease of use, terminology, screen design and navigation. It also was used to identify the situation of each construct (dependent and independent variables) such as mean and standard deviation.

4.4.1 Mean of Variables

The mean values of the variables were obtained by the measure on a five-Likert scale, which means the greater the number of the five point scale, the greater the goodness of the variable will be. Values nearer to five are considered better, while values close to zero are considered bad. A mean value equal or more than four shows a high agreement with a particular criterion; a mean value equal or less than two were considered as low, and a mean value of three was considered as a moderate agreement. A descriptive analysis of all the six variables is illustrated in Table 4.2.

Table 4.2
Mean of the Variables

Variables (N=176)	Minimum	Maximum	Mean	Std. Deviation
Intention to Use	3.00	5.00	4.16	0.61
Perceived Usefulness	3.00	5.00	4.13	0.51
Perceived Ease of Use	3.00	5.00	4.09	0.57
Terminology	3.00	5.00	4.07	0.60
Screen Design	3.00	5.00	4.10	0.54
Navigation	3.00	5.00	4.03	0.51

Table 4.2 illustrates the minimum, maximum, mean and the standard deviation of the model variables. The mean values of the intention to use, perceived usefulness, perceived ease of use, terminology, screen design and navigation range between 4.03 and 4.16. As a result, all the values are considered high.

The level of intention to use UUM e-library is quite high where mean value is 4.16. This shows that the students generally have higher intention to use UUM e-library. However, it depends on the independent variables that have a high agreement towards intention to use e-library.

The highest mean value of independent variable (belief variable) was obtained by perceived usefulness at 4.13 implying that the perceived usefulness factor has a high level of perception compared to the perceived ease of use which has a mean value of 4.09. With regards to interface characteristics, the highest mean value of external variables was obtained by screen design at 4.10, then followed by terminology and navigation with the mean for each variable are 4.07 and 4.03 respectively. All the independent variables are considered highest of the mean values.

4.5 The Differences of Intention to Use UUM e-Library in terms of Demographic Factors

In order to answer the first research questions, whether there are any differences between respondent's demographic profiles (i.e. gender, age, race, citizenship, program and school of study, years of experience in using computer and frequency of UUM e-library usage) towards intention to use UUM e-library, the test of differences was conducted through Independent Sample T-Test and One-way ANOVA.

4.5.1 The Difference of Intention to Use UUM e-Library among to Gender

The result from Independent Samples T-Test analysis in Table 4.3 indicates that the differences of mean and standard deviation between male and female towards the intention to use UUM e-library are relatively small. The mean difference is 0.52 while the t-value is 6.132 and its significant level is less than 0.05. Since, the significance level (p-value=0.000) is less than the acceptable level of 0.05, therefore finding concludes that there is significant difference of intention to use UUM e-library according to gender. The result also shows that female students are higher of intention to use UUM e-library compared to the male students.

Table 4.3
The Difference of Intention to Use UUM e-Library according to Gender

Gender	Mean	Std. Deviation	t-Value	Sig.
Female	4.38	0.55	6.132	**0.000**
Male	3.86	0.57		

4.5.2 The Difference of Intention to Use UUM e-Library in terms of Citizenship

The result from Independent Samples T-Test analysis in Table 4.4 indicates that the differences of mean and standard deviation between Malaysian and non-Malaysian towards the intention to use UUM e-library are relatively small. The differences of mean and standard deviation are 0.01 and 0.183 respectively while the t-value is 0.049 and its significant level is greater than 0.05. The significance level (p-value=0.961) is greater than the acceptable level of 0.05. Therefore, the finding concludes that there is no significant difference of intention to use UUM e-library

among citizenship. The result also shows that Malaysian students are higher of intention to use UUM e-library compared to the non-Malaysian students.

Table 4.4
The Difference of Intention to Use UUM e-Library in terms of Citizenship

Citizenship	Mean	Std. Deviation	t-Value	Sig.
Malaysian	4.16	.661	0.049	**0.961**
Non-Malaysian	4.15	.478		

4.5.3 The Difference of Intention to Use UUM e-Library in terms of Program of Study

Table 4.5 below indicates that the differences of mean and standard deviation between Master and Ph.D/ DBA towards the intention to use UUM e-library are relatively small. The differences of mean and standard deviation are **0.18** and 0.081 respectively while the t-value is 1.974 and its significant level is greater than 0.05. Since, the significance level (p-value=0.056) is greater than the acceptable level of 0.05. Hence, the finding concludes that there is no significant difference of intention to use UUM e-library among program of study. The result also shows that Ph.D students are higher of intention to use UUM e-library compared to the Master students.

Table 4.5
The Difference of Intention to Use UUM e-Library in terms of Program of Study

Program of Study	Mean	Std. Deviation	t-Value	Sig.
Ph.D / DBA	4.25	.566	-1.974	**0.056**
Master	4.07	.647		

4.5.4 The Difference of Intention to Use UUM e-Library among Age

Based on Table 4.6 shows that the value of F is 8.075 and significance value is 0.000. Since the significance value is less than 0.05 ($p<0.05$), thus this indicates there is a significant difference of intention to use UUM e-library among age. The result also presents that the students' age group of 21– 25 years are higher of intention to use UUM e-library compared to the others. Then, it is followed by the students' age group 41 years and above, 26 – 30 years, 31 – 35 years and 36 – 40 years.

Table 4.6
The Difference of Intention to Use UUM e-Library among to Age

Demographic Factor	Category	Mean	Std. Dev.	F	Sig.
Age	21 – 25 years	4.89	0.08		
	41 years old and above	4.53	0.51		
	26 – 30 years	4.12	0.60	8.075	**.000**
	31 – 35 years	4.00	0.63		
	36 – 40 years	4.00	0.47		

In order to determine the difference of intention of students' age group, Tukey's table was observed. Based on Tukey's table in Appendix E(ii), the result found that there are significant difference of intention to use UUM e-library between the students' age group of 21–25 years with the students' age group of 26–30 years, 31–35 years and 36–40 years. It also shows that there are significant difference of intention to use UUM e-library between the students' age group of 41 years old and above with the students' age group of 26–30 years, 31–35 years and 36–40 years.

4.5.5 The Difference of Intention to Use UUM e-Library among to Races

Based on Table 4.7 above shows that the value of F is 13.680 and significance value is 0.000. Since the significance value is less than 0.05 ($p<0.05$), this study concludes that there is a significant difference of intention to use UUM e-library among races. In other words, intention to use UUM e-library is not the same but it depends on type of the races of respondents.

Table 4.7
The Difference of Intention to Use UUM e-Library among Race

Demographic Factor	Category	Mean	Std. Dev	F	Sig.
Race	Chinese	4.79	0.336	13.680	.000
	Malay	4.15	0.624		
	Others	4.15	0.478		
	Indian	3.19	0.116		

The result also presents that Chinese students are higher of intention to use UUM e-library compared to the Malay, Indian and others. Then, it is followed by Malay students and other than Chinese and Malay students. However, Indian students are lower of intention to use UUM e-library compared to the others.

In order to determine the difference of students' race group, Tukey's table was observed. Based on Tukey's table in Appendix E(ii), the result found that there are significant difference of intention to use UUM e-library between the Malay students with the Chinese and Indian students. It also shows that there are significant difference of intention to use UUM e-library between the Chinese students with the Indian and others students. Others students in this study are intended for students who are Arabians, Indonesian and Nigerians. Furthermore, it also indicates that there

are significant differences of intention to use between the others students with the Indian and Chinese students.

4.5.6 The Difference of Intention to Use UUM e-Library among School of Study

Table 4.8 shows that the value of F is 32.823 and significance value is 0.000. Since the significance value is less than 0.05 ($p<0.05$), Therefore, this study concludes that there is a significant difference of intention to use UUM e-library among school of study. In other words, intention to use UUM e-library is not the same but it depends on school of study of students.

Table 4.8
The Difference of Intention to Use UUM e-Library among School of Study

Demographic Factor	Category	Mean	Std. Dev	F	Sig.
School of Study	OYAGSB	4.44	0.560		
	GSGSG	3.80	0.660	32.823	**.000**
	AHSGSAS	3.79	0.269		

The result also presents that OYAGSB students are higher of intention to use UUM e-library compared to the others. Then, it is followed by GSGSG students and AHSGSAS students. In order to determine the difference of school of studys' group, Tukey's table was applied. Based on Tukey's table in Appendix E (ii), the result found that there are significant differences of intention to use UUM e-library between the OYAGSB students with the GSGSG and AHSGSAS students.

4.5.7 The Difference of Intention to Use UUM e-Library according to Experience of Computer Usage

Based on Table 4.9 shows that the value of F is 2.264 and significance value is 0.064. Therefore, this study concludes that there is no significant difference of intention to use UUM e-library among experience of computer usage. The result also presents that students are using computer about 3–4 years are higher of intention to use UUM e-library compared to the other students. Then, it is followed by students in using computer more than 10 years, 9–10 years, 7–8 years and 5–6 years.

Table 4.9
The Difference of Intention to Use UUM e-Library according to Experience of Computer Usage

Demographic Factor	Category	Mean	Std. Dev	F	Sig.
Experience of Computer Usage	3 – 4 years	5.00	0.000	2.264	**.064**
	> 10 years	4.18	0.591		
	9 – 10 years	4.16	0.651		
	7 – 8 years	3.90	0.650		
	5 – 6 years	3.58	0.577		

4.5.8 The Difference of Intention to Use UUM e-Library aecording to Frequency of UUM e-Library Usage

Based on Table 4.10 shows that the value of F is 16.651 and significance value is 0.000. Since the significance value is less than 0.05 ($p<0.05$), thus the study concludes that there is significant difference of intention to use UUM e-library among frequency of UUM e-library usage. The result also presents that students are using UUM e-library more than once a day are higher of intention to use UUM e-library compared to the others. Then, it is followed by students in using UUM e-library about 2 or 3 times a week, about once a day and about once a week.

Furthermore, it also found that students are using UUM e-library about once in two weeks are lower of intention to use UUM e-library compared to the others.

Table 4.10
The Difference of Intention to Use UUM e-Library according to Frequency of UUM e-Library Usage

Demographic Factor	Category	Mean	Std. Dev	F	Sig.
Frequency of UUM e-Library Usage	More than once a day	4.79	0.303		
	2 or 3 times a week	4.29	0.603		
	About once a day	4.22	0.579	16.651	**.000**
	About once a week	3.95	0.488		
	About once in two weeks	3.47	0.437		

There are significant differences of intention to use UUM e-library between the students in using UUM e-library more than once a day with the other groups. It also presents that there is a significant difference of intention to use UUM e-library between the students in using UUM e-library about once a day with the students in using UUM e-library about once in two weeks. Furthermore, it also found that there is a significant difference of intention to use UUM e-library between the students in using UUM e-library about 2 or 3 times a week with the students in using UUM e-library about once a week and once in two weeks.

4.6 Assumption for Multiple Regression Analysis

According to Coakes and Steed (2007), there are four main assumptions underpinning the use of regression. The first assumption needed in regression is the ratio of cases to independent variables. The number of cases needed should ideally have twenty (20) times more cases than predictors and the minimum requirement is to have at least five times more cases than independent variables. According to this

study, there are five of independent variables and the number of respondents is 176 students which indicate around 35 times more cases than independent variables. Hence, there is no violation of the first assumption.

The second assumption for regression is outliers. The situation whereby there are extreme cases that considerable impact on the regression solution and should be deleted or modified to reduce their influence. For the multivariate analysis technique, the outliers can be deleted using statistical methods such as *Mahalanobis* distance values, and graphical methods such as residual scatter plots. Based on residual scatter plots and standardized residual values (refer Appendix E (iii)) indicated that there are no multivariate outliers among the independent variables.

The third assumption in regression is no multicollinearity. According Coakes and Steed (2003), multicollinearity refers to high correlations among the independent variables. Multicollinearity is a matter of degree, not a matter of presence or absence where the higher the degree of multicollinearity the greater the likelihood of the disturbing consequences of multicollinearity (Coakes & Steed, 2003). According to Hair et al. (2006), the most common measures for assessing multicollinearity are tolerance value and variance inflation factor (VIF) value. If the value of tolerance is greater than 0.1, and the value of variance inflation factor is between 1 and 10 ($1<VIF<10$), it means that this variable may not produce multicollinearity problems (Fauzi *et al.*, 2014). Other than that, according to Hair et al. (2010), it suspected that there is no multicollinearity ($r < .90$) if there is a low level correlation among independent variables (usually less than 0.90).

Refer to table Coefficients in Appendix E (iii), it indicated that all the values of tolerance are ranging from 0.515 and 0.644. It also indicated that the values of VIF for all variables ranging from 1.552 to 1.941. Since all of the tolerance values are greater than 0.1, and the VIF values are greater than 1 and lower than 10, it can be concluded that all the variables do not indicate a problem with multicollinearity.

Last assumption in regression is linearity, normality and homoscedasticity. The linearity is easily examined through the scatterplot of residuals against predicted values. Based on the three scatter plots in Appendix E (iii), it indicated that there is no clear relationship between the residuals and the predicted values, consistent with the assumption of linearity. The normal plot of regression standardized residuals for the dependent variable also indicated a relatively normal distribution.

Furthermore, the test for homoscedasticity that deals with the equality of the variance at all value for dependent and independent variables. From the scatter plots in Appendix E (iii), the shape of the cluster can be considered even from one end to the other. Thus, there is no violation of the homoscedasticity assumption.

From the above discussion, it has been proven that all the assumptions were not violated in this study. Hence, the multiple linear regression analysis could be used to examine the influence of perceived usefulness and perceived ease of use of UUM e-library on intention to use and the influence of interface characteristics (e.g. terminology, screen design and navigation) on the perceived usefulness and perceived ease of use of UUM e-library.

4.6.1 The Influence of Perceived Usefulness and Perceived Ease of Use towards Intention to Use UUM e-Library

Based on Table 4.11 below, the R square (R^2) value is the statistic that provides some information about the goodness of the model. The value of R^2 is 0.546. This finding indicates that 54.6% of the variation in the dependent variable explained by the independent variables. Generally, the higher value of R square, the better the model fits with the data.

Table 4.11

Result of the Influence of Perceived Usefulness and Perceived Ease of Use towards Intention to Use UUM e-Library

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.339	.268		1.262	.209
Perceived Usefulness (H1)	.764	.083	.630	9.182	**.000***
Perceived Ease of Use (H2)	.160	.073	.150	2.186	**.030***

Dependent Variable = Intention to use UUM e-library;
F-value = 104.021; Significant value = 0.000
R^{2} = 0.546;
Note: Sig. 0.05*

As per the Table 4.11 above, since significant values is less than 0.05 ($p<0.05$). It is evident that perceived usefulness has a significant influence towards the intention to use UUM e-library (Beta = 0.630, sig. = 0.000). Thus, the first hypotheses (H_1) is supported.

On the other hand, perceived ease of use has a significant influence towards the intention to use UUM e-library (Beta = 0.150, sig. = 0.030) based on Table 4.11 above. Since significant values is less than 0.05 ($p<0.05$), the second hypotheses (H_2) is supported.

4.7 The Influence of Interface Characteristics on the Perceived Usefulness of UUM e-Library

R square (R^2) value from Table 4.12 is 0.427. Therefore it indicates that almost 42.7% of the variation in perceived usefulness of UUM e-library explained by variation in terminology, screen design and navigation.

Table 4.12
Result of the Influence of Interface Characteristics on the Perceived Usefulness of UUM e-Library

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.228	.268		4.586	.000
Terminology	.184	.068	.216	2.685	**.008***
Screen Design	.371	.067	.396	5.509	**.000***
Navigation	.158	.072	.161	2.212	**.028***

Dependent Variable = Perceived usefulness of UUM e-library
F-value = 42.777; Significant value = 0.000
R^2 = 0.427;
Note: Sig. 0.05*

As depicted in Table 4.12, since significant values is less than 0.05 ($p<0.05$). It is indicates that terminology has a significant influence on perceived usefulness of UUM e-library (Beta = 0.216, sig. = 0.008). Therefore, the third hypotheses (H_3) is supported. Next result for testing forth hypotheses shows that screen design has a significant influence on perceived usefulness of UUM e-library (Beta = 0.396, sig. = 0.000). The fourth hypotheses (H_4) also supported. The results of the multiple linear regression also shows that navigation has a significant influence on perceived usefulness of UUM e-library (Beta = 0.161, sig. = 0.028). Therefore, the fifth hypotheses (H_5) is supported.

Based on the finding in this study, it indicates that screen design (Beta=0.396) was the most influential predictor on the perceived usefulness of UUM e-library, followed by terminology (Beta=0.216) and navigation (Beta=0.161).

4.8 The Influence of Interface Characteristics on the Perceived Ease of Use of UUM e-Library

With respect to the overall model in Table 4.13, the R square (R^2) value is 0.450 indicating that almost 45.0% of the variation in perceived ease of use of UUM e-library explained by variation in terminology, screen design and navigation.

Table 4.13
Result of the Influence of Interface Characteristics on the Perceived Ease of Use of UUM e-Library

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.979	.298		3.291	.001
Terminology	.455	.076	.472	5.991	**.000***
Screen Design	.241	.075	.227	3.219	**.002***
Navigation	.068	.080	.061	.849	**.397***

Dependent Variable = Perceived ease of use of UUM e-library
F-value = 46.851; Significant value = 0.000
R^2 = 0.450;
Note: Sig. 0.05*

Based on the Table 4.13 above, the results indicate that terminology has a significant influence on perceived ease of use of UUM e-library (Beta = 0.472, sig. = 0.000). Thus, the sixth hypotheses (H_6) is supported. For the next hypotheses testing (H_7), screen design proved that it has a significant influence on the perceived ease of use of UUM e-library (Beta = 0.227, sig. = 0.002). This indicates that the higher interface in terms of screen design will lead to higher perceived ease of use of UUM

e-library. Therefore, the seventh hypotheses (H_7) is supported. Nevertheless, navigation did not prove to be a significant predictor on the perceived ease of use of UUM e-library (Beta = 0.061, sig. = 0.397). Therefore, based on table 4.13 above, the eighth hypotheses (H_8) is not supported.

The findings showed that there are two variables that give the most influence towards perceived ease of use which are terminology and screen design where both give a higher Beta value of 0.472 and 0.227 respectively. Meanwhile, navigation becomes the third most influential of the perceived ease of use where the Beta value is 0.061 but do not give a significant value 0.05. Thus, this study can be concluded that terminology is more influential than screen design on the perceived ease of use of UUM e-library. Meanwhile, navigation has not influence on the perceived ease of use of UUM e-library.

4.9 Summary

In conclusion, the Independent Sample t-Test and ANOVA analysis showed that there are significant difference of intention to use UUM e-library according to demographic factors which are gender, age, race, school of study and frequency of UUM e-library usage. In addition, the result of the multiple regression analysis indicated that both perceived usefulness and perceived ease of use had significant positive effect on intention to use UUM e-library. Further, perceived usefulness was a much stronger predictor of the intention to use the UUM e-library as compared to the perceived ease of use. In addition, interface characteristics strongly influence the perceived usefulness and perceived ease of use of UUM e-library. Nevertheless, navigation clarity not approved as significant influence on the perceived ease of use

of UUM e-library. Overall, the hypotheses testing results are summarized in Table 4.14.

Table 4.14
Summary of Hypotheses Testing

Hyp	Statement	Finding
H_1	Perceived usefulness has significant influence towards intention to use UUM e-library.	Supported
H_2	Perceived ease of use has significant influence towards intention to use UUM e-library.	Supported
H_3	Terminology has significant influence on perceived usefulness of the UUM e-library.	Supported
H_4	Screen design has significant influence on perceived usefulness of the UUM e-library.	Supported
H_5	Navigation has significant influence on perceived usefulness of the UUM e-library.	Supported
H_6	Terminology has significant influence on perceived ease of use of the UUM e-library.	Supported
H_7	Screen design has significant influence on perceived ease of use of the UUM e-library.	Supported
H_8	Navigation has significant influence on perceived ease of use of the UUM e-library.	Not Supported

CHAPTER 5
DISCUSSION AND RECOMMENDATIONS

5.1 Introduction

This chapter discusses further on the output of this study to answer the research questions. It begins with the discussion of the findings. Then, this chapter presents the contribution of the study. Finally, several limitations and recommendations for future research have also been suggested.

5.2 Discussion of the Findings

This study investigates the influence of interface characteristics which are terminology, screen design and navigation on the perceived usefulness and perceived ease of use of UUM e-library and the influence of perceived usefulness and perceived ease of use of UUM e-library on intention to use among UUM post-graduate students.

5.2.1 The Differences of Intention to use UUM e-library Among Demographic Factors

The findings of this study indicate that there are significant difference of intention to use UUM e-library among demographic factors which are gender, age, race, school of study and frequency of UUM e-library usage among postgraduate students. However, there are no significant differences of intention to use UUM e-library among citizenship, program of study and experience of computer usage by the postgraduate students. In addition, results of this study build on those of previous

studies which have explored demographic factors which influence users' perceptions of e-libraries (Blackman, 2003; Brandt, 2008; De Rosa et al., 2006; Koohang & Ondracek, 2005).

The observation of this finding indicates that female students were higher of intention to use UUM e-library compared to the male students. This finding is in contrast to Blackman (2003) who found no difference according to gender and satisfaction with online library resources, but is consistent with the findings of Koohang (2004). Koohang found a significant difference in gender; however, his results indicate males scored higher on their perceptions toward use of the digital library. Females represented nearly 70% of those who participated in the Virtual Patron Library Survey which may have contributed to the gender difference.

With regard of ages, students in the 21-25 age categories were found to be significantly more intent towards UUM e-library resources than their peers in other age groups. This indicates that those who frequently used electronic resources were the younger generation. This generation is generally able to multitask, learn systems without consulting manuals, and surf the web however they lack technology and information skills appropriate for academic work. On contrarily however, Blackman (2003) who compared age and satisfaction with distance library resources found no significant difference for age groups when investigating satisfaction with online library resources. The findings also contrast to Koohang (2004) who explored perceptions toward the use of the digital library. Koohang found no significant difference for age. In addition, Chinese students indicated that they were higher of intention to use UUM e-library compared to the others race. Even though remarkable

efforts have been set into integrating technology especially personal computers into the daily lives of the students the level of technology among education student remains low (Ramayah et al., 2005). There are many factors contributing to underutilization. Factors such as cost of PC, availability of computer lab, motivation of the students, computer literacy hinder the total use (Ramayah et al., 2002). Mostly, the postgraduate students from OYAGSB were found to be significantly more intent to use UUM e-library compared to the other schools. This could be attributed to the fact that the postgraduate students in OYAGSB were more exposed and had more opportunities to the use of e-library for course related activities.

Next, the study revealed that students who rated themselves as more experienced with computer were found to be insignificantly difference of intention to use UUM e-library than those with limited experience. Students` reported computer experience not correlated positively with their intention to use UUM e-library. This finding is consistent with other study related to computer experience and the use of digital information systems (Blackman, 2003). Conversely, the results are in contrast to previous studies (Koohang, 2004; Koohang & Ondracek, 2005; Park et al., 2009; Sahin & Shelley, 2008) who found significant difference for computer experience and student satisfaction with an e-library. These findings also showed that there are no significant differences of intention to use UUM e-library according to citizenship, program of study and experience of computer usage. This means that all groups of citizenship, program of study and experience of computer usage had equally perceived that the use of the UUM e-library was a positive learning experience.

5.2.2 The Influence of Perceived Usefulness and Perceived Ease of Use towards Intention to Use UUM E-Library.

The following section discussed in further details regarding the influence of perceived usefulness and perceived ease of use towards intention to use UUM e-library. It is clearly indicate that the TAM appears to provide researchers of e-library systems a theoretically sound and parsimonious model with which they can predict users' intention to use. Consistent with prior researches (Davis, 1989; Hu et al., 1999; Jeong, 2011; Thong et al., 2002), this study showed that both the perceived ease of use and perceived usefulness have significant positive influence on intention to use. The present research also found that perceived usefulness and the perceived ease of use are strong predictors of intention to use. Hence, this finding answered the first research question of this study.

Nevertheless, the effect of usefulness is stronger than ease of use. This finding is parallel with the findings of the study by Jeong (2011), Thong et al. (2002) and Qutab (2016). It implies that students perceive the use of UUM e-library as a valuable resource. The possible justification may be that research students always work with time limits and therefore look to the system usefulness of the e-libraries and not its easiness. According to Jeong (2011), users prefer usefulness of a digital library over its ease of use if they perceive its resources relevant to their information needs. Thus, contents and resources of e-libraries must be matching with users' information needs to increase its usefulness. It may further make the system easy to use and probably prompt users towards the use of e-libraries.

Based on this study, e-library systems can be made more useful by having relevant content. When postgraduate students perceived that the e-library system was useful for their studies, they were more likely to use the system. Additionally, postgraduate students who found the system both easy to operate and useful were likely to adopt the e-library system. It seems reasonable that the quality of an e-library system and its relevance provided better opportunities for users to increase their behavioral intentions to use an e-library system (Hong et al., 2002; Thong et al., 2002).When an e-library system is feasible, users will adopt a positive behavioral intention towards the e-library system. Thus, for e-library systems to become successful, developers must focus their attention on designing systems that are both useful and easy to use.

5.2.3 The Influence of Interface Characteristics on Perceived Usefulness of UUM e-library.

This study has revealed that interface characteristics which are terminology, screen design and navigation have significant influence on the perceived usefulness of UUM e-library. However, the results are not supporting the findings of the study by Jeong (2011) who posited that all three indicators of interface characteristics did not have positive predictors of usability of the e-library. This finding indicates that 42.7% of the in perceived usefulness of UUM e-library explained by variation in screen design, terminology and navigation. The result also shows that good screen design was the most influential predictor on the perceived usefulness of UUM e-library, followed by terminology clarity and navigation clarity. Consequently, the second research question is answered. This means that the higher the clarity of terminology used in the UUM e-library, the higher the perceived usefulness. Good screen design will also increase perceived usefulness, which it indicated good screen

design helped user to find usefulness of e-library. The same goes for clarity in navigation, the higher the navigation clarity affect the higher the perceived usefulness of intention to use UUM e-library among postgraduate students.

5.2.4 The Influence of Interface Characteristics on Perceived Ease of Use of UUM e-library

Among the 3 interface characteristics factors, only terminology and screen design have a significant influence on the perceived ease of use of UUM e-library. However, navigation did not prove to be a significant predictor on the perceived ease of use of UUM e-library. Finally, the third research question is answered.

Terminology and screen design were found to be positive influence of perceived ease of use, which is similar to the findings of Hassan and Sheik Ali (2014), Jeong (2011), Ramayah (2006a) and Thong et al. (2002). Among them, terminology has the strongest influence on perceived ease of use of e-library, which suggests that clear terminologies minus jargon should be the order of the day. This observation is consistent with the findings by Hassan and Sheik Ali (2014), Ramayah (2006a) and Thong et al. (2002). Similarly, the results indicated that effect of terminology on easy use is higher than its usefulness. The results are parallel with the findings of Qutab (2016) who established that terminology higher influence on ease of use than usefulness.

Thong et al. (2002) suggested that clear terminology increases the perceived ease of use of an e-library by providing effective communication of system instructions and responses to users. They also suggested that if system designers want the user to find the system easy to use, clear and understandable, terminology will reduce search

efforts and ensure fast and efficient search of information. This clear technology will provide an easy system to the users. To attain best adaptation of the system, jargons and technical terms should be excluded. In addition, if the system's vocabulary is matched with user's language, terminology clarity will be achieved. Once terminology clarity is present, then it would make it easier for end-users to use the digital library.

In addition, screen design was also found to be a significant predictor of perceived ease of use of e-library. This is due to the fact that most users are new to digital library, though they are familiar with the use of computers. Furthermore, screen design would affect the perceived ease of use of digital library in view of the fact that postgraduate students are more interested in searching for information. Thus, the findings are consistent with the finding of the study conducted by Hassan & Sheik Ali (2014), Jeong (2011), Ramayah (2006a) and Thong et al. (2002), which found that screen design contributed significantly to the perceived ease of using digital library. According to Thong et al. (2002), screen design is very much related to the arrangement of the content in terms of layout, color schemes, format of paragraphs, icons, buttons, font sizes, and line spacing. Consistency should be maintained at all times and across all screens. Finally, feedback can be obtained from users to ensure that they both like the screen layout and understand each functional field correctly. Therefore, management of Sultanah Bahiyah Library, UUM should pay attention to both the overall arrangement of design features and to their details.

Meanwhile, navigation has not significant influence on perceived ease of use of e-library. This result is somehow not consistent with the assertions by Jeong (2011),

Ramayah (2006a) and Thong et al. (2002). Thus, it is suggested that proper navigational techniques should be provided in UUM e-library with the purpose; 1) to circumvent the searching uncertainty and; 2) to inform users about their searching paths. It is further inferred that even if a e-library is valuable but complex to utilize, the users may not utilize. At later stages, it is possible that users may suspend the adoption of e-libraries. In line with this, Ramayah (2006a) stated that the design should take into consideration the ease of navigation among the different services provided. Proper cues, such as navigation aids, should be incorporated to help users who get into trouble while navigating the increasingly complex web of online libraries. Concrete and descriptive labels can help users make more efficient navigation decisions when searching for information. To help users follow the logic flow of the system and reduce cognitive load, broad and shallow structures are preferred to narrow and deep ones. A shallow structure will enable users to reach their final inquiry results with a smaller number of steps as compared to a deep structure, and therefore require less cognitive effort from the users to keep track of their searching paths. The removal of unnecessary or redundant screens will also help to keep the navigation flow simple and unambiguous. However, this finding is in line with the findings of the previous studies (Jeong, 2011; Ramayah, 2006a; Thong et al., 2002; Qutab 2016).

5.3 Contributions of the Study

The findings of this study have meaningful managerial contributions to library management and theoretical contribution to prospective researchers.

5.3.1 Theoretical Contribution

From a managerial standpoint, the findings of this study reveal that, in order to foster individual intention to use a technology, positive perception of the technology's usefulness is crucial, whereas the students' attitude toward using the technology may not be equally important. Training and information sessions on e-library need to focus primarily on how the technology can help improve the efficiency and effectiveness of students' learning process rather than on the procedures of actual use of the technology. In conclusion, TAM is not a descriptive model, that is, it does not provide diagnostic capability for specific flaws in technology, and it can serve the purpose of evaluating and predicting technology acceptability.

This study highlighted the interface characteristics as an external factor in utilizing e-library. This is important because for instance given that terminology clarity is the most influential determinant of user perceptions of ease of use, it is highly recommended to prevent use of technical jargon in the interface of the databases and on the Web pages that provide links to the databases. In fact, the terms used in the interface of the databases may affect ease of use more than any other system features.

5.3.2 Practical Contribution

In addition, an important contribution is the use of a preeminent intention-based model in an educational context, which differs considerably from the business organizations ordinarily studied in previous research. The results of this study provide the following key inputs to the library for better planning of e-library system.

Overall, this study ascertained the determinants of the intention to use e-library among their users. The study has also contributed to the existing knowledge related to online library theory and practice. It is hoped that more similar research can be conducted on the use of this important and emerging e-library system.

This study also recommends the university management should strive to make an effort to upgrade the digital library system to be more users friendly so that it will be more easy to use by students. Other than that, the institution can also organize a kind of training workshop at least once in a semester for the postgraduate students in order to enable them effectively utilize and benefit from this library technology. Consequently, the library management should provide a feedback stock which will serve as a means for users' responses on the performance of each digital item or content and the level of satisfaction derived.

Lastly, it would be helpful if library management could provide a comprehensive and up-to-date manual to assist new students in utilizing e-library in future.

5.4 Limitations and Recommendations for Future Research

Notwithstanding, this study provides significant contributions to the literature, it has also two main limitations, which provide support for future studies.

Firstly, the sample in this study involved specific user group in specific locations which is the postgraduate students of UUM. Thus, the findings of this study could not be generalized to other user groups in other geographical areas. Consequently,

future studies are suggested to include e-library usage intention from diverse view by adding more samples from other categories of users from different parts of the country.

Secondly, the determinants used in this study are limited. For this reason, future studies could apply more set of predictors, not only interface characteristics factors, but also other potential factors. These other factors must be appropriate and meet the concept of e-library. For instance, organizational content (e.g. system accessibility, system visibility), system characteristics (e.g. system quality, relevance) and individual difference (e.g. knowledge of domain, self-efficacy, and computer experience) may also be investigated. Importantly, these determinants or external variables are expected to prepare a better explanation for the intention e-library usage. Notwithstanding these limitations, the study provides a key benefit to libraries of the university.

The findings in this study, however, suggest that different characteristics of a system can have different effects on perceived ease of use and perceived usefulness. Therefore, future research that wants to study the effect of the system should specify the individual system characteristics and identify their potential effects on perceived ease of use and perceived usefulness. Similarly, although usability includes the concepts of both ease of use and usefulness, the individual usability factors may have their own properties and affect either one or both of the beliefs. Therefore, there is a need to examine the effect of specific system characteristics individually.

In addition, considering that perceived usefulness is a major determinant of intention to use e-library, it is recommended that practitioners offer managerial support to promote positive beliefs about the utility of the databases. It may be helpful to provide a list of links to the databases according to their subjects so that users can easily recognize the relevance of the databases to their field of interest.

5.5 Conclusion

The study results clearly indicate that the TAM appears to provide researchers of e-library systems a theoretically sound and parsimonious model with which they can predict users' intention to use. The findings from this study indicate that both the perceived ease of use and perceived usefulness are important determinants for the adopting of intention to use. This finding itself supports the appropriateness of using the TAM to understand a user's intention to use technology systems.

This study has empirically proven the influence of interface characteristics on perceived ease of use, perceived usefulness and its subsequent influence on the intention to use an e-library. It is hoped that the findings of this study will be taken into account by those who build online libraries. Factors such as the exclusion of technical terms and jargon to enhance perceived ease of use of online libraries should be taken into consideration. Clear terminology to provide effective communication of system instructions and responses to users should be given priority. Navigational clarity should also be given importance by the technical designers. What comes out of the whole research is that although the design is the domain of computer scientists,

care must be taken to incorporate the input of behavioural scientists in terms of the interface characteristics so that the acceptance of the online library can be increased.

A more effective e-library would ensure that the postgraduate students would make full use of the e-library technology when doing their research as this would solve the problems faced by them in the traditional library. Moreover, students who need to do research would benefit from a more effective e-library as it would provide a combination of digitally delivered content with learning support and services. The e-library provides more choices, enhances flexibility and will often provide the learner within stint feedback. It allows students to select learning materials and is convenient to access at any time and at any place. In conclusion, analysis of the data collected discovered that interface characteristics to certain extent have influence on the postgraduate students' perceived usefulness and perceived ease of using e-library. Further, navigation did not influence on the perceived ease of using e-library.

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APPENDIX A
Questionnaire

APPENDIX A: QUESTIONNAIRE

UNIVERSITI UTARA MALAYSIA
OTHMAN YEOP ABDULLAH GRADUATES SCHOOL OF BUSINESS
POST GRADUATES PROGRAMME

Dear Respondent

Mr. / Mrs. / Miss,

I am a final semester student of **Master of Science (Management)**, Universiti Utara Malaysia. As one of the university's requirement, I am doing a research which the title is "**Interface Characteristics, Perceived Ease of Use, Perceived Usefulness and Intention to Use UUM e-Library**". With reference to the above matter, kindly be informed that you have been selected as a respondent for this research.

I hope that you will spend some time to answer the attached questionnaire, as objectively and as sincerely as possible, and without fear or favor. Your responses will be treated as PRIVATE and CONFIDENTIAL and used solely for academic purposes.

I am looking forward to your cooperation in participating in this study, and for that I thank you.

May Allah bless you.

Sincerely,

NIK MOHD BAIDZANI HADDAD IBRAHIM
(baidzani@uum.edu.my
Master of Science (Management)
School of Business Management
Universiti Utara Malaysia

SECTION A: Demographic Information

Please tick (√) the appropriate response.

1. Gender:

   ☐ Male ☐ Female

2. Age: _____ years

3. Race:

   ☐ Malay ☐ Indian
   ☐ Chinese ☐ Others, please specify:_____

4. Citizenship:

   ☐ Malaysian ☐ Non-Malaysian, please specify:_____

5. Program of study:

   ☐ Master ☐ Ph.D/ DBA

6. School of study:

   ☐ Othman Yeop Abdullah Graduate School of Business
   ☐ Awang Had Salleh Graduate School of Arts & Sciences
   ☐ Ghazali Shafie Graduate School of Government

7. Experience of computer usage:

   ☐ < 3 year ☐ 7-8 years
   ☐ 3-4 years ☐ 9-10 years
   ☐ 5-6 years ☐ > 10 years

8. Frequency of UUM e-library usage:

   ☐ More than once a day
   ☐ About once a day
   ☐ 2 or 3 times a week
   ☐ About once a week
   ☐ About once in two weeks
   ☐ About once a month
   ☐ Less than once a month

Note:
E-library also known as electronic or online library referred as a digital library that requires technology to link the resources of many libraries and information services. UUM e-library provides electronic resources, collections, and online services.

SECTION B: Acceptance of UUM E-Library

Based on the scale given, please circle the number that you think appropriate for each statement below.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

	Your Perception	1 ← → 5
9	I intend to continue using UUM e-library in the future.	1 2 3 4 5
10	I will continue using UUM e-library in the future.	1 2 3 4 5
11	I will regularly use UUM e-library in the future.	1 2 3 4 5
12	I intend to increase my use of UUM e-library in the future.	1 2 3 4 5
13	Learning to use UUM e-library is easy for me.	1 2 3 4 5
14	My interaction with UUM e-library is clear and understandable.	1 2 3 4 5
15	It is easy for me to become skilful at using UUM e-library.	1 2 3 4 5
16	I find that UUM e-library is very easy to use.	1 2 3 4 5
17	Using UUM e-library would improve my learning performance.	1 2 3 4 5
18	Using UUM e-library would enhance my effectiveness in my learning.	1 2 3 4 5
19	Using UUM e-library would increase my learning productivity.	1 2 3 4 5
20	I find that UUM e-library is useful in my learning.	1 2 3 4 5
21	I understand most of the terms used throughout UUM e-library.	1 2 3 4 5
22	The use of terms throughout UUM e-library is consistent.	1 2 3 4 5
23	UUM e-library provides terms that are easy to understand.	1 2 3 4 5
24	UUM e-library commands are well depicted by buttons and symbols.	1 2 3 4 5
25	The layout of UUM e-library screens is clear and consistent.	1 2 3 4 5
26	Fonts (style, color, and saturation) are easy to read on-screen.	1 2 3 4 5
27	It is easy to navigate UUM e-library site.	1 2 3 4 5
28	In UUM e-library, I can easily navigate to where I want.	1 2 3 4 5
29	UUM e-library system's directions and navigations are clear.	1 2 3 4 5

THANK YOU FOR YOUR COOPERATION

APPENDIX B
Reliability Analysis

APPENDIX B: RELIABILITY OF THE INSTRUMENTS

i) Intention to Use

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.937	.940	4

Item Statistics

	Mean	Std. Deviation	N
B9) I intend to continue using UUM e-library in the future.	4.16	.624	176
B10) I will continue using UUM e-library in the future.	4.19	.645	176
B11) I will regularly use UUM e-library in the future.	4.19	.657	176
B12) I intend to increase my use of UUM e-library in the future.	4.08	.744	176

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
B9) I intend to continue using UUM e-library in the future.	12.46	3.576	.874	.895	.912
B10) I will continue using UUM e-library in the future.	12.44	3.493	.880	.898	.910
B11) I will regularly use UUM e-library in the future.	12.43	3.515	.846	.745	.920
B12) I intend to increase my use of UUM e-library in the future.	12.55	3.266	.822	.723	.932

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
16.63	6.030	2.456	4

ii) Perceived Ease of Use

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.863	.865	4

Item Statistics

	Mean	Std. Deviation	N
B13) Learning to use UUM e-library is easy for me.	4.05	.735	176
B14) My interaction with UUM e-library is clear and understandable.	4.17	.618	176
B15) It is easy for me to become skilful at using UUM e-library.	4.10	.698	176
B16) I find that UUM e-library is very easy to use.	4.05	.670	176

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
B13) Learning to use UUM e-library is easy for me.	12.32	2.824	.773	.625	.799
B14) My interaction with UUM e-library is clear and understandable.	12.20	3.246	.739	.580	.818
B15) It is easy for me to become skilful at using UUM e-library.	12.27	3.137	.667	.445	.844
B16) I find that UUM e-library is very easy to use.	12.32	3.201	.678	.463	.839

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
16.37	5.274	2.297	4

iii) Perceived Usefulness

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.868	.870	4

Item Statistics

	Mean	Std. Deviation	N
B17) Using UUM e-library would improve my learning performance.	3.99	.637	176
B18) Using UUM e-library would enhance my effectiveness in my learning.	4.34	.572	176
B19) Using UUM e-library would increase my learning productivity.	4.19	.542	176
B20) I find that UUM e-library is useful in my learning.	4.02	.637	176

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
B17) Using UUM e-library would improve my learning performance.	12.55	2.249	.757	.589	.816
B18) Using UUM e-library would enhance my effectiveness in my learning.	12.20	2.426	.757	.609	.817
B19) Using UUM e-library would increase my learning productivity.	12.35	2.605	.687	.532	.845
B20) I find that UUM e-library is useful in my learning.	12.52	2.354	.687	.508	.846

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
16.54	4.101	2.025	4

iv) Terminology

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.855	.857	3

Item Statistics

	Mean	Std. Deviation	N
B21) I understand most of the terms used throughout UUM e-library.	4.05	.731	176
B22) The use of terms throughout UUM e-library is consistent.	4.09	.631	176
B23) UUM e-library provides terms that are easy to understand.	4.07	.685	176

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
B21) I understand most of the terms used throughout UUM e-library.	8.16	1.495	.688	.525	.840
B22) The use of terms throughout UUM e-library is consistent.	8.12	1.729	.683	.528	.838
B23) UUM e-library provides terms that are easy to understand.	8.13	1.440	.823	.678	.703

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
12.20	3.261	1.806	3

v) Screen Design

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.838	.839	3

Item Statistics

	Mean	Std. Deviation	N
B24) UUM e-library commands are well depicted by buttons and symbols.	3.99	.605	176
B25) The layout of UUM e-library screens is clear and consistent.	4.15	.556	176
B26) Fonts (style, color, and saturation) are easy to read on-screen.	4.11	.600	176

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
B24) UUM e-library commands are well depicted by buttons and symbols.	8.26	1.071	.726	.527	.751
B25) The layout of UUM e-library screens is clear and consistent.	8.10	1.196	.690	.479	.787
B26) Fonts (style, color, and saturation) are easy to read on-screen.	8.14	1.113	.690	.478	.787

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
12.24	2.346	1.532	3

vi) Navigation

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.832	.837	3

Item Statistics

	Mean	Std. Deviation	N
B27) It is easy to navigate UUM e-library site.	3.98	.637	176
B28) In UUM e-library, I can easily navigate to where I want.	4.07	.629	176
B29) UUM e-library system's directions and navigations are clear.	4.02	.523	176

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
B27) It is easy to navigate UUM e-library site.	8.09	1.077	.703	.506	.758
B28) In UUM e-library, I can easily navigate to where I want.	8.01	1.126	.668	.448	.793
B29) UUM e-library system's directions and navigations are clear.	8.05	1.283	.721	.523	.752

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
12.07	2.412	1.553	3

APPENDIX C
Normality Test

APPENDIX C: NORMALITY OF THE DATA

i) Intention to Use

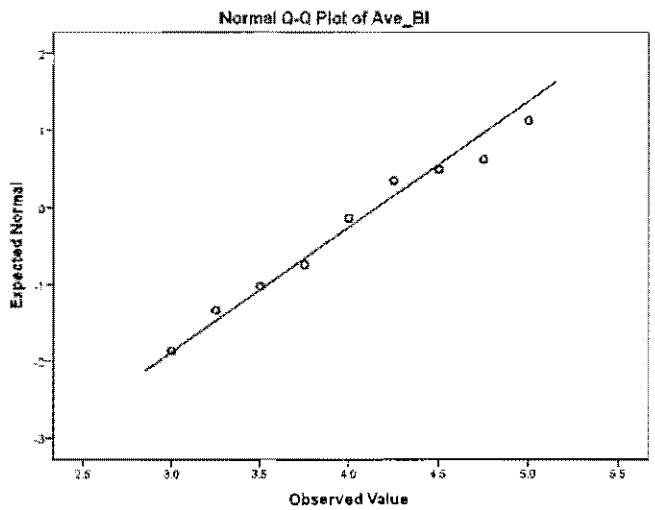
Descriptives

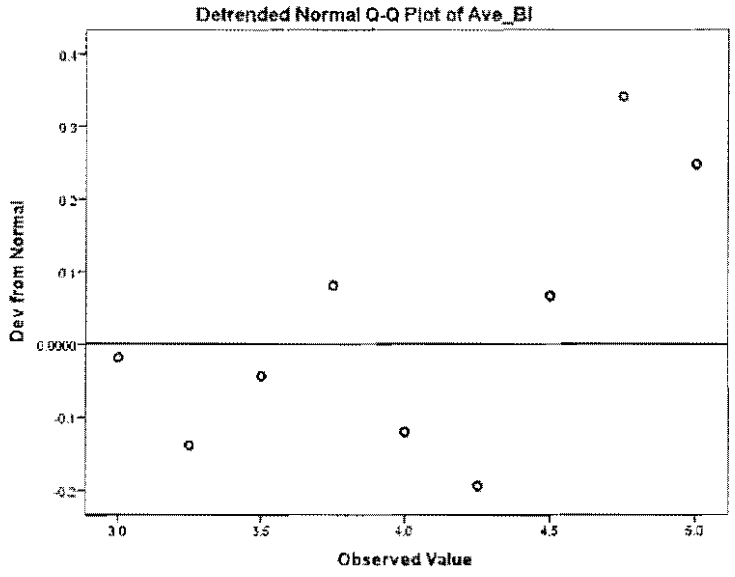
			Statistic	Std. Error
Ave_BI	Mean		4.16	.046
	95% Confidence Interval for Mean	Lower Bound	4.06	
		Upper Bound	4.25	
	5% Trimmed Mean		4.17	
	Median		4.00	
	Variance		.377	
	Std. Deviation		.614	
	Minimum		3	
	Maximum		5	
	Range		2	
	Interquartile Range		1	
	Skewness		.003	.183
	Kurtosis		-.922	.364

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Ave_BI	.220	176	.000	.892	176	.000

a. Lilliefors Significance Correction





ii) Perceived Ease of Use

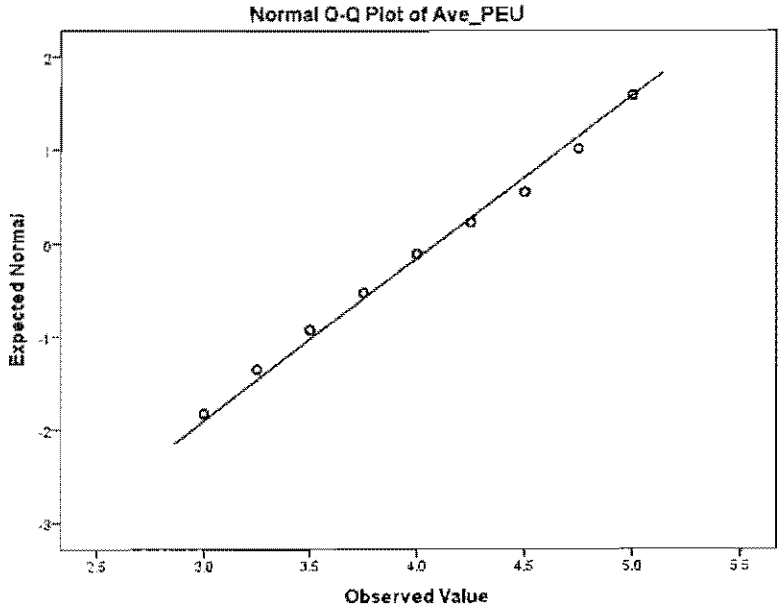
Descriptives

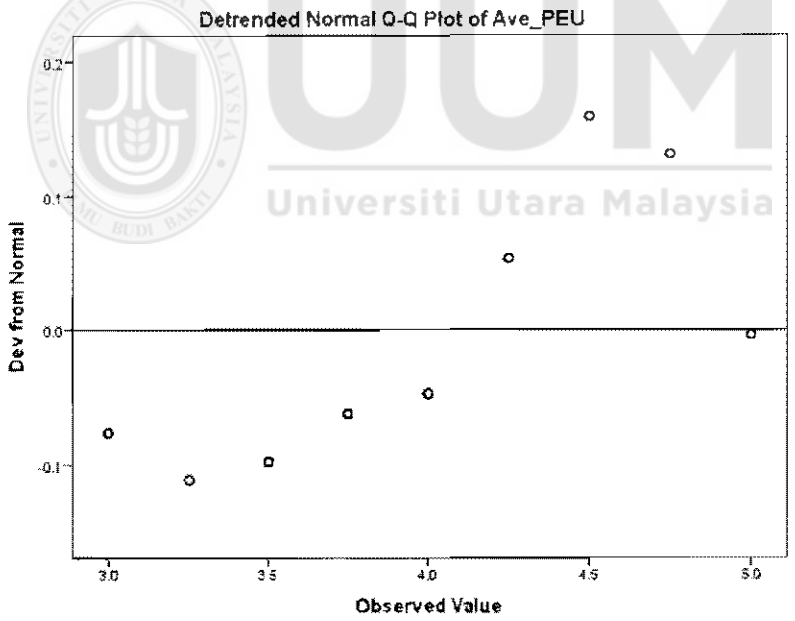
			Statistic	Std. Error
Ave_PEU	Mean		4.09	.043
	95% Confidence Interval for Mean	Lower Bound	4.01	
		Upper Bound	4.18	
	5% Trimmed Mean		4.10	
	Median		4.00	
	Variance		.330	
	Std. Deviation		.574	
	Minimum		3	
	Maximum		5	
	Range		2	
	Interquartile Range		1	
	Skewness		-.115	.183
	Kurtosis		-.898	.364

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Ave_PEU	.142	176	.000	.948	176	.000

a. Lilliefors Significance Correction





iii) Perceived Usefulness

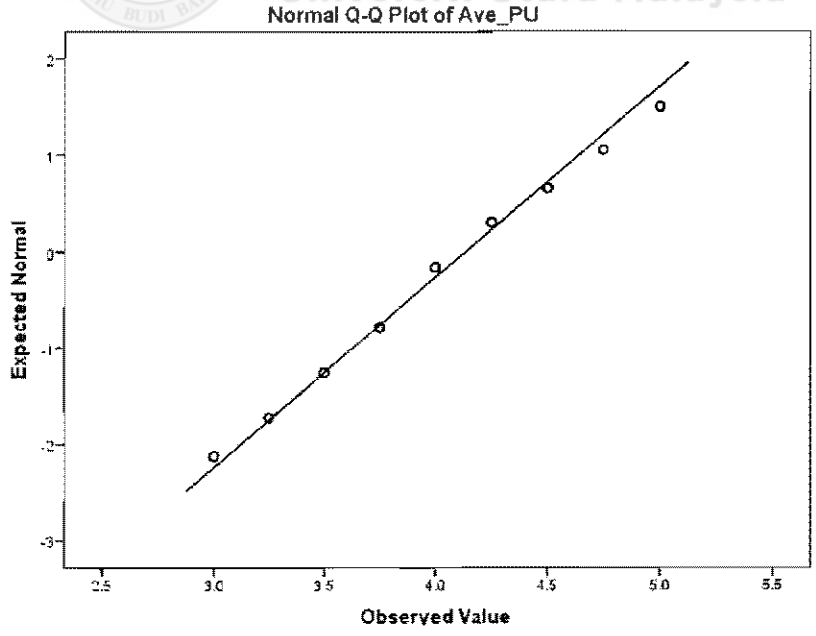
Descriptives

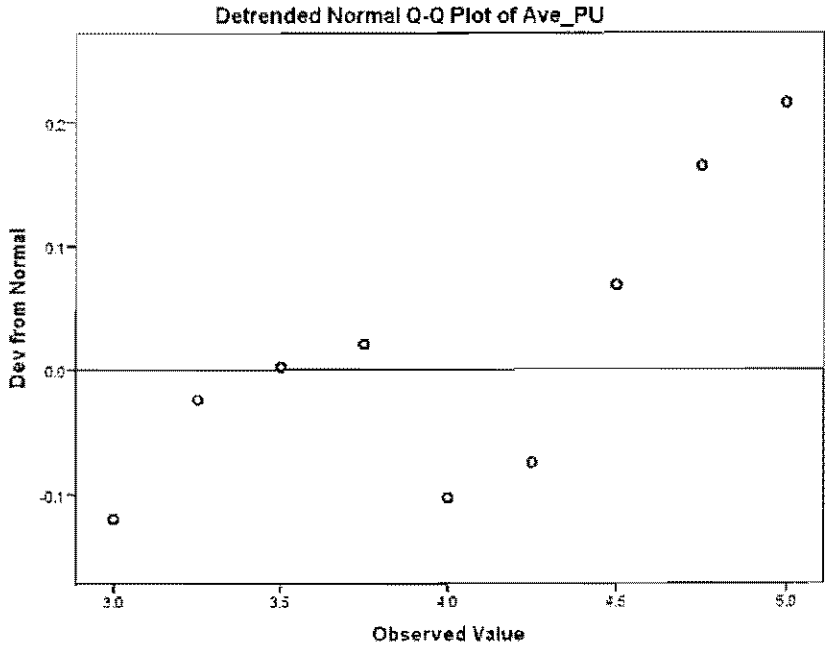
			Statistic	Std. Error
Ave_PU	Mean		4.13	.038
	95% Confidence Interval for Mean	Lower Bound	4.06	
		Upper Bound	4.21	
	5% Trimmed Mean		4.14	
	Median		4.00	
	Variance		.256	
	Std. Deviation		.506	
	Minimum		3	
	Maximum		5	
	Range		2	
	Interquartile Range		1	
	Skewness		.073	.183
	Kurtosis		-.498	.364

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Ave_PU	.196	176	.000	.939	176	.000

a. Lilliefors Significance Correction





iv) Terminology

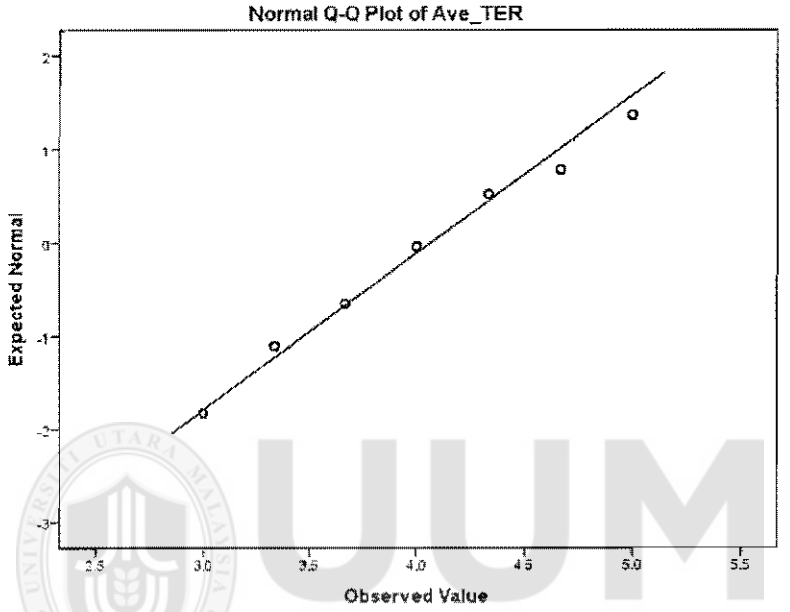
Descriptives

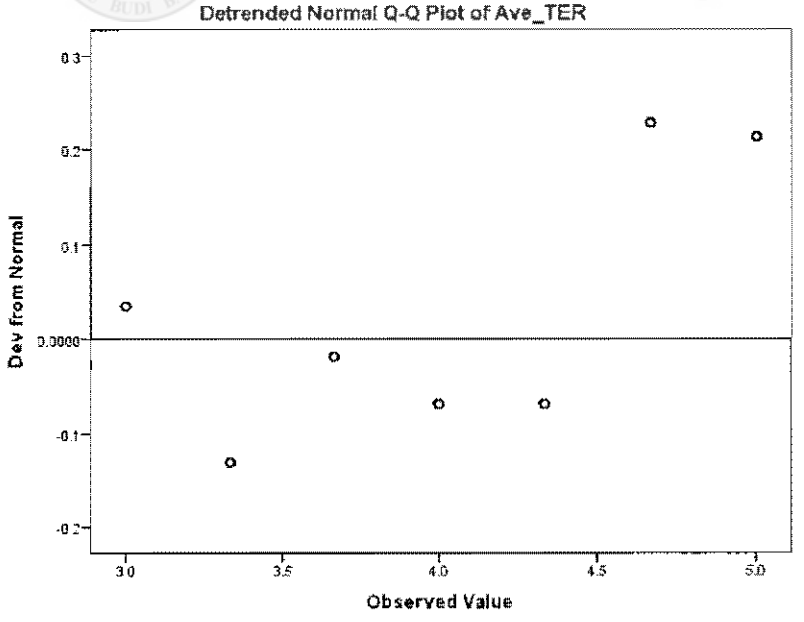
			Statistic	Std. Error
Ave_TER	Mean		4.07	.045
	95% Confidence Interval for Mean	Lower Bound	3.98	
		Upper Bound	4.15	
	5% Trimmed Mean		4.07	
	Median		4.00	
	Variance		.354	
	Std. Deviation		.595	
	Minimum		3	
	Maximum		5	
	Range		2	
	Interquartile Range		1	
	Skewness		.104	.183
	Kurtosis		-.845	.364

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Ave_TER	.203	176	.000	.915	176	.000

a. Lilliefors Significance Correction





v) Screen Design

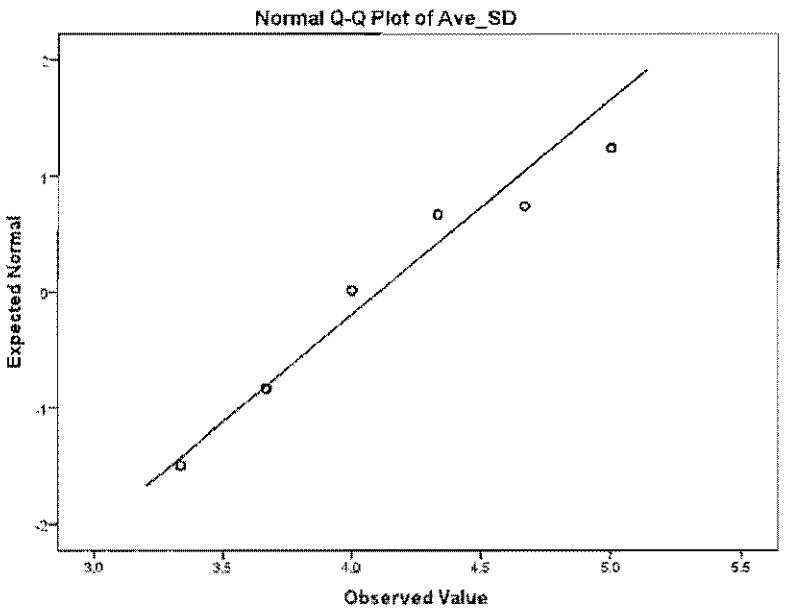
Descriptives

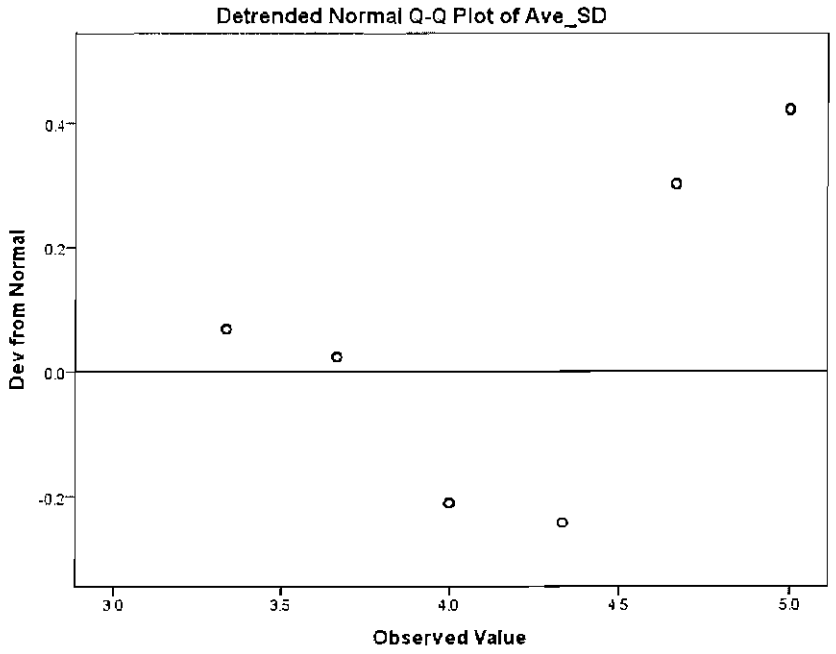
			Statistic	Std. Error
Ave_SD	Mean		4.10	.041
	95% Confidence Interval for Mean	Lower Bound	4.02	
		Upper Bound	4.18	
	5% Trimmed Mean		4.10	
	Median		4.00	
	Variance		.292	
	Std. Deviation		.540	
	Minimum		3	
	Maximum		5	
	Range		2	
	Interquartile Range		1	
	Skewness		.560	.183
	Kurtosis		-.717	.364

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Ave_SD	.319	176	.000	.826	176	.000

a. Lilliefors Significance Correction





vi) Navigation

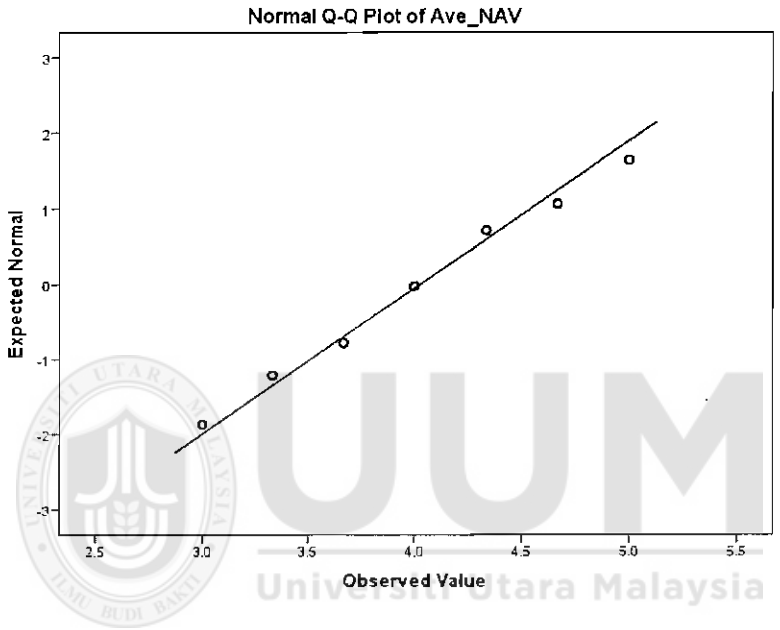
Descriptives

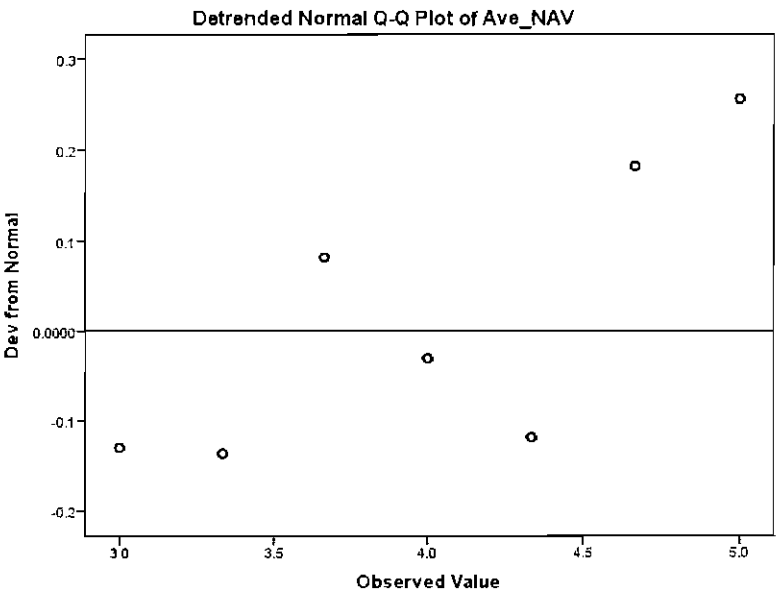
			Statistic	Std. Error
Ave_NAV	Mean		4.03	.039
	95% Confidence Interval for Mean	Lower Bound	3.95	
		Upper Bound	4.10	
	5% Trimmed Mean		4.03	
	Median		4.00	
	Variance		.265	
	Std. Deviation		.514	
	Minimum		3	
	Maximum		5	
	Range		2	
	Interquartile Range		1	
	Skewness		.101	.183
	Kurtosis		-.191	.364

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Ave_NAV	.236	176	.000	.912	176	.000

a. Lilliefors Significance Correction





APPENDIX D

Descriptive Statistics

(i) Profile of the Respondents
(ii) Level of the Variables

APPENDIX D: DESCRIPTIVE STATISTICS
(i) PROFILE OF THE RESPONDENTS

Statistics

		Gender	Age	Race	Citizenship	Program of study	School of study	Experience of computer usage	Frequency of UUM e-library usage
N	Valid	176	176	176	176	176	176	176	176
	Missing	0	0	0	0	0	0	0	0
Mean		1.56	3.09	2.00	1.28	1.48	1.63	5.56	3.10
Median		2.00	3.00	1.00	1.00	1.00	1.00	6.00	3.00
Sum		275	544	352	225	261	286	979	545

Frequency Table

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	77	43.8	43.8	43.8
	Female	99	56.3	56.3	100.0
	Total	176	100.0	100.0	

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21-25 years old	6	3.4	3.4	3.4
	26-30 years old	56	31.8	31.8	35.2
	31-35 years old	59	33.5	33.5	68.8
	36-40 years old	26	14.8	14.8	83.5
	41 years old and above	29	16.5	16.5	100.0
	Total	176	100.0	100.0	

Race

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Malay	106	60.2	60.2	60.2
	Chinese	13	7.4	7.4	67.6
	Indian	8	4.5	4.5	72.2
	Others	49	27.8	27.8	100.0
	Total	176	100.0	100.0	

Citizenship

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Malaysian	127	72.2	72.2	72.2
	Non-Malaysian	49	27.8	27.8	100.0
	Total	176	100.0	100.0	

Program of study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Master	91	51.7	51.7	51.7
	Ph.D/ DBA	85	48.3	48.3	100.0
	Total	176	100.0	100.0	

School of study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	OYAGSB	99	56.3	56.3	56.3
	AHSGSAS	44	25.0	25.0	81.3
	GSGSG	33	18.8	18.8	100.0
	Total	176	100.0	100.0	

Experience of computer usage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2-4 years	2	1.1	1.1	1.1
	5-6 years	3	1.7	1.7	2.8
	7-8 years	13	7.4	7.4	10.2
	9-10 years	34	19.3	19.3	29.5
	10 years	124	70.5	70.5	100.0
	Total	176	100.0	100.0	

Frequency of UUM e-library usage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More than once a day	19	10.8	10.8	10.8
	About once a day	30	17.0	17.0	27.8
	2 or 3 times a week	59	33.5	33.5	61.4
	About once a week	52	29.5	29.5	90.9
	About once in two weeks	15	8.5	8.5	99.4
	About once a month	1	.6	.6	100.0
	Total	176	100.0	100.0	

APPENDIX D: DESCRIPTIVE STATISTICS
(ii) MEAN OF THE VARIABLES

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Ave_BI	176	2	3	5	4.16	.614	.377
Ave_PEU	176	2	3	5	4.09	.574	.330
Ave_PU	176	2	3	5	4.13	.506	.256
Ave_TER	176	2	3	5	4.07	.595	.354
Ave_NAV	176	2	3	5	4.03	.514	.265
Ave_SD	176	2	3	5	4.10	.540	.292
Valid N (listwise)	176						

APPENDIX E

Inferential Analysis

(i) Independent Samples T-Test
(ii) One-way ANOVA
(iii) Multiple Linear Regression

APPENDIX E: INFERENTIAL ANALYSIS

(i) INDEPENDENT SAMPLES T-TEST

(a) Gender towards Intention to Use

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Ave_BI	Male	77	3.86	.567	.065
	Female	99	4.38	.551	.055

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Ave_BI	Equal variances assumed	1.853	.175	-6.132	174	.000	-.520	.085	-.688	-.353
	Equal variances not assumed			-6.111	161.235	.000	-.520	.085	-.688	-.352

(b) Citizenship towards Intention to Use

Group Statistics

	Citizenship	N	Mean	Std. Deviation	Std. Error Mean
Ave_BI	Malaysian	127	4.16	.661	.059
	Non-Malaysian	49	4.15	.478	.068

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Ave_BI	Equal variances assumed	9.421	.002	.043	174	.966	.004	.104	-.200	.209
	Equal variances not assumed			.049	119.922	.961	.004	.090	-.174	.183

(c) Program of Study towards Intention to Use

Group Statistics

	Program of study	N	Mean	Std. Deviation	Std. Error Mean
Ave_BI	Master	91	4.07	.647	.068
	Ph.D/ DBA	85	4.25	.566	.061

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff,	Std. Error Diff.	Lower	Upper
Ave_BI	Equal variances assumed	.037	.847	-1.974	174	.050	-.181	.092	-.363	.000
	Equal variances not assumed			-1.983	173.269	.049	-.181	.091	-.362	-.001

APPENDIX E: INFERENTIAL ANALYSIS
(ii) ONE-WAY ANOVA

(d) Age towards Intention to Use

Descriptives

Ave_BI

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
21-25 years old	6	4.89	.008	.002	4.00	5.00	4	5
26-30 years old	56	4.12	.603	.081	3.95	4.28	3	5
31-35 years old	59	4.00	.627	.082	3.83	4.16	3	5
36-40 years old	26	4.00	.469	.092	3.81	4.19	3	5
41 years old and above	29	4.53	.506	.094	4.33	4.72	3	5
Total	176	4.16	.614	.046	4.06	4.25	3	5

Test of Homogeneity of Variances

Ave_BI

Levene Statistic	df1	df2	Sig.
3.156	4	171	.016

ANOVA

Ave_BI

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.478	4	2.620	8.075	.000
Within Groups	55.475	171	.324		
Total	65.953	175			

Multiple Comparisons

Dependent Variable: Ave_BI
Tukey HSD

(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
21-25 years old	26-30 years old	.884*	.245	.004	.21	1.56
	31-35 years old	1.004*	.244	.001	.33	1.68
	36-40 years old	1.000*	.258	.001	.29	1.71
	41 years old and above	.474	.255	.345	-.23	1.18
26-30 years old	21-25 years old	-.884*	.245	.004	-1.56	-.21
	31-35 years old	.120	.106	.789	-.17	.41
	36-40 years old	.116	.135	.911	-.26	.49
	41 years old and above	-.410*	.130	.017	-.77	-.05
31-35 years old	21-25 years old	-1.004*	.244	.001	-1.68	-.33
	26-30 years old	-.120	.106	.789	-.41	.17
	36-40 years old	-.004	.134	1.000	-.37	.37
	41 years old and above	-.530*	.129	.001	-.89	-.17
36-40 years old	21-25 years old	-1.000*	.258	.001	-1.71	-.29
	26-30 years old	-.116	.135	.911	-.49	.26
	31-35 years old	.004	.134	1.000	-.37	.37
	41 years old and above	-.526*	.154	.007	-.95	-.10
41 years old and above	21-25 years old	-.474	.255	.345	-1.18	.23
	26-30 years old	.410*	.130	.017	.05	.77
	31-35 years old	.530*	.129	.001	.17	.89
	36-40 years old	.526*	.154	.007	.10	.95

*. The mean difference is significant at the 0.05 level.

(e) Race towards Intention to Use

Descriptives

Ave_BI

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Malay	106	4.15	.624	.061	4.03	4.27	3	5
Chinese	13	4.79	.336	.093	4.59	4.99	4	5
Indian	8	3.19	.116	.041	3.09	3.28	3	3
Others	49	4.15	.478	.068	4.02	4.29	4	5
Total	176	4.16	.614	.046	4.06	4.25	3	5

Test of Homogeneity of Variances

Ave_BI

Levene Statistic	df1	df2	Sig.
6.847	3	172	.000

ANOVA

Ave_BI

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12.705	3	4.235	13.680	.000
Within Groups	53.248	172	.310		
Total	65.953	175			

Multiple Comparisons

Dependent Variable: Ave_BI
Tukey HSD

(I) Race	(J) Race	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Malay	Chinese	-.635*	.164	.001	-1.06	-.21
	Indian	.966*	.204	.000	.44	1.50
	Others	.000	.096	1.000	-.25	.25
Chinese	Malay	.635*	.164	.001	.21	1.06
	Indian	1.601*	.250	.000	.95	2.25
	Others	.635*	.174	.002	.19	1.09
Indian	Malay	-.966*	.204	.000	-1.50	-.44
	Chinese	-1.601*	.250	.000	-2.25	-.95
	Others	-.966*	.212	.000	-1.52	-.42
Others	Malay	.000	.096	1.000	-.25	.25
	Chinese	-.635*	.174	.002	-1.09	-.19
	Indian	.966*	.212	.000	.42	1.52

*. The mean difference is significant at the 0.05 level.

(f) School of Study towards Intention to Use

Descriptives

Ave_BI

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
OYAGSB	99	4.44	.560	.056	4.33	4.55	3	5
AHSGSAS	44	3.79	.269	.041	3.71	3.87	3	4
GSGSG	33	3.80	.660	.115	3.56	4.03	3	5
Total	176	4.16	.614	.046	4.06	4.25	3	5

Test of Homogeneity of Variances

Ave_BI

Levene Statistic	df1	df2	Sig.
23.807	2	173	.000

ANOVA

Ave_BI

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.142	2	9.071	32.823	.000
Within Groups	47.811	173	.276		
Total	65.953	175			

Multiple Comparisons

Dependent Variable: Ave_BI
Tukey HSD

(I) School of study	(J) School of study	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
OYAGSB	AHSGSAS	.650*	.095	.000	.42	.87
	GSGSG	.644*	.106	.000	.39	.89
AHSGSAS	OYAGSB	-.650*	.095	.000	-.87	-.42
	GSGSG	-.006	.121	.999	-.29	.28
GSGSG	OYAGSB	-.644*	.106	.000	-.89	-.39
	AHSGSAS	.006	.121	.999	-.28	.29

*. The mean difference is significant at the 0.05 level.

(g) Experience of Computer Usage towards Intention to Use

Descriptives

Ave_BI

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
3-4 years	2	5.00	.000	.000	5.00	5.00	5	5
5-6 years	3	3.58	.577	.333	2.15	5.02	3	4
7-8 years	13	3.90	.650	.180	3.51	4.30	3	5
9-10 years	34	4.16	.651	.112	3.93	4.39	3	5
> 10 years	124	4.18	.591	.053	4.08	4.29	3	5
Total	176	4.16	.614	.046	4.06	4.25	3	5

Test of Homogeneity of Variances

Ave_BI

Levene Statistic	df1	df2	Sig.
1.580	4	171	.182

ANOVA

Ave_BI

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.317	4	.829	2.264	.064
Within Groups	62.637	171	.366		
Total	65.953	175			

Multiple Comparisons

Dependent Variable: Ave_BI
Tukey HSD

(I) Experience of computer usage	(J) Experience of computer usage	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
2-4 years	5-6 years	1.417	.552	.082	-.11	2.94
	7-8 years	1.096	.460	.125	-.17	2.36
	9-10 years	.838	.440	.319	-.38	2.05
	10 years	.819	.431	.323	-.37	2.01
5-6 years	2-4 years	-1.417	.552	.082	-2.94	.11
	7-8 years	-.321	.388	.922	-1.39	.75
	9-10 years	-.578	.365	.508	-1.58	.43
	10 years	-.598	.354	.442	-1.57	.38
7-8 years	2-4 years	-1.096	.460	.125	-2.36	.17
	5-6 years	.321	.388	.922	-.75	1.39
	9-10 years	-.258	.197	.687	-.80	.29
	10 years	-.278	.176	.516	-.76	.21
9-10 years	2-4 years	-.838	.440	.319	-2.05	.38
	5-6 years	.578	.365	.508	-.43	1.58
	7-8 years	.258	.197	.687	-.29	.80
	10 years	-.020	.117	1.000	-.34	.30
10 years	2-4 years	-.819	.431	.323	-2.01	.37
	5-6 years	.598	.354	.442	-.38	1.57
	7-8 years	.278	.176	.516	-.21	.76
	9-10 years	.020	.117	1.000	-.30	.34

*. The mean difference is significant at the 0.05 level.

(h) Frequency of UUM e-Library Usage towards Intention to Use

Descriptives

Ave_BI

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
More than once a day	19	4.79	.303	.070	4.64	4.94	4	5
About once a day	30	4.22	.579	.106	4.00	4.43	4	5
2 or 3 times a week	59	4.29	.603	.079	4.13	4.45	3	5
About once a week	52	3.95	.488	.068	3.82	4.09	3	5
About once in two weeks	16	3.47	.437	.109	3.24	3.70	3	4
Total	176	4.16	.614	.046	4.06	4.25	3	5

Test of Homogeneity of Variances

Ave_BI

Levene Statistic	df1	df2	Sig.
1.580	4	171	.182

ANOVA

Ave_BI

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.488	4	4.622	16.651	.000
Within Groups	47.465	171	.278		
Total	65.953	175			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: Ave_BI

Tukey HSD

(I) Frequency of UUM e-library usage	(J) Frequency of UUM e-library usage	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
More than once a day	About once a day	.573*	.154	.003	.15	1.00
	2 or 3 times a week	.501*	.139	.004	.12	.88
	About once a week	.838*	.141	.000	.45	1.23
	About once in two weeks	1.321*	.179	.000	.83	1.81
About once a day	More than once a day	-.573*	.154	.003	-1.00	-.15
	2 or 3 times a week	-.071	.118	.974	-.40	.25
	About once a week	.265	.121	.188	-.07	.60
	About once in two weeks	.748*	.163	.000	.30	1.20
2 or 3 times a week	More than once a day	-.501*	.139	.004	-.88	-.12
	About once a day	.071	.118	.974	-.25	.40
	About once a week	.336*	.100	.009	.06	.61
	About once in two weeks	.819*	.149	.000	.41	1.23
About once a week	More than once a day	-.838*	.141	.000	-1.23	-.45
	About once a day	-.265	.121	.188	-.60	.07
	2 or 3 times a week	-.336*	.100	.009	-.61	-.06
	About once in two weeks	.483*	.151	.014	.07	.90
About once in two weeks	More than once a day	-1.321*	.179	.000	-1.81	-.83
	About once a day	-.748*	.163	.000	-1.20	-.30
	2 or 3 times a week	-.819*	.149	.000	-1.23	-.41
	About once a week	-.483*	.151	.014	-.90	-.07

*. The mean difference is significant at the 0.05 level.

APPENDIX E: INFERENTIAL ANALYSIS

(iii) MULTIPLE LINEAR REGRESSION

(a) Factors Influence of Perceived Usefulness and Perceived Ease of Use towards Intention to Use UUM e-Library.

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Ave_PEU, Ave_PU[b]	.	Enter

a. Dependent Variable: Ave_BI

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.739[a]	**.546**	.541	.416

a. Predictors: (Constant), Ave_PEU, Ave_PU

b. Dependent Variable: Ave_BI

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.009	2	18.005	104.021	.000[b]
	Residual	29.944	173	.173		
	Total	65.953	175			

a. Dependent Variable: Ave_BI

b. Predictors: (Constant), Ave_PEU, Ave_PU

Coefficients[a]

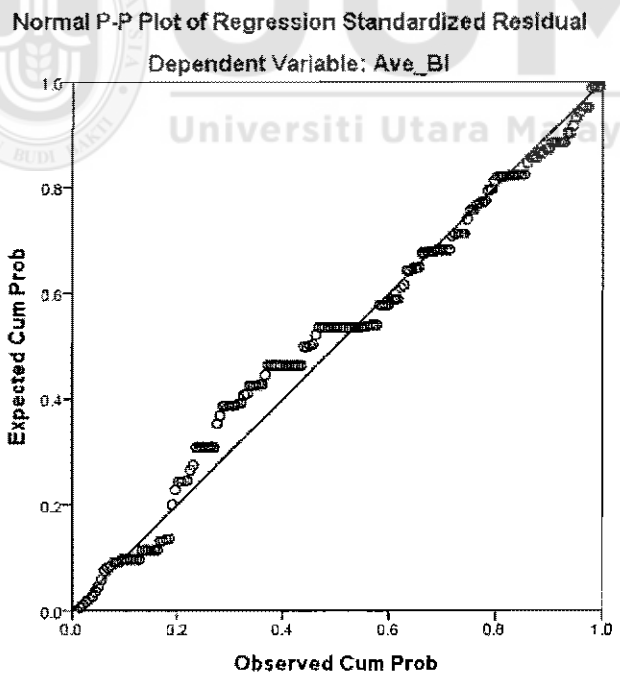
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.339	.268		1.262	.209		
	Ave_PU	.764	.083	**.630**	**9.182**	**.000**	.557	1.796
	Ave_PEU	.160	.073	**.150**	**2.186**	**.030**	.557	1.796

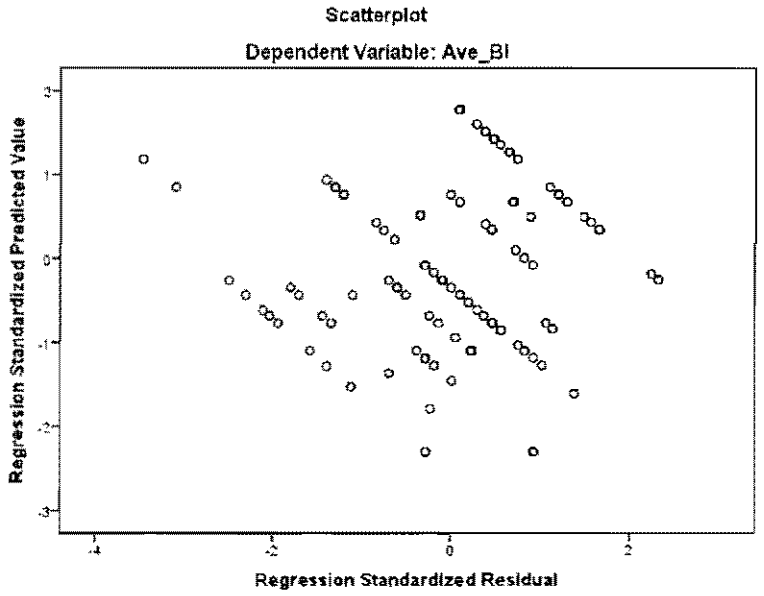
a. Dependent Variable: Ave_BI

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.11	4.96	4.16	.454	176
Std. Predicted Value	-2.299	1.779	.000	1.000	176
Standard Error of Predicted Value	.032	.108	.052	.015	176
Adjusted Predicted Value	3.10	4.96	4.16	.454	176
Residual	-1.442	.962	.000	.414	176
Std. Residual	-3.266	2.312	.000	.994	176
Stud. Residual	-3.491	2.319	.001	1.002	176
Deleted Residual	-1.463	.979	.001	.420	176
Stud. Deleted Residual	-3.610	2.349	-.001	1.010	176
Mahal. Distance	.072	10.717	1.989	1.888	176
Cook's Distance	.000	.091	.005	.011	176
Centered Leverage Value	.000	.061	.011	.011	176

a. Dependent Variable: Ave_BI





(b) Factors Influence of Interface Characteristics (Terminology, Screen Design and Navigation) on Perceived Usefulness of UUM e-Library.

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Ave_NAV, Ave_SD, Ave_TER[b]	.	Enter

a. Dependent Variable: Ave_PU

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.654[a]	**.427**	.417	.386

a. Predictors: (Constant), Ave_NAV, Ave_SD, Ave_TER

b. Dependent Variable: Ave_PU

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.168	3	6.389	42.777	.000[b]
	Residual	25.690	172	.149		
	Total	44.858	175			

a. Dependent Variable: Ave_PU

b. Predictors: (Constant), Ave_NAV, Ave_SD, Ave_TER

Coefficients[a]

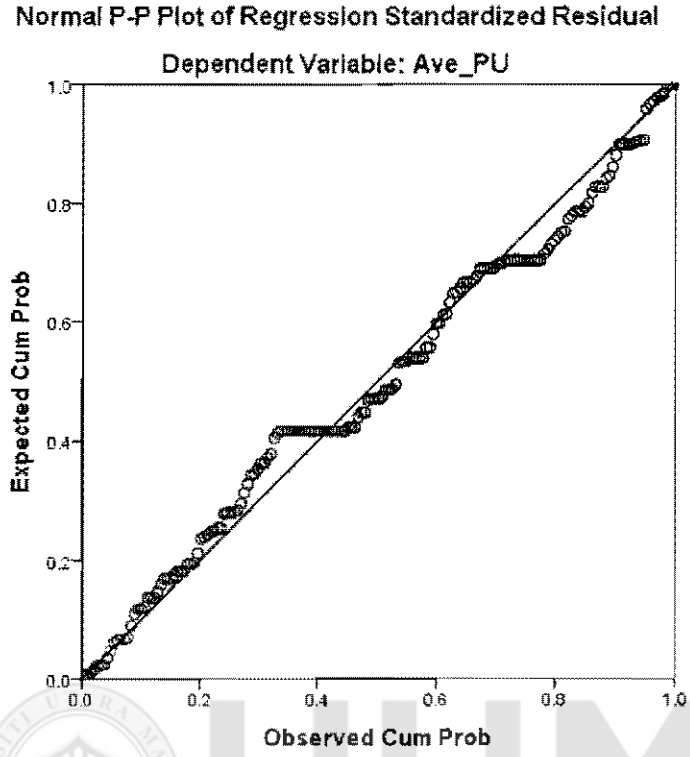
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.228	.268		4.586	.000		
	Ave_TER	.184	.068	**.216**	**2.685**	**.008**	.515	1.941
	Ave_SD	.371	.067	**.396**	**5.509**	**.000**	.644	1.552
	Ave_NAV	.158	.072	**.161**	**2.212**	**.028**	.630	1.588

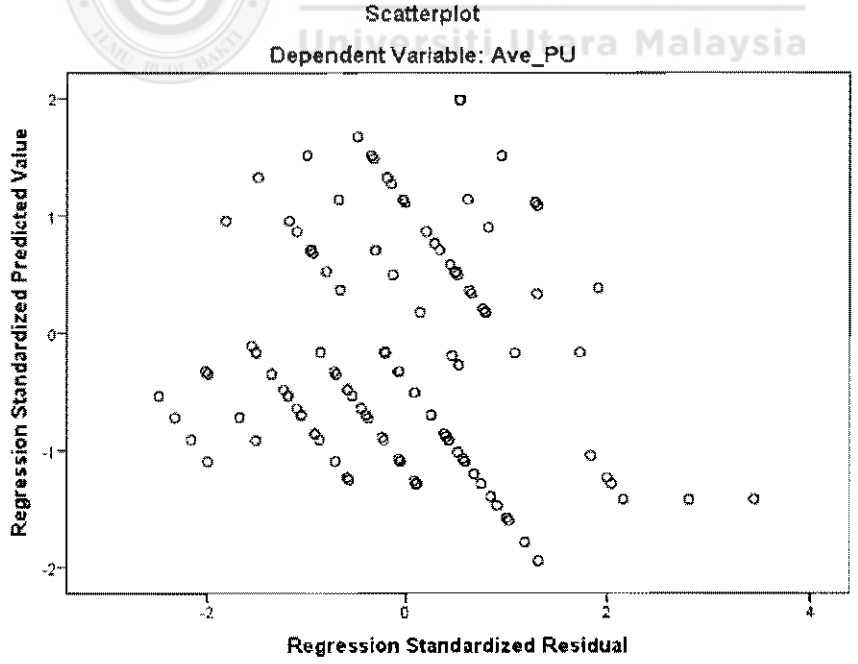
a. Dependent Variable: Ave_PU

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.49	4.79	4.13	.331	176
Std. Predicted Value	-1.945	1.991	.000	1.000	176
Standard Error of Predicted Value	.030	.098	.056	.016	176
Adjusted Predicted Value	3.47	4.79	4.13	.331	176
Residual	-.957	1.334	.000	.383	176
Std. Residual	-2.476	3.251	.000	.991	176
Stud. Residual	-2.489	3.492	.001	1.003	176
Deleted Residual	-.967	1.365	.001	.392	176
Stud. Deleted Residual	-2.528	3.612	.002	1.013	176
Mahal. Distance	.038	10.340	2.983	2.017	176
Cook's Distance	.000	.073	.006	.011	176
Centered Leverage Value	.000	.059	.017	.012	176

a. Dependent Variable: Ave_PU





(c) Factors Influence of Interface Characteristics (Terminology, Screen Design and Navigation) on Perceived Ease of Use of UUM e-Library.

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Ave_NAV, Ave_SD, Ave_TER[b]	.	Enter

a. Dependent Variable: Ave_PEU

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.671[a]	**.450**	.440	.430

a. Predictors: (Constant), Ave_NAV, Ave_SD, Ave_TER

b. Dependent Variable: Ave_PEU

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25.942	3	8.647	46.851	.000[b]
	Residual	31.746	172	.185		
	Total	57.687	175			

a. Dependent Variable: Ave_PEU

b. Predictors: (Constant), Ave_NAV, Ave_SD, Ave_TER

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.979	.298		3.291	.001		
	Ave_TER	.455	.076	**.472**	**5.991**	**.000**	.515	1.941
	Ave_SD	.241	.075	**.227**	**3.219**	**.002**	.644	1.552
	Ave_NAV	.068	.080	**.061**	**.849**	**.397**	.630	1.588

a. Dependent Variable: Ave_PEU

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	3.35	4.80	4.09	.385	176
Std. Predicted Value	-1.923	1.837	.000	1.000	176
Standard Error of Predicted Value	.033	.109	.062	.018	176
Adjusted Predicted Value	3.34	4.79	4.09	.385	176
Residual	-1.277	1.126	.000	.426	176
Std. Residual	-2.972	2.620	.000	.991	176
Stud. Residual	-3.021	2.654	.001	1.004	176
Deleted Residual	-1.319	1.155	.001	.437	176
Stud. Deleted Residual	-3.095	2.702	.000	1.011	176
Mahal. Distance	.038	10.340	2.983	2.017	176
Cook's Distance	.000	.076	.006	.012	176
Centered Leverage Value	.000	.059	.017	.012	176

a. Dependent Variable: Ave_PEU