LMS CONTINUANCE AMONG STUDENTS AND LECTURERS IN NORTHERN MALAYSIAN PUBLIC UNIVERSITIES THROUGH EXPANDED EXPECTATION CONFIRMATION THEORY (ECT) PERSPECTIVE

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2017

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By

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Thesis Submitted to
School of Technology Management and Logistics
University Utara Malaysia,
In Fulfilment of the Requirement for the Degree of Master of Science

Kolej Perniagaan
(College of Business)
Universiti Utara Malaysia

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Tarikh: **25 September 2016**
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Tajuk Tesis / Disertasi *(Title of the Thesis / Dissertation)*	:	**LMS Continuance Among Students and Lecturers in Northern Malaysian Public Universities Through Expanded Expectation Confirmation Theory (ECT) Perspective.**
Program Pengajian *(Programme of Study)*	:	**Master of Science**
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ABSTRACT

Learning Management System (LMS) is a system that especially developed and broadly applied for teaching and learning process. This thesis aims to investigate users' expectation in using LMS for their teaching and learning process among higher education institutions. In detail, this thesis was conducted to determine students' and lecturers' expectations on using LMS and define their future need on LMS. For the purpose of this study, a survey which involved 727 students and lecturers from the northern region public university was carried out. This thesis used expanded Expectation Confirmation Theory (ECT) to find users' expectation in accepting LMS. In addition, six main variables include perceived usefulness (PU), perceived ease of use (PEOU), confirmation (CON), perceived enjoyment (PE), satisfaction (SAT) and continuance intention (CI) on LMS usage were used to find the relationship between the selected variables that influence users' intention to use LMS in their teaching and learning. A structured questionnaire was designed where data were analysed by SPSS 20.0 to determine the relationship between the selected variables. The findings show that PU, PEOU, CON, PE, SAT and CI were significantly important determinants to predict users' intention to use LMS continuously.

Keyword: Learning Management System (LMS), Students, Lecturers, Expectation Confirmation Theory (ECT), Continuance Intention

ABSTRAK

Sistem Pengurusan Pembelajaran (LMS) merupakan satu sistem khusus yang dibina dan digunakan secara meluas dalam proses pengajaran dan pembelajaran. Tesis ini bertujuan untuk mengkaji gelagat pengguna dalam penggunaan LMS bagi proses pengajaran dan pembelajaran di institusi pengajian tinggi awam. Secara terperinci, tesis ini dilaksanakan untuk menjangka gelagat pelajar dan pensyarah dalam penggunaan LMS. Selain itu, tesis ini bertujuan untuk menentukan keperluan mereka pada masa depan dalam menggunakan LMS. Satu tinjauan telah dijalankan yang melibatkan para pelajar dan pensyarah daripada universiti awam wilayah utara. Seramai 727 orang responden telah dipilih sebagai sampel kajian. Tesis ini telah menggunakan *Expectation Confirmation Theory* (ECT) untuk melihat gelagat pengguna dalam menerima LMS. Di samping itu, terdapat enam pemboleh ubah utama termasuk kegunaan dilihat (PU), penggunaan mudah dilihat (PEOU), pengesahan (CON), keseronokan dilihat (PE), kepuasan (SAT) dan jangkaan penerusan (CI) dalam penggunaan LMS bagi mencari hubungan antara pemboleh ubah yang dipilih yang mempengaruhi jangkaan pengguna untuk menggunakan LMS dalam pengajaran dan pembelajaran mereka. Satu set soal selidik berstruktur telah digunakan. Data kajian telah dianalisis menggunakan perisian SPSS 20.0, bagi menentukan hubungan antara pemboleh ubah yang dipilih. Dapatan kajian menunjukkan bahawa PU, PEOU, CON, PE, SAT dan CI adalah pemboleh ubah penting untuk menjangka gelagat pengguna dalam penggunaan LMS secara berterusan.

Kata Kunci: Sistem Pengurusan Pembelajaran (LMS), Pelajar, Pensyarah, *Expectation Confirmation Theory* (ECT), Jangkaan Penerusan

ACKNOWLEDGEMENT

First and foremost, I would like to thanked the one and only God for blessing and giving me strength of mind, spirit, ablity, good physical condition, good health and guidance for me to complete this theis. God is one of my motivation to keep positive in completing this thesis and by God's blessing and permission, I have succeeded in completing this thesis. Along the way in my journey to finish this thesis, there are numerous parties involved in helping me either directly or indirectly assistance in order for me to accomplish my objective.

Secondly, my deepest gratitude and thanks of course to my supervisor, Dr Fadhilah Mat Yamin for giving me sincere and committed guidance, moral support, cooperation and being helpful throughout the whole process of completing this thesis since I first got acquainted with them personally. All their valuable comments, suggestions, academic support, moral support, ideas and advices have been instrumental guidance for me in finalizing this thesis. My supervisor is very dedicated and I highly respect her as an amazing lecturer.

Thirdly, special thanks dedicated to my beloved parents, Mr Muruthy A/L Sinnathamby and Mrs Indrani A/P Subbiah for non-stop prayers for my success, endless love, support and cares during my journey in accomplishing this thesis. Both of them are also one of my motivator to be positive and working my way in the right direction all the time. I would like to extend my thanks to all my brothers and sister, Kumara Guru, Kalaivani and Shivaguru for encouraging and motivating me from start till the end.

I also would like to give my sincere thanks to all my senior and dearest fellow friends especially Thana Naidu , Yogambigai Rajentran, Leelavathy Annadurai, Manoghari Devdas and Syarifah for giving me the moral support, companionship and help in finishing my study and also being my wonderful friends. I would like to say thanks to my senior Taneshan Letchumanan for helping me especially to do the data collection process. Additionally, I would like to thanks to all my fellow friends that I forget to mention who support and assist me.

Finally, I would like to thanked to employees from OYA, GSB, HEA (UUM, USM and UniMap) and other UUM's lecturer and staff for their good and remarkable service and special thanks to all the respondents who had given their cooperation along the process in completing this thesis. May God repay the kindness of everyone that I have mention above.

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LIST OF ABBREVIATION

LMS	= Learning Management System
ECT	= Expectation Confirmation Theory
PEOU	= Perceived Ease Of Use
PU	= Perceived Usefulness
PE	= Perceived Enjoyment
CON	= Confirmation
SAT	= Satisfaction
CI	= Continued LMS Usage Intention
IV	= Independent Variable
DV	= Dependent Variable
UUM	= Northern Malaysian University
USM	= University Science Malaysia
UniMAP	= University Malaysia Perlis
UiTM	= University Technology Mara
HEP	= Studnets Affairs Department
E-LEARNING	= Electronic Learning
DePAN	= Dasar E-Pembelajaran Negara
MOOC	= Massive Open Online Course
HEI	= Higher Education Institution
KPT	= Higher Education Ministry
PSPTN	= Pelan Strategik Tinggi Negara
GOL	= Globalised Online Learning

CHAPTER 1

INTRODUCTION

1.0 CHAPTER OVERVIEW

This section discusses the overall contents of the thesis. This chapter includes the background of study, problem description, research questions, research objectives, scope of the study, and significance of the study, plus the organisation of the thesis.

1.1 BACKGROUND OF STUDY

The e-learning system is an electronic technology that helps to develop knowledge and information, and to understand the users' behaviour. This is because the technology is able to demonstrate the users' ability and this can positively influence their behaviours. E-learning is a medium that provides paramount information and knowledge to the users. A study in Docebo (2014) that covers certain regions in the world has indicated that Asia scored the highest growth rate (17.3%) in the usage of e-learning, followed by Eastern Europe (16.9%), Africa (15.2%), and Latin America (14.6%). The statistics from Docebo showed that e-learning is under the concern of the users, where it is known as one of the important technologies among the users.

Additionally, e-learning is also listed as an advanced technology that is actively developed from time to time; especially in the area of information and communications technology (ICT). E-learning, at the early stage, is concerned more about spreading information around the world. However, in this 21st century, e-learning is emphasised on the construction of knowledge through the collaboration between the students via social network (Ishak, Yamin, & Ibrahim, 2015; Asia e-University, 2010). In short, e-learning is really beneficial to its

online users, where the technology is able to save cost, time and space, in which it is able to reduce the workload of the users.

Moreover, the Higher Education Ministry in Malaysia is aware of the importance of e-learning usage in higher education and they planned to support the *Pelan Strategik Tinggi Negara* (PSPTN). This awareness leads them to begin the *Dasar e-Pembelajaran Negara* (DePAN) on 16th April 2011, where they highly focused on providing the best quality system to develop productive users. This DePAN policy has planned three phases to be focused on implementing e-learning. According to Asia e-University (2010), DePAN is the fundamental policy towards their future development for Globalised Online Learning (GOL).

Furthermore, the Learning Management System (LMS) is one of the e-learning tools that can be utilized in every organisation to administered e-learning (Ishak, Yamin, & Ibrahim, 2015). Generally, most of the universities in Malaysia have already implemented their own LMS to record the users' performance. Students, lecturers, and administrators are the three major groups of people who are involved to use LMS widely in higher education.

Continually, besides LMS, there are various types of the e-learning system that are officially used; for instance, Learning Content Management System (LCMS), Knowledge Management System (KMS), and Course Management System (CMS) are the basic systems used (Adzharuddin & Ling, 2013). All these types are more related to the teaching and learning process. Whereas, this thesis gives more focus on LMS because it is used globally and locally. LMS is a software application or a web-based technology that is especially used to administrate, to assess a specific learning process, to share and deliver knowledge, and to track records. Importantly, LMS plays a vital role in the online learning process (Nor & Yamin, 2015; Min, Yamin, & Ishak, 2012). LMS typically provides instructions on how to

deliver content, to monitor the students' participation, and also to assess their performances (Rouse, 2005).

LMS is generally used in the corporate training and student learning environment to improve the users' skills. LMS can be utilised in various faculties mainly due to the ease of use, because the application is more user-friendly. Besides that, LMS is popular and widely used because it is free to obtain and can be modified. This is the prominent reason why the Ministry of Education in Malaysia plans to implement LMS in universities (Embi, 2011). There are several types of open sources used in LMS. The most common open sources used in the education environment are Moodle, Blackboard, Sakai, Dokeos, eFront, Schoology, and ILIAS, to name a few. Each type of these open sources has its own advantages and disadvantages.

However, this thesis does not concentrate on the type of applications; instead, it only focuses on the students and lecturers' perception and expectation on accepting LMS and to use the system continuously. It is because each and every university has developed its own LMS to simplify its teaching and learning operation. Moreover, the system is also able to control and determine the users' participation.

The main concern of this thesis is to find the users' expectation of using LMS continuously for their teaching and learning process. So far, there are a lot of studies showing that the LMS usage among the users has decreased compared to the new developing teaching method, which is web 2.0 tools. In the past 2014, there were some companies that used only 74% of LMS for their virtual classroom (Pappas, 2015).

As mentioned above, the enhancement in the web 2.0 tools for teaching and learning, also known as social network, has become a threat to LMS. The web 2.0 tools have been developed during the 19th century. As stated in certain earlier studies, most of the universities

were not able to completely utilise the web 2.0 tools due to the active LMS usage by the students to retrieve information (Asia e-University, 2010). However, this information is not necessarily true because the web 2.0 tools attract more online users to share information, especially for learning purpose (Ishak, Yamin, & Ibrahim, 2015).

Figure 1.1 shows the top 10 pages from Facebook and Twitter that are most commonly visited by the users in Malaysia. This shows that Facebook (84%), Twitter (80%), and additionally YouTube (80%) are the three major social networks that gain more attention from the users (Socialbakers, 2015). Based on this record, it is obvious that the web 2.0 tools are the most attracting tool used by the users.

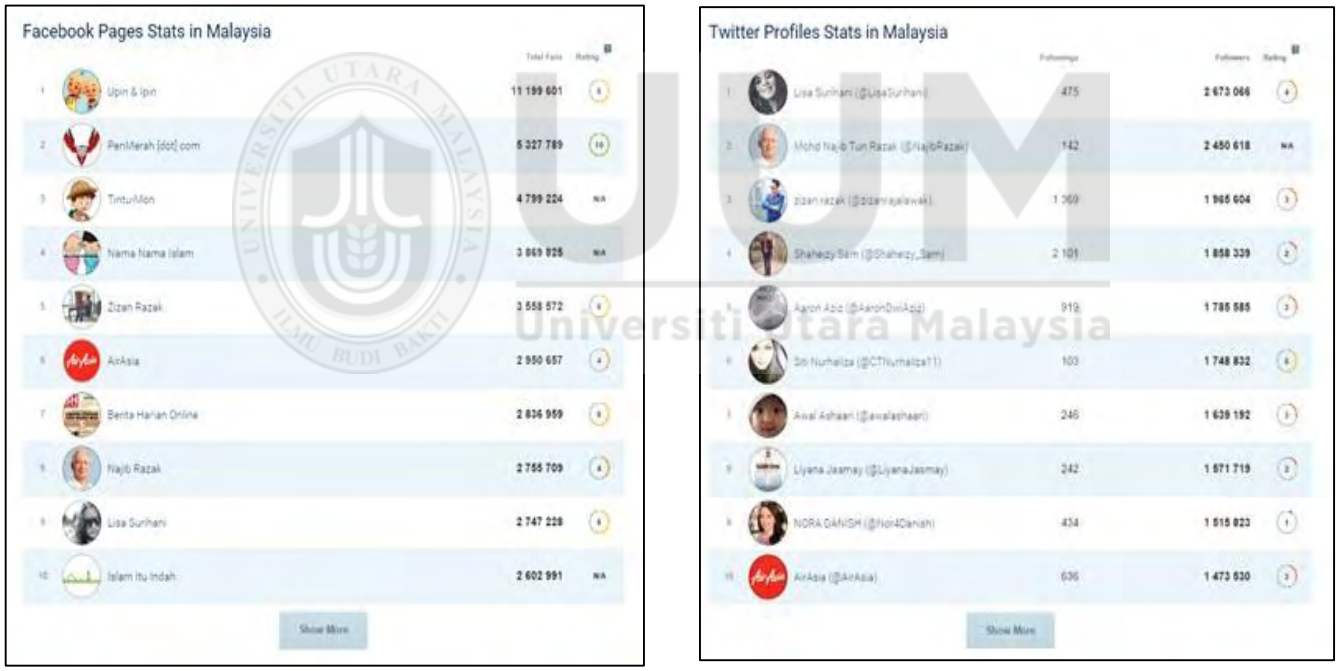

Figure 1.1: The top 10 pages on Facebook and Twitter viewed in Malaysia (Socialbakers, 2015)

Besides that, a study conducted in 2011 by Mohamed Amin about the e-learning system in Malaysian higher education institutions, pointed out that Slide Share (45.3%), Facebook (36.8%), and YouTube (37%) are being widely used as alternative applications for LMS by lecturers for teaching purpose. As generally known, high implementation of the web 2.0 tools

in the teaching and learning process indirectly reduces the LMS usage among the users. Obviously, all these statistics shown above indirectly addressed that the web 2.0 tools are a threat to LMS.

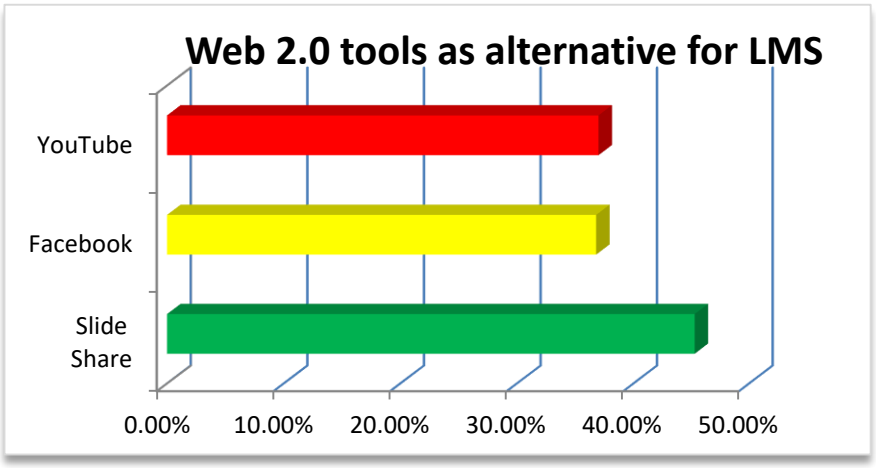

Figure 1.2: Social network as LMS among lecturers for teaching and learning purposes (Mohamed Amin Embi, 2011)

In addition, students and lecturers also felt more comfortable in using social network for their teaching and learning purposes. However, LMS is a great medium that is able to develop the communication between the students and lecturers.

Moreover, there are some prior researches that have been conducted on the e-learning system in the past decade. There is a previous study that discussed about the usage of LMS and web 2.0 tools among the students. The main purpose of the previous study is to determine the differences between Facebook and LMS. The aim of the prior study was to analyse the students' expectations and satisfaction in using the tools. The study also concentrated on the implementation of Facebook as LMS due to the benefits and potential viability (Meishar-Tal, Kurtz, & Pieterse, 2012; Gutschmidt, 2012). However, they failed to understand that implementing Facebook for the teaching and learning process may avoid the universities to

obtain adequate information regarding the users' performance in their teaching and learning process. Each and every recorded data on the users' activity during the teaching and learning process is really important in order to understand the users' perception and is helpful for future analysis.

Additionally, another study discussed on adopting the web 2.0 tools in academic libraries. It also pointed out several factors that cause less integration in LMS among the students. Besides that, the study was also conducted to identify the extent and purpose of adapting the features of the web 2.0 tools as LMS in order to use it in the academic libraries (Mahmood & Richardson, 2011; Hisyam, 2006; Han & Quan Liu, 2009). Possibly, this method can make the users more comfortable in using the web 2.0 tools concept rather than LMS. However, this may lead to less LMS usage, where the administrator will not able to record the users' access.

Moreover, in 2014, there is a study that discussed the satisfaction level of using the online learning system based on the learning association and the system design factor. The study was more concerned on the effectiveness of online learning with the perfect design structure in the learning process (Lee, 2014; Moses, Wan Ali, & Eric Krauss, 2014). However, this thesis focused on the users LMS satisfaction and expectation where the features were not in the concern.

Besides that, there is another discussion by Goyal and Purohit (2010), which analysed the effectiveness of the teaching and learning process among the users by using Moodle, one of the LMS open sources. They adapted Moodle in LMS because it is already available and is designed to fulfil the learning experience. More likely, interior design or the structure of the internal system is important to analyse the usage. However, this thesis does not concentrate on the type or design, but focused on the general LMS usage where each and every

perception of the users from the different background. This is because various opinions on LMS can provide more expectation and continuance of the LMS usage.

Furthermore, an article discussed the users' perceptions of using LMS in order to identify the problems and issues, and help to build a productive learning environment. They mainly focused on the stakeholders' (students and teachers) perception and the implementation of the LMS system in a Russian University (HSE) in order to understand the users' acceptance (Emelyanova & Voronina, 2014). However, the present thesis focuses on the northern regional universities and uses the study by Emelyanova and Voronina (2014) as reference. Moreover, the understanding of users' perception and expectation in LMS is important to improve the teaching and learning process, and to obtain a better outcome.

Importantly, another study combined several universities and colleges, to analyse the issues and challenges that need to be focused in order to improve the assessment among the students and the instructors. This is because both students and instructors are facing problems while implementing the technology due to their limited knowledge and skills (Arabasz & Judith, 2003). This study shows that the level of knowledge among the instructors and students is vital to make them perform efficiently.

Adding to that, Andersson (2008) discussed the challenges in developing countries while using LMS for the teaching and learning process. Furthermore, there are more concerns in improving the settings and students' productive outcome in using LMS. In connection with that, it has been identified the factors that give effects on students' usage on LMS and the barriers they face during using the system are also important. The previous study also focused that the schools (teachers) are the individuals that use LMS more rather than the students; to get a better outcome (Nasser, Cherif, & Romanowski, 2011). However, the two-way transmission between the instructors and students will give a good result.

At last, determining the LMS survival as the main teaching and learning tool among the students and lecturers is detailed in this thesis. Besides, the LMS continuity among the students and lecturers based on their expectation, and the challenges are also clearly stated in the discussion.

1.2 PROBLEM STATEMENT

The major problem focused in this thesis is to find out the users' expectation of using LMS continuously for their teaching and learning purpose. The higher number of web 2.0 tools usage by the universities compared to LMS among the students and lecturers is the main issue that has motivated researchers to conduct studies (Asad, Abdullah-Al-Mamun, & Clement, 2012; Cheung, Chiu, & Lee, 2011; Hew, 2011; Forkosh-Baruch & Hershkotz, 2011; Hurt et Al., 2012; Irwin, Ball, & Desbrow, 2012; Lampe, Wohn, & Vitak, 2011; Paul, Baker, & Cochran, 2012; Zaidieh, 2012). This issue is really important to be given attention because LMS is a system that has been developed especially for teaching and learning purposes. However, this thesis does not compare the web 2.0 tools and LMS; it focuses on the low LMS usage.

LMS is officially used and developed by each and every university to share and discuss their teaching and learning information. It has helped to record the users' activity and their participation. The university administration spends a huge amount of money to develop a sophisticated LMS system in the universities to produce an effective outcome. Therefore, LMS is supposed to be the most appropriate system to be used for the teaching and learning process. Since some users are not satisfied with LMS (Meishar-Tal, Kurtz, & Pieterse, 2012; Armstrong, 2013; Mobbs, 2003; Bickford, 2013), understanding their expectation on LMS is really important to motivate the users to use LMS continuously.

However, the less involvement in using LMS among the users is the major problem that needs to be given attention in the fisrt place. Due to that issue, this thesis expects to determine the users' real expectation on using LMS continuously for their teaching and learning process. Therefore, this thesis focuses on understanding whether the users are really motivated to use LMS continuously or they just use LMS as an obligation.

There is a lack of studies that focus on the users' expectations on continuously using LMS for their teaching and learning purposes. Therefore, this thesis uses a new theory from the marketing field that aims to find and evaluate the users' expectations on the continuous usage of LMS by adopting the expanded Expectation Confirmation Theory (ECT). Using this marketing theory (ECT) can state as one of the new methods to determine the users' mindset towards LMS consumption. There are six variables used in this theory, where they can be divided into five independent variables and one dependent variable. The first three independent variables are Perceived Usefulness (PU), Perceived Ease of Use (PEOU), and Perceived Enjoyment (PE) used to enhance the users' expectations on LMS. The other two remaining independent variables, Confirmation (CON) and Satisfaction (SAT) are used to understand the user satisfaction level, which can directly influence the dependent variable, Continued LMS Usage Intention (CI).

As indicated above, most of the studies have pointed out that the web 2.0 tools are widely being used as learning tools. This is mainly because students feel more comfortable in using the web 2.0 tools such as Facebook compared to the traditional LMS due to its ease of use (Meishar-Tal, Kurtz, & Pieterse, 2012; Cheung, Chiu, & Lee, 2011; Hew, 2011). Thus, this could be a main factor that has caused the users to avoid using LMS. Based on Gutschmidt's (2012) point of view, there is a positive impact on students' learning process by using social network (web 2.0 tools) as LMS. Shockingly, using web 2.0 tools in the teaching and

learning process is inappropriate because most of the time it diverts the users' attention to irrelevant areas, which indirectly affect their studies (Madge, 2009).

According to Arabasz and Judith (2003), computer experience, technical limitation, and infrastructure are the major issues faced by the users in using LMS. Adding to the previous statement, identifying the best tools or applications in LMS is the right solution to attract the users towards LMS usage. In other words, it is crucial to determine the expectations of the users on LMS when they start comparing the web 2.0 tools as the best system rather than LMS. The improvement in LMS will subsequently heighten the users' satisfaction on LMS usage, which is vital for LMS's survival.

Besides, another study discussed the teachers' determination and enthusiasm in inspiring the students' mindset towards the use of LMS (Emelyanova & Voronina, 2014). The users must understand the perceived usefulness and ease of use associated with LMS that can ultimately improve their performance. In conjunction with that, users' expectations of LMS must be understood and met for the continuous usage of LMS.

Additionally, as mentioned earlier, developing or implementing a new technology always involves a high amount of energy and cost on the part of the administration. Moreover, the students' active involvement and satisfaction will give a good return in investment (Naveh, Tubin, & Pliskin, 2010). All in all, the LMS usage and its satisfaction among the users are analysed to achieve a worthy outcome and motivate them to use the system continuously.

1.3 RESEARCH QUESTION

Based on the issues and problem statement that have been discussed above in Sub-Chapter 1.2, the central question of this thesis is as follows:

What is the impact of users' satisfaction on the continued LMS intention for their teaching and learning process in northern Malaysian universities?

The main question is further divided into several sub-questions to ease the findings. The sub-questions are as follows:

1. Does the users' satisfaction relate to the continued LMS usage intention?

2. Does the users' confirmation of expectation relate to their satisfaction on LMS?

3. Does the users' perceived usefulness influence their satisfaction?

4. Does the users' perceived usefulness directly influence the continued LMS usage intention?

5. Does the users' confirmation of expectations relate to the perceived usefulness?

6. Does the users' perceived ease of use have a relationship with their satisfaction?

7. Does the users' perceived ease of use have a relationship with the continued LMS usage intention?

8. Does the users' perceived ease of use have a relationship with the perceived usefulness?

9. Does the users' confirmation of expectation relate to the perceived ease of use?

10. Does the users' perceived enjoyment of LMS influence their satisfaction directly?

11. Does the users' perceived enjoyment of LMS influence their continued LMS usage intention?

12. Does the users' perceived enjoyment of LMS influence their perceived ease of use?

13. Does the users' confirmation relate to their perceived enjoyment of LMS?

1.4 RESEARCH OBJECTIVES

The overall aim of this study is to examine the impact of users' satisfaction on the continued LMS intention for their teaching and learning process in northern Malaysian universities. There are several other objectives that have been formulated to answer the research questions. The formulated objectives are listed below:

1. To examine the relationship between users' satisfaction and continuance LMS usage intention.
2. To examine the relationship between the users' confirmation of expectation and satisfaction on LMS.
3. To investigate the influence of users' perceived usefulness on satisfaction.
4. To investigate the relationship between the users' perceived usefulness and continuance LMS usage intention.
5. To determine the connection between the users' confirmation of expectations and perceived usefulness.
6. To determine the users' perceived ease of use on their satisfaction.
7. To investigate the users' perceived ease of use on continuance LMS usage intention.
8. To examine the relationship between users' perceived ease of use and perceived usefulness.
9. To determine the users' confirmation of expectation on perceived ease of use.

10. To identify whether users' perceived enjoyment of LMS can influence their satisfaction.

11. To identify whether users' perceived enjoyment of LMS can influence the continuance LMS usage intention.

12. To identify whether users' perceived enjoyment of LMS can influence the perceived ease of use.

13. To clarify the connection between confirmation and the perceived enjoyment of LMS.

1.5 SCOPE OF STUDY

For this research, choosing a suitable benchmarking institution is very difficult as most of the universities are situated far away from each other. It is very hard to collect relevant information for this thesis in a short period of time. Besides that, the large number of population, the duration for preparing the questionnaires, and the travel fees have been considered before making a decision on choosing an institution. Furthermore, this thesis has been conducted in the Malaysian context. In order to complete this thesis within the given period, a specific region has been selected to determine the students and lecturers' expectation on using LMS continuously for their teaching and learning process. The thesis considered the users' expectation based on their satisfaction on the system rather than the features.

Due to the facts as mentioned above, the northern regional public universities in Peninsular Malaysia are the most suitable universities, which helped this thesis to collect the data easily. The chosen public universities for this thesis are Northern University of Malaysia (UUM), University of Malaysia Perlis (UniMAP), and University of Science Malaysia (USM). MARA University of Technology (UiTM) was not selected for this study due to some factors

such as it has several branches and some of the locations of the branches are out of the scope. Besides, Sultan Idris Education University (UPSI) was also not selected because it is not listed in the northern region area.

Furthermore, the population of this thesis are the students and lecturers who have been selected from the three universities. This thesis uses multi-stage sampling, where it combines two different sampling methods. Stratified sampling and simple random sampling have been selected to determine the sample size of users. It is because, the total amount of users is really large, where it involves all the LMS users. To perform this sampling method, the total number of users has been collected from the Department of Students Affairs (HEP) of each respective university. Then, the simple random sampling is conducted based on the total number of users.

Besides that, the data from this thesis helps to find the effectiveness of the LMS usage among public university users. The scope of the data on LMS usage by the users of the northern regional public universities is relatively small if compared to the LMS usage by the users in the rest of public universities other than the northern region. However, the range of population within the northern region eases the process of data collection.

A prior research related to this topic examined the pattern of using the application (frequency) of the users within UUM in using LMS. However, this thesis extends to determine the users' expectations in using LMS continuously. This thesis only focuses on the users' continued LMS usage intention based on their satisfaction and it does not involve any design or feature of the system. It also involves a large number of users from different universities in the northern region, who have helped the research to achieve its aims.

1.6 SIGNIFICANCE OF STUDY

This thesis gives a good understanding about the users' expectations in using LMS. Besides that, the thesis also helps to identify the intention of the users' expectation of using LMS continuously in their teaching and learning process based on their satisfaction towards the system. This is because the thesis looks into the users' major point of view towards the LMS usage for teaching and learning purposes. To produce a better outcome, this thesis focuses on northern regional public universities only, where these involve the combination of three universities, namely UUM, USM, and UniMAP.

Furthermore, this thesis also helps to identify the major causes that lead to lower consumption of LMS in universities. By determining the causes, the universities could improve their technology infrastructures in order to maximise the LMS usage among the users. Despite the fact that the web 2.0 tools are very much influential among the users, the positive perception on LMS compared to the web 2.0 tools can ultimately improve the LMS usage in future. Due to that, overcoming the basic expectation of users on the web 2.0 tools is important to take into consideration in improving the LMS usage.

In short, all the findings and solutions in this thesis might help the universities to enhance a better LMS by fulfiling the users' requirements and expectations in the future. Additionally, these findings have both academic and practical values in achieving the aims of the thesis. In the academic perspective, this thesis is aimed to test the theoretical framework in the context of continuous LMS usage. The practical perspective is more concerned on how the users perceive on using LMS; so that the public universities are able to determine the users' expectation.

Besides that, the result of this thesis is expected to improve the awareness on LMS among the developers and senior management in the future. The expectations are as follows:

1. The empirical data from the thesis can used by the IT departments in universities or others who are responsible for setting up, evaluating, or implementing LMS.
2. The thesis also helps to improve the core information for programme administrators to create a new system in which they can fulfil the users' expectation by understanding the current trend.
3. The data collected and the recommendation provided in this thesis are helpful and applicable to other institutions as well, not just public universities and private universities.
4. The empirical data and the research framework can be used in future studies as well to establish a better LMS in other regions (not just the northern region) even if the trend of learning system differs in future.

1.7 DEFINITION OF KEY TERMS

This section explains the definition of each key term of the variables in this thesis. There are six variables in this expanded ECT framework.

1.7.1 Continuance Intention on LMS (CI)

This Continuance Intention on LMS is the main variable in this thesis, which helps to identify the users' expectation and their future intention to use the system. The continuance intention is usually developed based on the users' initial acceptance decision after an experience with a product or service. Generally, the positive impact of the system will increase the users' continuance intention or vice versa.

1.7.2 Perceived Ease of Use (PEOU)

Perceived Ease of Use is a variable that helps to determine the users' belief in the system's simplicity. The users' positive perception of a system, where it can reduce their workload, will directly increase the use of the system. Due to that, this variable is vital to ascertain the users' acceptance of the system, which can develop the continuance use.

1.7.3 Perceived Usefulness (PU)

Perceived Usefulness is another variable in the framework that is related to the users' belief in the system's enhancement towards their job performance. This is a variable that supports the users to understand whether they are able to conduct their task easily and productively. Therefore, this variable is important to predict the users' continuance intention of the system.

1.7.4 Perceived Enjoyment (PE)

Perceived Enjoyment is a variable that is used to determine the users' joviality and enjoyment throughout using the system. It is an important variable in this thesis because discovering the users' involvement helps to clarify their interest in using the system. As usual, a high level of enjoyment directly increases the users' continuance usage, while less interest will reduce the usage.

1.7.5 Confirmation (CON)

Confirmation is a variable that is related to the users' desire on a product or service based on their expectation. In detail, the more the users expect from the product or service, the more coincidental they get disappointed or vice versa. Due to that, the users' confirmation on the product or service is clearly related to their expectation or prediction based on their perception.

1.7.6 Satisfaction (SAT)

Satisfaction is another variable in this framework that is crucial to this thesis. Satisfaction is an expression of the users after they consume a product or service. Generally, the users' have a high level of satisfaction if their expectation is fulfiled by the product or service after use. Hence, it is really important to focus on the product or service quality so as to boost the users' satisfaction, which directly increases the continuance of use.

1.8 ORGANISATION OF THESIS

This thesis includes five chapters, references, and appendix that are related to this thesis. The entire five chapters are discussed below. The first chapter discusses the overall contents of the thesis. This part includes the background of study, problem description, research questions, research objectives, scope of the study, significant of the study, and organisation of thesis.

This second chapter discusses the overview of e-learning, specifically focusing on the LMS area of this thesis. This chapter initially defines LMS, its function, potential benefits and limitation, usage, purpose, and the general issues faced by users. Additionally, this chapter also reviews the web 2.0 tools in short. After that, it examines the underlying theory, the expanded Expectation Confirmation Theory (ECT), and its hypotheses and the relationship between the variables.

In the third chapter, the research design (quantitative), population and sample (northern regional public university student and lecturer users), data collection procedure (questionnaire), variables, and measurements used in the thesis are discussed in detail. At the end of this chapter, there is a brief description of the strategies used to analyse the data collection.

The fourth chapter will concentrate on the analysis and the interpretation of the data collected for this research. At the beginning of the chapter, there is a brief explanation on the specific software that is used in the analysis. Some reports of the descriptive statistical analysis, factor analysis, regression, and correlation are included as well. The output of the analysis will be summarised into a number of tables and charts in order to facilitate the interpretation.

In this last chapter, there is an overall discussion and interpretation on the data collected in this thesis. Later on, those findings are compared to the previous studies and the hypotheses in Chapter 2. Following that, some recommendations or suggestions are also given, especially on how to improve LMS in future. There is a list of limitations faced during the study. At the end of Chapter 5, a general conclusion will be given by summarising the whole thesis.

CHAPTER 2

LITERATURE REVIEW

2.0 CHAPTER OVERVIEW

This chapter presents an overview of the general scope (e-learning) and narrow down to Learning Management System (LMS). Then it discusses about the definition, features and advantages as well as disadvantages in LMS. It also introduces and discusses about the underlying theory chosen for this thesis which is the expanded Expectation Confirmation Theory (ECT). In addition, the hypotheses were listed and described with supportive research findings.

2.1 THE E-LEARNING USAGE AROUND THE WORLD

As mentioned before in the background of study, e-learning is a medium that used by an individual, organisation or a country to communicate and learn through electronic medium. E-learning provides a lot of information and knowledge to the users. At the same time, this e-learning has contributed benefits; especially to the students and lecturers where it can influence and changing their imagination toward the online education.

According to Chawla and Joshi (2012), e-learning has emerged as the most popular medium for education and training. Additionally, Tagoe (2012), agrees that e-learning is a system that is usually supported by information and communications technology (ICT) such as the Internet, Intranets and Extranets to improve the quality of teaching and learning. This shows e-learning is very essential to the teaching and learning process.

In addition e-learning is also considered as an alternative to the traditional learning because it is an effective way that could help the students to access their course-related materials via online system (Ishak & Yamin, 2016; He, Peng, Mao and Wu , 2010). Moreover, the teachers

also extend the area of learning, besides from the classroom learning experience by providing the part of the course content via online to the students (Martins & Kellermanns, 2004). The previous studies explained that the e-learning could not succeed or achieve its goal without user participation. It is because the participation of the students is the preconditions to the successful implementation of e-learning system. However, the lecturers also plays the important role to motivate the students to use the system.

Besides that, the e-learning system also known as a web based information system of teaching and learning, where the methods allow flexible learner-centred education, (Lee, 2008 as cited in Ying-YA & Wang, 2008). However, the e-learning is not the only way to gather information but it is also a way to promote the learning content, advance personalized system, relevant to the learning experience and improve the collaboration with the experts and peers (Pillay *et al*., 2007 as cited in Chawla & Joshi ,2012).

Due to the importance of the e-learning, it has been spread and used all over the world. In 2014, there is a study conducted to know the market trends of e-learning that show the growth of the usage among the users are positively increased. The statistics were discussed in the Sub-Chapter 1.1 where; the Asia region scores the high score due to the highest usage on e-learning in India. So, how about the other countries in Asia region, especially Malaysia? The statistic of the e-learning growth in several regions is shown in figure 2.1.

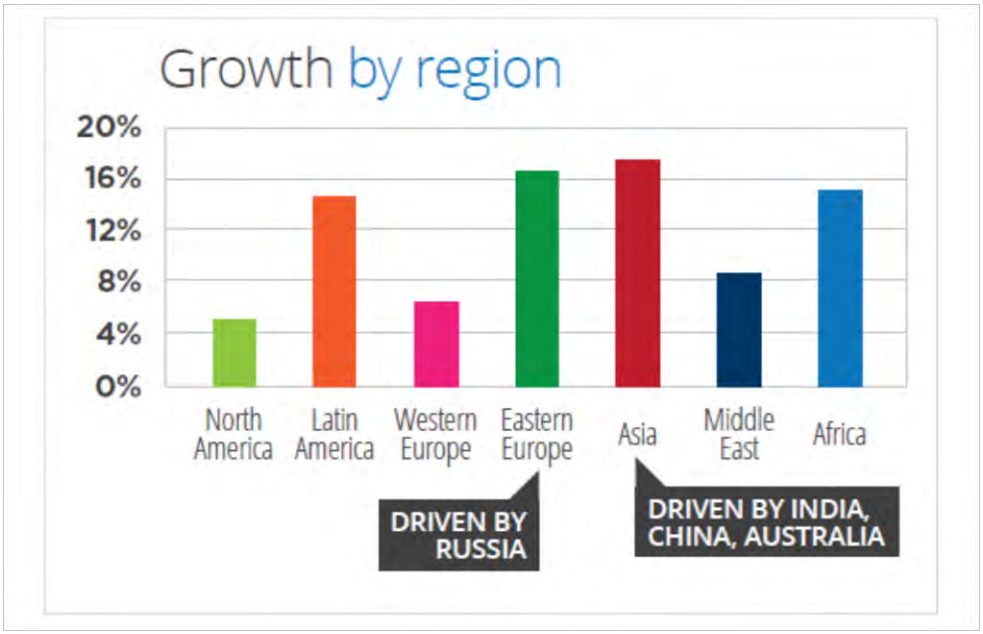

Figure 2.1: 2011-2016 E-Learning Growth rates by region (Docebo, 2014)

In Malaysia, e-learning started to be established in 1998 by University of Malaya (UM), where the first LMS that is the course on-line (COL) in Malaysia. Then, it followed by other universities such as MMU, IMU, UNITAR and OUM (Asirvatham, 2009). The e-learning also can be categories in several types such as mobile learning and cloud computing while the focus of this study is LMS. This is because, LMS is a system in e-learning, which helps to connect the users for educational purpose.

2.2 THE LEARNING MANAGEMENT SYSTEM (LMS)

As mentioned in Chapter 1, the LMS can be categorize as one of the internal system in e-learning. The LMS is the e-learning instrument, which is frequently used in the learning area and it is a core instructional resource that is especially developed to use for the teaching and learning purpose. Besides that, LMS is designed to connect and allow the instructors and students to access the system from anywhere, at any time (Kokensparger, 2013; Naveh, Tubin, Pliskin, 2010). In relation to the previous sentence, there are several universities using the LMS as a medium to support the information and knowledge transfer between the instructors and students (Moses, Wan Ali, Eric Krauss, 2014).

More than that, the entire educations that used the Web-based interaction learning environment are widely using the LMS (Absouchedid & Eid, 2004). However, Shepherd (2011), stated that the combination of formal and compliance learning with informal and collaborate learning is able to motivate and empower the users on what they want to learn. It also integrate the set of network; which able to support the online teaching and learning process among the users by computerized the tools in LMS (Goyal, 2010).

Mainly, the LMS is created or purchased by the educational institution. It is obtain to help the students to have their own space for online studies (Meishar-Tal, Kurtz & Pieterse, 2012). Typically the LMS is the most suitable tool which provide the users to understand and able to perform to create the contents, monitoring the students participation and discuss their opinion. Additionally, the LMS offer the higher level of interactivity with the users by providing some significant application. The LMS also has been utilised as an application on tracking, manage the process systematically in administration and recording the past data, examining, planning, virtual classroom and instructed-led courses for each specific courses (Adzharuddin, 2013).

Besides that, the LMS contained several features that can attract the users to apply the system for their teaching and learning purpose. The features that discuss in ITVIZ (2012), Ferriman (2012), Sharma and Vatta (2013), Edutech Wiki, Reliant (2009) are such as automate administration (registration & enrolment), self-guide service (user's account), enrollment in courses (adding or deleting), compile and deliver learning content quickly, consolidate initiatives for training, support standards and portability, customize content (upload and retrieve assignment), access and complete performance evaluations (forum and module), complete skill test and enable the reuse of knowledge and deliver webinars and training session online.

All the features can differ for every open source. Apart from that, the LMS has some common open sources such as Moodle, Sakai, eFront, Dokes and ILIAS. Moodle is the most common system that widely used by the universities. However, the selected universities for this thesis using different open sources. However, this thesis does not concerned more on this open source or its features that used by the universities but concern on the users' perception on the LMS and their future expectation.

Moreover, there is a distinct advantage and disadvantage on using the web 2.0 tools such as Facebook over the LMS; because it became a challenge to the users understanding. Even though most of the universities users were adopting the new web 2.0 tools which is Facebook for their teaching and learning purpose. It is because the non-systematic structure associated with Facebook unlike the conventional LMS is considered as an important factor that affects the learning process of the students as Facebook has more social space compared to learning space (Meishar-Tal, Kurtz & Pieterse, 2012; Gutschmidt, 2012).

However, there is a study where analyses the students' and teachers' perception on LMS in Russion University. The study assumed the administrative support, system implementation in

university and various organisations, structural and infrastructure issues are the important factors that influence and help to determine the connection and the users' perception. Despite that, both the teachers and students have different perceptions towards the LMS; where the students feel that they have lack of control and involvement in using the LMS to improve their progress (Emelyanova & Voronina, 2014).

Based on several studies, this thesis has identified and perceived the variables and the findings for the current research. While there is a study discussed about the challenges that used five variables to produce an outcome about their current computer expertise and use quantitative method (Arabasz & Judith, 2003). On the other hand, Andersson (2008), used seven variables to identify the challenges for e-learning by using the mix method to compare that in 2003. There are some common variables used in the studies such as supports for students, flexibility, reluctant, attitude on e-learning, access, mainstream user (Arabasz & Judith, 2003; Andersson, 2008). More commonly both of the studies are aimed to find the issues that faced by the users in using the LMS.

Furthermore, there was a study conducted to analyse the students' perceptions on e-learning by using the Technology Acceptance Model (TAM). Although the point is irrelevant, the outcome of the study consider as important point to this thesis. Whereas, the TAM as positive outcome, because the students are able to accept and use the technology in more advance manner. It also mentioned that the users have sufficient awareness of the system and the variables have strong impact on e-learning (Almarabeh, 2014).

However, there is an article about the students' expectation on teacher in using the LMS also discussed some point that related to this thesis. This study focused on what students were expecting on how the system should be used by their instructors. The result indicated the staffs' and the instructors' ability on use the advance LMS will more helpful to the students

(Steel, 2007). Hence, the lecturers need, to understand the students' requirement for their teaching and learning process. By fulfil the students' need they directly can influence the students comfort on using the LMS.

Due to some factors the LMS are widely used by the universities and it is easy to determine the advantage and disadvantage of the LMS to the users. The key element of the advantage and disadvantage of LMS were stated in the table 2.1.

Table 2.1: Difference between the advantage and disadvantage of LMS (Adapted from Sharma and Vatta, 2013; Mott, 2010)

ADVANTAGE	DISADVANTAGE
Using the simple proper and consistent learning strategies	Conventionally, LMS tend to be course centered rather than student centered
Supports the sophisticated contents in various format	Focus on instructor use rather than student use
Able to access to course material at anytime	Many teachers are challenged to design and organise a mixture of learning activities (Samsonov & Beard,2005)
Improvement in teaching methodology and the outcomes of the learning are not guaranteed through LMS	Very easy to convert existing poor teaching practices to a LMS
Various activities offered to the users	Online teaching leads to an increase in teacher workload (Dralle,2007)
Re-use of the learning activities can be done	Lack of information literacy or knowledge among the trainers in information management skills
Simple and inexpensive to train and support	Interoperability challenges and difficulties
Private and secure	Rigid, non-modular tools
Integrate with student information system	

Besides that, there is a statement on LMS in business world. It says that LMS is an important element within an organisation to track, manage and report all learning and development activities (Tatiparthi, 2014). The amazing 6 statistics about LMS, developed by the India CommLab for the effective learning and its discussed in detail in the next paragraph.

According to Tatiparthi (2014), there are six statistics statement on LMS. The first statement indicated that, according to Capterra, Moodle is the most popular open source in LMS. It is because Moodle is the very common open source that suitable for the learning and training among the users. Second statement explains that, 59.6% of federal, state and government agencies were using the corporate LMS product (ELearning Guild, 2013 as cited in Tatiparthi, 2014). As stated above, the LMS is fully focused on online learning so the users can perform well.

Then the third statement is about 78% of the organisation were already used the LMS where the 33% were looking to upgrade or replace the system for advance technology (Brandon Hall, 2012 as cited in Tatiparthi, 2014). Technology is something that has continuance update where the upgraded software can improve the product performance. Hence, when the organisation try to upgrade the new version of the LMS; it can enhance the users' performance and able to increase the productivity.

Continuously, there are 25% of organisation in survey stated that they use multi LMS to cater their varied business need. Adding to that, 40% from a survey shared that 20% to 50% of their training budgets were spent on training and LMS administration while 7.3% report that they spend more than 50% (Expertus, 2007 as cited in Tatiparthi, 2014). Finally, the 67% of organisation say user engagement is the top barrier to adopting technology enabled compliance training (Towards Maturity, 2013 as cited in Tatiparthi). However, sometimes the employees feel less involved in using the new technology because their low level of

expertise. This issue can be overcome by providing more training on the LMS to the employees.

2.3 THE ISSUE OF USING LMS AMONG UNIVERSITIES USERS

There are several issues as been addressed in using the LMS on previous studies. The low infrastructure and technology which is not in current trend also a problem that faced by the users. Adding to this, the awareness level, low adoption rate, bandwidth issues and connectivity, computer literacy and digital divide, lack of quality e-content, difficulty in engaging the online learning and language barrier among the students also consider as an issue among the students (Arabasz, Pirani & Fawcett, 2003).

Besides that, enhance or improve the outcome from a department, they always need to have a new adoption of technology. Due to that, the LMS also involved higher number of investment to develop a system in the universities to receive a positive reflects from users. Naturally, the high technology contains several applications which can delight the users work on-line. However, buying or adopting a new technology in an organisation often very costly and expensive to the administration due to various reasons (Hall & Khan, 2003; Meishar-Tal, Kurtz & Pieterse, 2012; Project summary & supporting data, 2011). The technology development always involve a long time period, resources and high cost, so each decision must be vice before the implementation (Bickford, 2013).

Nevertheless, the implementation on LMS could not determine as best solution for improving the level of users (Randall & Sweetin, 2010). However, the knowledge that applies on the technology is the factor that can determine the success or the failure of a system. The time limitation and lack of support are the frequent answer or known as barrier by the instructor to

not use the LMS (Christie & Garrote, 2011). There some studies declared that LMS received a lot of complaints from the end users. Most of the issues are very common to each study. All the problems are listed below (Bickford, 2013; Ferriman, 2012):

i. Does not have new version frequently
ii. Confusing for new users to navigate
iii. Cost a lot every time during customize a feature
iv. Does not fix the existing administration workflow
v. Does not provide the appropriate report
vi. Does not have virtual classroom

Nowadays, most of the users are familiar with the web 2.0 tools on their teaching and learning process. Due to the problems as listed above, the web 2.0 tools become popular among the users and a threat to the LMS. Therefore, this thesis planned to determine the users expectations and overcome the issues that faced by the LMS for teaching and learning process.

2.3.1 Web 2.0 tools

Web 2.0 tools are a social network whereas used for sharing the knowledge and information for learning purpose. Currently, the web 2.0 tools play an important role among the users because it helped them to interact and collaborate with each other in social media. There are several type of web 2.0 tools that become main concern among the users are Blogs, Facebook, Twitter, YouTube and Slide share. As discussed in the background of study, there are a lot of studies has been conduct on this area where using the web 2.0 tools as LMS for teaching and learning purpose.

Meishar-Tal, Kurtz and Pieterse (2012), stated that the web 2.0 tools (Facebook) have several distinct advantage over LMS in Israel. But, the web 2.0 tools have high level of exposure to each other's life which is more sensitive and unhealthy for the learning area. Certain parties says that web 2.0 technology provide the valuable information for the future strategic development (Han & Quan liu, 2009). The extended applications in the web 2.0 tools are the main source that attracting the users to increase their interest on using the web 2.0 tools. Due to that, the adaption from the web 2.0 tools on LMS might able to increase the LMS usage among the users.

2.4 THE UNDERLYING THEORY

In earlier, there are a lot of studies regarding LMS. Most of the studies are aimed to analyse the perception, usage, factors and challenges in LMS. The regarding studies to LMS mostly used the TAM model; because it is the common framework that regularly used to analyse the continuance intention of the users. But this thesis focused on the students' and lecturers' perception and their expectation on using the LMS for their teaching and learning process.

As stated previously, there are some prior studies used this model in different areas that combined these theories. Adding to that, there is also a study that combined this TAM and ECT theory with Theory of Planned Behaviour (TPB) and DeLone and McLean model. However, this thesis is mainly aimed to determine the students' and lecturers' expectation and their continuance usage on LMS. Due to that, the expanded Expectation Confirmation Theory (ECT) model has been focused on this thesis.

2.4.1 Expectation Confirmation Theory (ECT)

Expectation Confirmation Theory (ECT) is a theory that used to explain the post-purchase or post-adoption satisfaction of the users. In other word, this theory also used to determine the users expectation on certain usage. The model of this theory was developed in 1977 and extends for new version on 1980 by Richard L. Oliver. The model by Richard L. Oliver is more to the pre-adoption. Then, this theory further adapted by Bhattacherjee in 2001, where developed to a post-adoption model. This thesis follow Bhattacherjee basis IS model concept which is post-adoption on LMS usage. Previously, this theory normally use in the psychology and marketing field to understand the users mindset and their satisfaction on the products. According to Kim and Crowston (2011), the ECT helps to realize the phenomena among the users to consider on the continued or discontinued use of technology.

This thesis used the ECT to identify the users' expectation on LMS. Whereas, in different study the ECT explains the cause of satisfaction occur by focus on antecedents and satisfaction formation process (Susarla, Barua & Whinston, 2003). Nevertheless, the intention to repurchase each product is based on the fulfilment of their initial expectation (Al-maghrabi, Dennis, Halliday & Abeer, 2011).

There are several ECT model has been explored on the earlier studies. As mention before Bhattacherjee is the person who developed the first IS continuance model; also known as the extended or post-acceptance ECT model in 2001. In this model he was combined the Technology Acceptance Model (TAM) to determine the post-expectation of the users. This is because the perceived usefulness has strong influence on understanding the continuance intention based on the user satisfaction (Premkumar & Bhattacherjee, 2008). In addition, this model also able to relate the satisfaction and perceived usefulness to determine the users'

expectation on using the LMS (Limayem & Cheung, 2008). The origin of the ECT framework to discern the post adoption of LMS is depicted in figure 2.2:

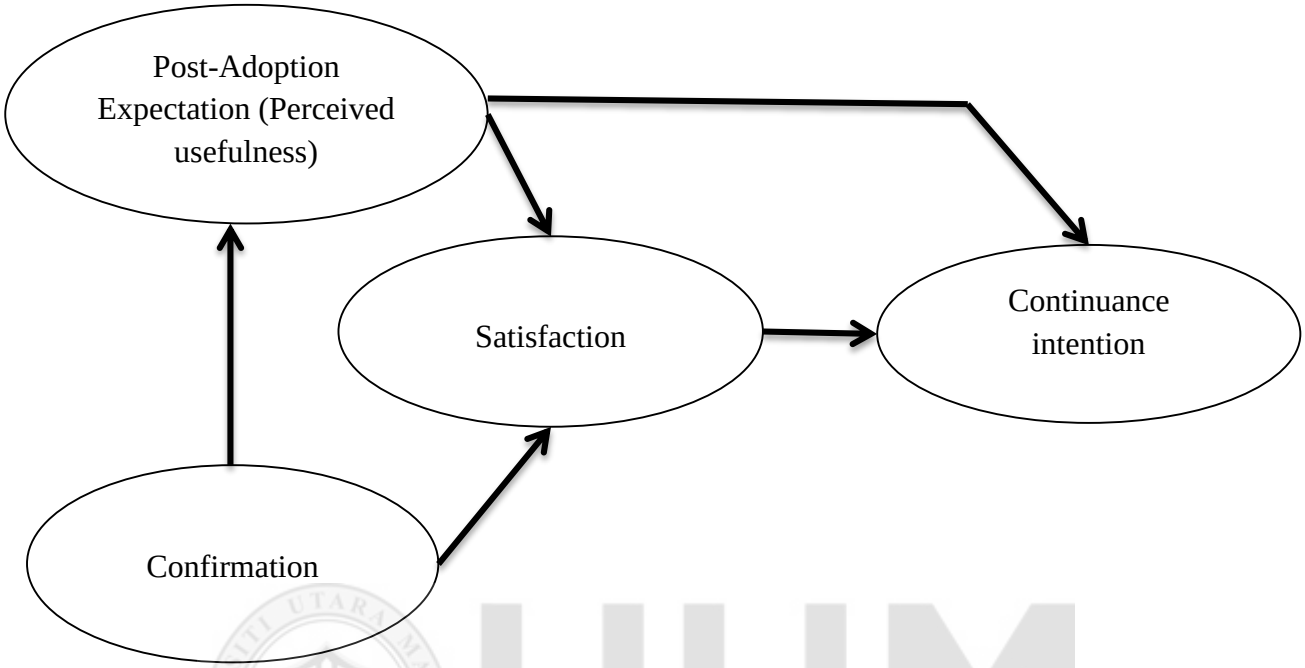

Figure 2.2: A Post-Acceptance Model of IS Continuance Intention, (Bhattacherjee, 2001)

However, this thesis select the expanded ECT model that adopted from Thong, Hong and Tam (2006). All those six variables in the framework discussed in below 2.5 and 2.6.

2.5 CONTINUANCE INTENTION ON LMS

The main focus and dependent variable of this thesis is the continuance intention on LMS. Intention are the strong predictor of future behaviour of a person which hard to recognise. Due to that, it is really crucial to analyse the continuous intention of the northern regional public university students' and lecturers' to determine their expectation on using the LMS. An understanding of the continuance intention toward LMS usage provides insights to the universities administration whom able to realize the users' need in LMS. As mentioned by

Bhattacherjee (2001), this IS continuance framework is developed to identify the distinctions between the acceptance and continuance behaviour of users.

This continuance intention has been used in several studies in past decade where in different scope. Each of the studies were aimed to discover and improve the continuance intention of the users' to obtain a better outcome. According to Al-maghrabi, Dennis, Halliday and Abeer (2011), the continuance intention of the customer able to provide the useful and important information for the managers to understand and increase the online shopping among their online consumers. This shows that the continuous usage among the users' are reflect their satisfaction and loyalty of the product.

Conversely, the technology changes or development in a system (technology in use) also indirectly can influence the user's perception and may affect the continued use in contrast with the initial use or acceptance (Mendoza, Carroll & Stern, 2008). Moreover Gao, Waechter and Bai (2015), also declared that understanding the users' continuance intention is vital for them to create profitability and sustainable development by knowing the consumers intention for mobile purchase. As per the previous article, determining the continuance use is really important to ensure sustainable growth of service provider in using the mobile instant messaging (MIM) (Oghuma, Libaque-Saenz, Wong & Chang, 2015).

Besides that, Chow and Shi (2013), stated that the confirmation of expectation of e-learning among the students' is directly or indirectly helped to predict the users' satisfaction and continuance intention. Based on this, identifying the continuance intention among the users helps the administration to enhance and develop the product or service according to the users' expectation.

In addition, the confirmations of students' evaluation of their usage in LMS also affect their perception about its usefulness; as well as their satisfaction which can influence their

intention to continue using the technology (Limayem & Cheung, 2008; Bhattacherjee, Perols & Sanford, 2008). Moreover, there is positive output when the intention on continue using the LMS by the users based their believed would eventually improve their job performance, even the performance are not realized during prior usage experience (Bhattacherjee, Perols & Sanford, 2008).

Hereafter, the supporting variables in this theory also consider as important implication that contribute to the continuance intention on using the LMS. According to this expanded ECT, the users' confirmation of expectation is directly influence the perceived ease of use, perceived usefulness and perceived enjoyment on using the LMS which in turn affects satisfaction. Whereas, the satisfaction can stated as a main factor that have the high influence on continuance intention. This framework also indicates that, these five variables are together directly and indirectly affects the continuance intention on using the LMS.

2.6 INDEPENDENT VARIABLES

This expanded ECT model has some unique features which extended from the post-acceptance model (IS Continuance Model). The previous model that developed by Bhattacherjee only has four variables where it develops to six variables. As mention above, this expanded ECT model mainly highlight and focus on the post-adoption expectation rather than pre-adoption expectation. The independent variables that listed in this framework are perceived ease of use, perceived usefulness, perceived enjoyment, confirmation and satisfaction.

2.6.1 Perceived Ease of Use (PEOU)

Perceived ease of use can define as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989). Besides that, it can define as users' subjective perception of their ability on using the technology to develop their job performance to complete a task (Bugembe, 2010; Shen, Laffey, Lin & Huang, 2006). Also PEOU is strongly depends on its actual implementation rather than the functionality itself (Rocker, 2009). Additionally, PEOU is a variable that related to the usage on particular system that would be effortless to the users (Karahanna & Straub, 1999).

Moreover, the PEOU is a "user-friendly" to the users on the website, so this can potentially increase the online purchases (Ramayah & Ignatius, 2005). According to Gefen and Straub (2000), the perceived ease of use is more related to the nature of task such like the intrinsic of the characters of system where the PEOU can directly affect the technology if the technology has integral part on IT usage. The perceived ease of use also an assessment of mental effort where make users to focus on the system interaction and not on objective external interaction (Heijden, 2004).

2.6.2 Perceived Usefulness (PU)

Perceived usefulness (PU) can be defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989; Rocker, 2009). The perceived usefulness is a significant factor which can predict the intention of students to use the courseware (Shen, Laffey, Lin & Huang, 2006). The system also with high PU can influence the users' believes in the existence of positive use-performance relationship (Bugembe, 2010).

The perceived usefulness is considered as important antecedent on technology adoption and used to analyse or understand the adoption of technology usage (Gefen & Straub, 2000). Besides that, the perceived usefulness also define as a users' opinion where the usage of a system would improve their performance (Karahanna & Straub, 1999). Perceived usefulness also able to draws the attention of the user interaction on outside benefit and external of the system to improve the job performance (Heijden, 2004).

2.6.3 Perceived Enjoyment (PE)

According to Davis, Bagozzi and Warshaw (1992), the perceived enjoyment is "the extent to which the activity of using the computer is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated". Moreover, the PE has an extra focus on intrinsic motivation which expects to predictor the intention on using the LMS (Heijden, 2004). Adding to the previous statement, the PE develops the belief among the users to buy online based shopping orientation (Ramayah & Ignatius, 2005).

In a past study, the perceived enjoyment define as, "It represented a type of intellectual playfulness and is define as an individual characteristic that describe an individual's tendency to interact spontaneously, inventively and imaginatively with computer" (Anandarajan, Igbaria & Anakwe, 2002). Normally the perceived usefulness and perceived enjoyment are not directly related to each other. This is because; the social pressure will not affect the microcomputer usage as state in Anadarajan, Igbaria and Anakwe (2002). But this thesis used the perceived ease of use with perceived enjoyment in using the LMS because it related to the students self-motivational or experience factors. If an study need to identify the users' satisfaction and continuance usage, this perceived enjoyment play an important role where it has both direct and indirect effect on users LMS usage.

2.6.4 Confirmation

The confirmation is totally different from the disconfirmation. Confirmation is the combination between the positive and negative site where "have low and high probability desirable and undesirable events occur or do not as expected" (Oliver, Rust & Varki, 1977). Whereas, this confirmation positively relate to the users expectation and their perceive performance. However, "predictions about the future and unrestricted universal generalisations are logically implied by our observational evidence, which is limited to particular facts in the present and past" (Maher, 2006).

2.6.5 Satisfaction

Satisfaction is an expression of the users after they implement or use the product or service such as LMS. The customers' satisfaction build based the evaluation after used some product whether it is different by some features, factor or the presentation of the product itself through the expectation (Yi, 1990; Day, 1984; Kotlar, 1991; Parasuraman et. al., 1985, 1988; Tse & Wilton. 1988 as cited in Jakpar, Sze Na, Johari & Myint, 2012).

Besides that, the satisfaction can be measured only after the post-purchase evaluation process (Hermans, Haytka & Mott-Stenerson, 2009). Adding to previous statement, the satisfaction is defines as the difference between the expectation and performance however the quality and satisfaction is totally difference because it is interrelated (Mosahab, Mahamad & Ramayah, 2010). Due to some factors the users' satisfaction on LMS may lead to success or failure of the system. This is because; the users' satisfaction is a critical factor in analysing their expectation (Zviran, Glezer & Avni, 2006). According to this framework, the satisfaction is not an mediator or moderator (Thong, Hong & Tam, 2006).

2.7 THE RELATIONSHIP BETWEEN THE INDEPENDENT VARIABLES AND DEPENDANT VARIABLE

2.7.1 Satisfaction and Continued LMS Usage Intention

In general, every satisfaction on certain product or service will increase the users' usage. Almahamid and Abu Rub (2011), stated that the satisfaction could be a key factor where can lead to continuous use of LMS. Besides that, the users' satisfaction with their expectation has higher level of continuance usage of the system (Limayem & Cheung, 2008).

Moreover, trust is another sub-element in the satisfaction of the customer. Consequently, the high level of trust on LMS can increase the users' satisfaction and it was directly lead to continuous LMS usage. Although, the regular interchange of the system also produce new information and give impact on the individual's perception (Flavin, Guinaliu & Gurrea, 2006). Hence this thesis derives the following hypothesis:

> ***H1. Users' satisfaction with LMS is positively related to their continued LMS usage intention.***

2.7.2 Confirmation and Satisfaction

The confirmation referred to the features of the system which can influence the users' satisfaction in online environment (Bolliger & Wasilik, 2009). Satisfaction also can be said as a causal driver of recommended and repeated intention (Norizan Kassim & Nor Asiah Abdullah, 2010). Each customers' satisfaction is depend on the product perceive performance where it exceed the expectation and make the user to satisfy or vice-versa (Sahin, 2014).

Sometimes all the regular measurement for user satisfaction was not applicable to every sector or analysis because the expectation of the users were not same (Palvia, 1996). In a study stated that the quality Web site's interface that fit or reach the user preference will have the higher value of satisfaction (Zviran, Glezer & Avni, 2006; Lin, Wu, Hsu & Chou, 2012).

Also, the confirmation has positive relation on the users' satisfaction because it able to indicate the reality and expected benefit on using the system (Wang, Butler, An Hsieh & Hsun Hsu, 2008). Due to that, this thesis focused on the users' expectation and comfort on using the LMS for their teaching and learning purpose. Similarly, this thesis anticipates that:

H2. Users' confirmation of expectations is positively related to their satisfaction with LMS.

2.7.3 Perceived Usefulness and Satisfaction

Based the users' perception, the perceived usefulness also used to determine on how useful is the technology to conduct a job that include the time limitation, efficiency and accuracy to achieve customer satisfaction (Bugembee, 2010). As well, the users who perceived LMS as a useful and valuable system has been more satisfy with the usage (Calisir & Calisir, 2004).

In addition, there is a study stated the perceived usefulness of the e-learning courses among the students was significantly correlated with their level of satisfaction (Chiu, Hsu, Sun, Lin & Sun, 2005). Based on Joo, Lim and Kim (2011), perceive usefulness of the learning tools among the learner has a positive relationship on their satisfaction level. Due to that, the users will satisfy with the system due to the course related purpose and its usefulness. Hence, the hypothesis is:

H3. Users' perceived usefulness of LMS is positively related to their satisfaction with LMS.

2.7.4 Perceived Usefulness and Continued LMS Usage Intention

According to Rocker (2009), the users' negative attitude towards a specific technology could be outweighed by a positive believes on system usefulness where it can derive to a positive

usage intention at last. Moreover, the improvements in their job performance helped to extrinsic the motivation of the user to continue the usage (Heijden, 2004).

In previous study believed and stated that, the perceived usefulness improved the performance in using the system (Saade & Bahli, 2005). Based on this statement, this thesis focused that if the LMS usefulness increases then the users also will eager to use the LMS. Hence, the thesis hypothesizes:

> ***H4. Users' perceived usefulness of LMS is positively related to their continued LMS usage intention.***

2.7.5 Confirmation and Perceived usefulness

The expectation confirmation directly influences the perceived usefulness. As mention before, the less expectation will produce more effective performance of the system. Bhattacherjee (2001), mentioned that the perceived usefulness can adjust by the confirmation when the users do not expect much. Likewise, the positive experiences in the confirmation able to leads to a better perception of the new strategies in PU (Lam, Lee, Chan & McNaught, 2011).

Besides that, the perceived usefulness also used to measure the information quality of a product or service based the customers' perception that influence by the customers' confirmation (Jeong & Lambert, 2001). Based on this, the users' expectation on using the LMS has direct relationship on perceived usefulness. Consequently, the hypothesis develops that:

> ***H5. Users' confirmation of expectations is positively related to their perceived usefulness of LMS.***

2.7.6 Perceived ease of use and Satisfaction

The easiest system will encourage the users to use more and will accumulate their expectation to determine their satisfaction. The PEOU always able to determine the students' satisfaction based on their acceptance and usage where the technology must effective and efficient (Park, 2009). This perceived ease of use is one of the variables used to measure the satisfaction of the user (Calisir & Calisir, 2004).

However Doll and Torkzadeh (1988) stated that, their research focused on the general satisfaction rather than on a specific application and they overlook on some aspect that important to ease of use. But there is another opinion, that the ease of use in the system helped more on complete the learning proses and capable to determine the system's act (Flavian, Guinaliu & Gurrea, 2006). Hence, developed the hypothesis that,

> ***H6. Users' perceived ease of use of LMS is positively related to their satisfaction with LMS.***

2.7.7 Perceived ease of use and Continued LMS Usage Intention

Above and beyond, the perceived ease of use also directly related to the continuous LMS usage by the users. It is because PEOU estimate by the users' comfort and the high adoption with the technology. However, this perceived ease of use also has a direct and an indirect influence on the continuance LMS usage (Davis, 1989).

Besides that, the perceived ease of use also helped the user to interact with the students' assessment and feel free to use without cognitive burden (Saade & Bahli, 2005). Based on this, the users does not need to waste their time and effort during using the LMS. By this the PEOU directly have relationship with the users' intention on using the LMS. Therefore, the study hypothesizes that:

H7. Users' perceived ease of use of LMS is positively related to their continued LMS usage intention.

2.7.8 Perceived ease of use and Perceived usefulness

Perceived ease of use and perceived usefulness are the most important element in Technology Acceptance Model (TAM). Both of this were conceptually close in nature and play an important role to estimate the future usage of the technology among users (Sun & Zhang, 2004). Although, the perceived ease of use and perceived usefulness are easily can be influenced by the users' experience based the system usage (Adams, Nelson & Tood, 1992).

Besides that, the perceived ease of use and perceived usefulness is the variables that considered on this thesis to explicit the possible effect and the co-influence on using the LMS. However, there is a study stated that perceived usefulness is more important than perceived ease of use (Lu & Gustafson, 1994). Nonetheless, the PU and PEOU both are most important when the study consider of a new technology (Arbaugh, 2000).

Additionally, PEOU and PU are helps to have less effort to use and contribute more to improve the job performance (Mahmood, Burn, Gemoets & Jacquez, 2000). In another study the PEOU and PU highly have a significant and positive relationship with the duration that the students spend on online system (course) (Shen, Laffey, Lin & Huang, 2006). Therefore, the thesis posits:

H8. Users' perceived ease of use of LMS is positively related to their perceived usefulness of LMS.

2.7.9 Confirmation and Perceived ease of use

The confirmation is the initial variable that used to determine the perceived ease of use. The users' confirmation of expectation is the source; where the low expectation can have low

impact on the PEOU of the system or vice-versa. According to Solechan (2012), the perceived ease of use is the benchmark of users' confirmation of expectation to further use.

Moreover, the experience or the expectation of user is positively related to the perceived ease of use to increase the usage of the system (Hackbarth, Grover & Yi, 2003). By this, the thesis has focused on the users' need or expect and the ease of use on LMS. Hence developed the hypothesis:

> ***H9. Users' confirmation of expectations is positively related to their perceived ease of use of LMS.***

2.7.10 Perceived enjoyment and Satisfaction

As discussed above the perceived enjoyment is a perspective of the users where it can be pro or cons on using the LMS system. If the user enjoy or have full involvement on using the system, then it will directly influence the user satisfaction. In past literature, a study accepts that the PE as positive and negative mediation which can effect or affect in perceived Web quality and e-trust relationship (Hwang & Kim, 2007).

Moreover Heijden (2004), introduced that this variable perceived enjoyment was used to declare users' involvement in using the system. Also the perceived enjoyment that affects the users' attitude or behaviour may provide the satisfaction (Hsiung Liao, Wang Tsou & Chung Shu, 2008). Due to that, the thesis hypothesizes:

> ***H10. Users' perceived enjoyment of LMS is positively related to their satisfaction with LMS.***

2.7.11 Perceived enjoyment and Continued LMS Usage Intention

As mention above, the perceived enjoyment is the users' interest on using the system. The more convenient and enjoyable of the online usage compare to the conventional way are the main reason that leads to the continued usage of online shopping (Ramayah & Ignatius, 2005). In previous study, the perceived enjoyment was used to entertain the students to use the online system because it is enjoyable. Hence, it created a favourable perception and higher degree of continuance intention to use the system (Balog & Pribeanu, 2010).

More likely to some other study, the PE is an intrinsic motivation that used to perform an activity purely for enjoyment that will affect the intention to use the LMS continuously (Liaw & Huang, 2003). "If the user can experience enjoyment through the adoption of new technology, attitude toward adoption will be positive" (Suki & Suki, 2011). The perceived enjoyment is significantly influence the further LMS usage. Therefore, this thesis adds and expects that:

H11. Users' perceived enjoyment of LMS is positively related to their continued LMS usage intention.

2.7.12 Perceived enjoyment and Perceived ease of use

The perceived ease of use is completely a mediated variable for the perceive enjoyment to determine the continuous use of technology. Sometimes the enjoyment of the technology may bring an underestimate of the difficulty on using the technology (Venkatesh, 2000). Other than that, the enjoyment has the highest loading score with cognitive absorption and it could guess the similar mediating effects (Sun & Zhang, 2004; Mahmood, Burn, Gemoets & Jacquez, 2000).

In a study, it declares that the perceived enjoyment is a factor that influences the perceived ease of use by the changes in the frequency of internet use (Teo, Lim & Lai, 1999). Due to that, the study shows that perceived enjoyment is an act to produce a significant influence on users' intention to use the PEOU (Teo & Noyes, 2011). Based on this, the users who enjoy using the LMS for their teaching and learning purpose are able to simplify their task. Thus, developed the hypothesis in below:

H12. Users' perceived enjoyment of LMS is positively related to their perceived ease of use of LMS.

2.7.13 Confirmation and Perceived enjoyment

There are limited study has been conduct between this two variables. According to Thong, Hong and Tam (2006), the actual positive or negative experience of the user in the beginning helped to identify the users' current enjoyment during using the system. The new decision or confirmations after post adoption of the technology lead a direct influence on perceive enjoyment.

Due to the limitation, this thesis will focus a bit more about the relationship between the users' expectation (confirmation) and their joyfulness (perceived enjoyment) in using the LMS. Therefore, derives the hypothesis that:

H13. Users' confirmation of expectations is positively related to their perceived enjoyment of LMS

2.8 The Theoretical Framework (ECT)

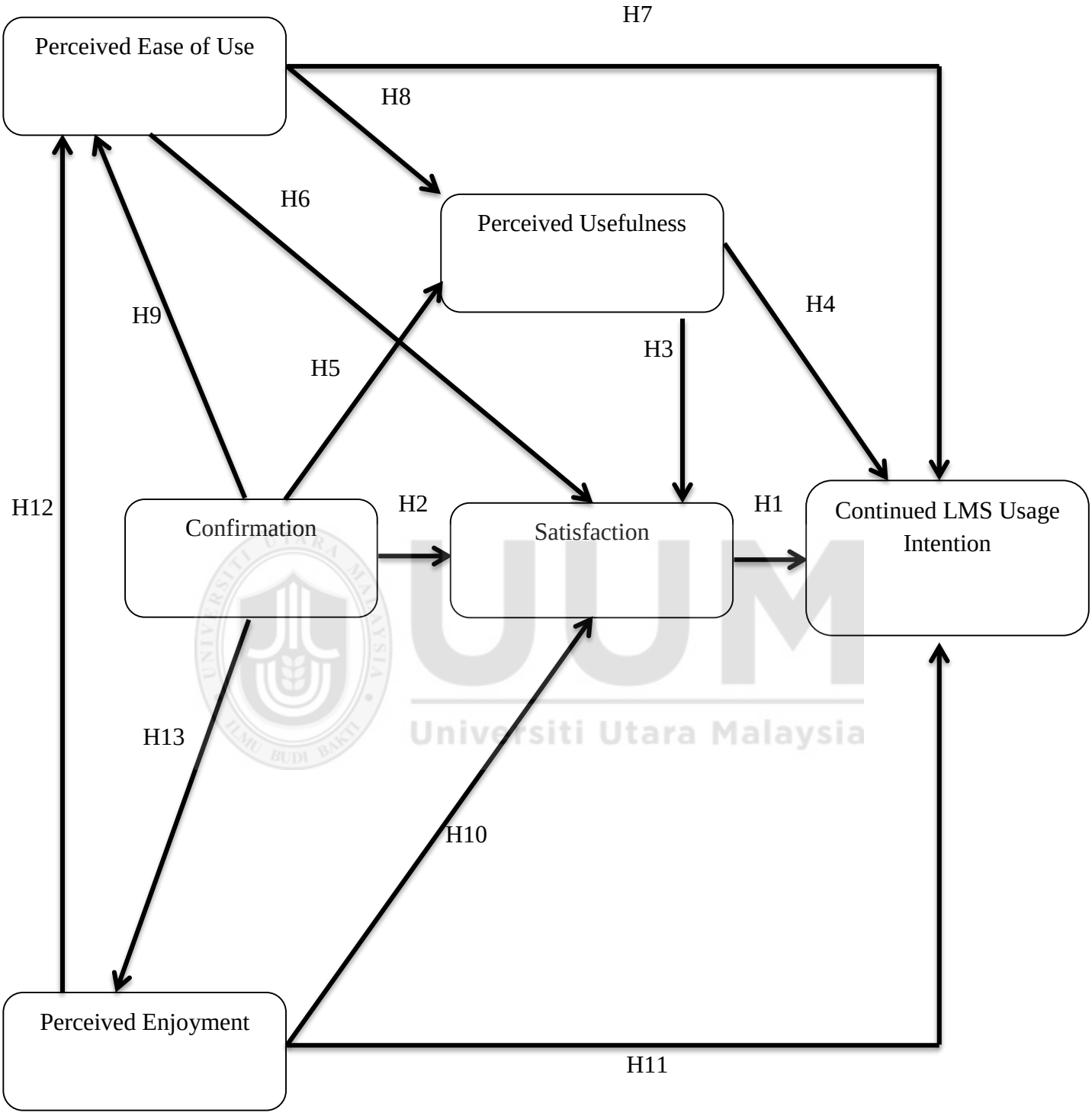

Figure 2.3: An Expanded ECT Model of LMS Continuance (adopted from Thong, Hong, & Tam, 2006)

At last, from this section the research model proposed thirteen hypotheses. All the hypotheses are as following:

Hypothesis 1: Users' satisfaction with LMS is positively related to their continued LMS usage intention.

Hypothesis 2: Users' confirmation of expectations is positively related to their satisfaction with LMS.

Hypothesis 3: Users' perceived usefulness of LMS is positively related to their satisfaction with LMS.

Hypothesis 4: Users' perceived usefulness of LMS is positively related to their continued LMS usage intention.

Hypothesis 5: Users' confirmation of expectations is positively related to their perceived usefulness of LMS.

Hypothesis 6: Users' perceived ease of use of LMS is positively related to their satisfaction with LMS.

Hypothesis 7: Users' perceived ease of use of LMS is positively related to their continued LMS usage intention.

Hypothesis 8: Users' perceived ease of use of LMS is positively related to their perceived usefulness of LMS.

Hypothesis 9: Users' confirmation of expectations is positively related to their perceived ease of use of LMS.

Hypothesis 10: Users' perceived enjoyment of LMS is positively related to their satisfaction with LMS.

Hypothesis 11: Users' perceived enjoyment of LMS is positively related to their continued LMS usage intention.

Hypothesis 12: Users' perceived enjoyment of LMS is positively related to their perceived ease of use of LMS.

Hypothesis 13: Users' confirmation of expectations is positively related to their perceived enjoyment of LMS.

2.9 Justification for adopting expanded ECT model

The Expectation Confirmation Theory (ECT) by Bhattacherjee (2001), is a model that mainly developed to determine the post adoption expectation of users' on a product or service after the usage. As discussed before, the main focus of this thesis was to determine the students' and lecturers' expectation on using the LMS continuously. Due to that, the ECT is the most suitable theory which can be used for this thesis.

Besides that, there are a lot of studies that applied ECT as their underpinning theory. Each of the studies produced different version of ECT model according to their problems and scope. Lin, Wu and Tsai (2005), conduct a study to investigate the users' intention to use a web site continuously by adding one variable (perceived playfulness) in the ECT model. Other than that, Kim (2010), also did a study on investigate the continuance mobile data service by combine the ECT model and Theory of Planned Behaviour (TPB) model to predict the users continuance intention. As well, each and every model includes different combination of variables and theory based their study.

However, this thesis choose the expanded ECT model by Thong, Hong and Tam (2006) which was more relevant to the scope of this thesis. This is because all the six variables that included in this expanded ECT model were able to fulfil the aim of this thesis. The expanded ECT model adds two new variables such as perceived ease of use and perceived enjoyment to the ECT model. The combination of these six variables seems helpful to determine the users' need on LMS in future. This expanded ECT framework is well-suited and adequate for this thesis. Due to that, this thesis adopts the model rather than adapt to know the users' expectation on using the LMS continuously.

2.10 Summary

Based on prior studies, this thesis found some justification that determines the users' expectation on continuous LMS usage is important. This is because, as discussed above the LMS is the official learning system which specially developed for helps the users to perform well in their teaching and learning process. This study discussed more on identifies the users' expectation rather than determine their perception on LMS and continuous usage in future.

The LMS is facing several problems; especially when the web 2.0 tools were started to use for teaching and learning purpose. Due to that, this thesis helps to identify the lack of attention and low infrastructure on LMS by the administration in the universities. A part from that, the outcome of this thesis gives some idea to the top management and alerts them with the current issues that face by the users. So, the administration can fully utilise their investment on developing the LMS system effectively.

In justification, this thesis planned to use the expanded Expectation Confirmation Theory (ECT) by Thong, Hong and Tam, (2006) to find the users' satisfaction and their basic requirement to use of LMS further for their teaching and learning process. Moreover, relating each variable in this extended ECT framework that plays an important role to achieve the aim of this thesis.

CHAPTER 3

RESEARCH METHODOLOGY

3.0 Chapter Overview

This chapter concentrates on the research design that has been used in this thesis. This chapter also focuses on the particular population and sample that are suitable for this thesis to ease the completion in a short period of time. Besides that, the data collection procedures, variables, and measurements are discussed in detail in this chapter. At the end of this chapter, there is a brief description about the strategies used to analyse the data.

3.1 Research Design

Choosing a research method is an imperative stage in all kind of researches, where this helps to determine the direction of any research. Choosing a reliable and correct method always aids the research to produce a better outcome. As such, the quantitative approach has been selected to conduct the further analysis in this thesis. This is because the collected data are in numerical form.

3.1.1 Quantitative Approach

The quantitative method is an approach that is commonly used by researchers. The quantitative research is referred to the systematic and empirical study that investigates the social phenomena through descriptive statistical analysis (Given & Lisa 2008; Aliaga & Gunderson, 2000). Most of the researchers prefer to use this technique especially when the data is in numerical form. There are several other methods that have been used to collect data such as questionnaires and surveys. It should be noted that the outcomes will be objective rather than subjective.

3.1.1.1 Advantages and Disadvantages of Quantitative Approach

The quantitative approach has been chosen for this thesis after a detailed review of its advantages and disadvantages from the past literature. The quantitative approach is more flexible in collecting data for a large number of participants compared to other research methods. Besides that, the quantitative method regularly uses descriptive statistics that are in numerical form. The descriptive analysis is able to determine the relationship between the variables and produce a proper outcome. Table 3.1 indicates the advantages and disadvantages of a quantitative research.

Table 3.1: Advantages and Disadvantages of Quantitative Research (Rhodes et al., 2014; Labaree, 2010)

ADVANTAGE	DISADVANTAGE
Broad study (able to gather information from a large number of participants)	Difficulty in recognising new and untouched phenomena
Provide numerical rating information	It could miss some contextual detail
Use statistical techniques that help to determine the relationship between variables	Caution in interpretation without a control group
Allow for greater objectivity and accuracy of result	Results provide less detail on behaviour, attitudes, and motivation
Personal 'bias' can be avoided by the researcher by keeping an distance from participants	Results do not necessarily reflect how people feel, but they match to preconceive the hypothesis
Allow to generalise a broad population	Employs an inflexible process of discovery
Research is conducted in a number of groups and allows for comparison	Researcher may collect a much narrower and sometimes superficial dataset

3.2 Population and Sample

Understanding the population and sample for a thesis is an important element that has been considered carefully. Importantly, population can be defined as a group of individuals or items that share one or more similar characteristics from whom the data can be gathered and analysed. The selection of the sample and population basically depends on two different questions. Firstly, whether or not the study can be completed within the given period of time, given the selected population and sample? Secondly, can the data be collected from the selected population and sample in order to gain an accurate outcome? If the answer for those questions are 'yes', then the selected population and sample are most likely acceptable.

Moreover, choosing the correct population and sample for a study is always hard to decide. This thesis focuses more on the students and lecturers' expectations on the using LMS continuously for their teaching and learning process. As mentioned previously, LMS is a formal organisational system that is widely used by various universities around the world. However, this thesis only focuses on the LMS usage among Malaysian northern regional public university students and lecturers due to its lack of usage in learning institutions (Adzharuddin & Ling, 2013). Northern region was selected because it is the most convenient region for this thesis.

After considering the factors above, this thesis chooses the university students and lectures as the selected population for this thesis. There are 20 government universities in Malaysia. However, taking all the users from all Malaysian government universities into account for the thesis is nearly impossible as it will be an uphill struggle to collect data from all of them within the given time period. As such, this thesis concentrates only on the LMS users in the Malaysian public universities of the northern region. Hence, there are three public universities that have been listed as the selected population for the purpose of this thesis.

Besides selecting the reliable population, taking appropriate sample is also vital to gain a better outcome. Samples are generally defined as selected elements (people or objects) that are chosen from the selected population for participation in a study. As stated above, the selected population is the three public universities in the northern region. However, due to several factors such as limitation of time, this thesis chooses the students and lecturers from three public universities as an appropriate sample. The three main public universities that are selected are Northern University of Malaysia (UUM), University of Malaysia Perlis (UniMAP), and University of Science Malaysia (USM).

MARA University of Technology (UiTM) is another university that is located in the northern site; however, it is not selected in this thesis due to a few factors. Firstly, UiTM has a great number of branch campuses around Malaysia, whereby there are three branches in the northern region, namely in Kedah, Penang, and Perlis. Choosing the three branches in the northern region will not represent the whole of UiTM. Besides that, it is also really hard to collect data from all the UiTM branches all over Malaysia. Moreover, UiTM has built their LMS in-house. However, this thesis concentrates on LMS that is developed and purchased by the universities, which involve a high amount of cost. Due to that, UiTM cannot be categorised in this thesis. Adding to that, Sultan Idris Education University (UPSI) is also not selected for this thesis because the university's location is not under the northern region area.

There are many types of sampling method such as simple random sampling, stratified sampling, cluster sampling, and convenience sampling. However, all of these different sampling methods have one similar goal, that is to create a smaller subset from the larger set of general participants (population); where the smaller subset represents the larger population. Hence, this thesis uses the multi-stage sampling method, where two different sampling methods are combined. The stratified sampling and simple random sampling methods have been used to determine the sample size of the users.

Additionally, this thesis performs sampling by arranging the name list of faculties of each university to collect the users' information from the Department of Students Affairs (HEP) of each respective university, due to the large number of population. Then, the students and lecturers from these three universities are chosen randomly for sampling and data collection. Each and every faculty in the universities takes part in the data collection, therefore, the users are randomly chosen from all the faculties.

As stated above, this thesis involves the students and lecturers from three north region public universities, namely UUM, USM, and UniMAP as the sample population. The total population of this thesis is 70,346 users, consisting of 66,598 students and 3,748 lecturers. Due to the large number of population, this thesis used Krejcie and Morgan's (1970) table to determine the sample size. According to the table, the total sample size is 727 users, comprising 381 students and 346 lecturers. Detailed information about the sampling is shown in Table 3.2.

Table 3.2: The Propotional Table

Public HEIs	Students population	Percentage of sample (%)	Students sample	Lecturers population	Percentage of sample (%)	Lecturers sample
UUM	28,844	43.31	165	1119	29.86	103
USM	24,331	36.53	139	1757	46.88	162
UniMAP	13,423	20.16	77	872	23.26	81
Total	66,598	100	381	3748	100	346

Due to the large amount of the population, this thesis needs to find the students and lecturers sampling amount separately to simplify the finding. All the analyses of this thesis have combined the lecturers and students under one dimension as users because the outcome from

the t-test has justified that the students and lecturers have less difference and it is statistically significant. Hence, there is no problem in combining the lecturers and students for further analysis.

3.3 Variables and Measurement

As discussed in the previous chapter, this thesis has six variables to analyse the users' expectations and intention on using LMS continuously. Each and every variable has several items. These variables can be divided into two main categories. They are dependent variable (DV) and independent variable (IV). There is a DV that is related to five different IVs (refer Figure 2.3 in Chapter 2).

Users' continuance intention on using LMS is the main focus of this thesis based on the users' expectations on the system. This makes 'continuance intention' as the dependent variable of the thesis. Thus, the other variables can be listed as independent variables such as perceived ease of use, perceived usefulness, perceived enjoyment, confirmation, and satisfaction. The table below indicates the list of items used in the variables in previous studies. This thesis did not adopt the overall questionnaire from Thong, Hong, and Tam (2006), but reconfirmed the items from other dimensions. This is because, the researcher wants to explore whether there are any other items that are suitable for this thesis. Besides, this is also one of the contributions from this thesis. For further details regarding the items that are used in the questionnaire, it can be referred to in Appendix A.

3.3.1 Dependent Variable (DV)

ITEM CODE	VARIABLE NAME	SOURCE	NO. OF ITEM
CI	Continued LMS usage Intention	Adapted from Bettayeb (2014)	CI 1, CI 2, CI 3, CI4

3.3.2 Independent Variable (IV)

ITEM CODE	VARIABLE NAME	SOURCE	NO. OF ITEM
PU	Perceived usefulness	Adapted from Mohamad Osama A. Hashim (2011)	PU 1, PU 2, PU 3, PU 4, PU 5, PU6
SAT	Satisfaction	Adapted from Bettayeb (2014)	SAT 1, SAT 2, SAT 3, SAT 4, SAT 5
PEOU	Perceived Ease of Use	Adapted from Mohamad Osama A. Hashim (2011)	PEOU 1, PEOU 2, PEOU 3, PEOU 4, PEOU 5, PEOU 6
CON	Confirmation	Adapted from Thong, Hong, and Tam (2006)	CON 1, CON 2, CON 3

PE	Perceived Enjoyment	Adapted from Childers, Carr, Peck, and Carson (2001) and Adapted from Liao, Tsou, and Shu (2008)	PE 1, PE 2, PE 3, PE 4, PE 5, PE 6, PE 7, PE 8 PE 9, PE 10

By choosing questionnaire as the data collection method, the scales of measurements are predictable. There are several types of Likert scale measurement in a survey. However, this thesis used a five-point scale (Likert scale) to analyse the variables. This is because the Likert scale is able to help the respondents to answer the questions with less confusion and they can simply answer any statement whether it is subjective or objective. Most of the time, this scale is used to measure the agreement or disagreement of an individual perception based on their behaviour.

Continuously, to conduct a measurement in a survey, there are four levels of measurement involved, such as nominal, ordinal, interval, and ratio. As stated before, the questionnaire uses a five-point Likert scale, where it means the scale will be arranged in order from 1 (strongly disagree) to 5 (strongly agree). Moreover, the questionnaire also collects some of the basic information that relates to the respondents' demographical detail such as their age, gender, institution, and career.

3.4 Data Collection Procedures

Data collection is another element in the research that helps to conduct a study and justify the objective with the hypothesis. For data collection, the procedure is an important segment that

needs to be planned beforehand to avoid problems in future. In this thesis, the quantitative method has been chosen. The quantitative data collection normally involves numbers to assess information. There are basically two types of data that are used in data analysis; namely primary data and secondary data. The primary data is the main concern in this thesis when collecting data.

Before using the instrument, there are some other procedures that have been considered. First of all, the researcher prepares a formal letter to each selected institution to gather the information of their respective LMS users. After obtaining the approval, the letter will be posted to the Department of Students Affairs (HEP) of the three universities. This is the department that has the full detail and information of the students and lecturers in each university. The department helps in providing the users' information, especially the total number of active lecturers and students. This total amount of users is the most important key to select the students and lecturers randomly and pass them the questionnaire.

3.4.1 Data Collection Instrumentation

As mentioned before, there are several instruments in the quantitative method. This thesis uses the questionnaire as the main instrument to collect data. The questionnaire has been developed based on several past studies. Firstly, the questionnaire has been tested for the pre-pilot study to gain approval from academic experts to validate the questions. After the pre-test, a pilot study is conducted, which involved several numbers of students and lecturers to check the reliability and validity of the questionnaire. This step was applied to reduce misunderstanding and to find overlooked mistakes in the questionnaire.

Afterwards, the corrected questionnaires are distributed to the users randomly according to the lists that are collected from the three universities. The information helps to generate the list of users. The questionnaires are distributed to the users directly by visiting the respective

universities and passing them face-to-face. As generally known, sometimes getting a reply from the professionals is really hard. Therefore, the questionnaire will be repeatedly sent to the users until the researcher has collected the required sample. This thesis also seeked the help from the administration of each university from every faculty without any discrimination to give support in obtaining the information from the users.

3.5 Statistical Technique Analysis

Statistical technique is one of the methods that is used to analyse or represent the statistical data. The statistics is an applied mathematics that concerns with the data collection and interpretation of the quantitative data. It also uses the probability theory to estimate the population parameters in the studies. Most of these techniques are used in a systematic way, where they follow the sequences. In this thesis, determining the reliability of the data collection is very important for future analysis. There are four main techniques that will be applied in this thesis such as descriptive analysis, reliability and validity, regression, and correlation.

3.5.1 Descriptive Analysis

Descriptive analysis is the main feature that is generally used in every quantitative research. This is because, the descriptive analysis is mostly utilised to summarise the outcome from the samples rather than reading the population among the selected sample. Commonly, all the summarised outcomes of the data analysis are shown or displayed in visual form such as graphs, charts, and tables. This allows the readers to interpret the information easily as compared to reading the text-form information. The data from this descriptive analysis provides the mean, mode, median, standard deviation, and analysis of variance.

3.5.2 Reliability and Validity

Reliability can be said as the quality of the data and the measurement of the study. To conduct a measurement, all data needs to be reliable and consistent. For example, the measurement scale in the questionnaire must be reliable. This may avoid misunderstanding among the respondents when answering the questions. The Cronbach's alpha is the tool for assessing the reliability of scales in SPSS. Cronbach's alpha is able to determine the internal consistency or average correlation of items in the survey to measure its reliability.

Validity encompasses the entire experimental concept and establishes whether the results obtained meet the research requirements. It means that validity is used to ensure that the questionnaire is actually measured on what it is intended to measure. If the questionnaire is reliable and valid, then the outcome of the result will be more acceptable.

3.5.3 Regression

Regression is a statistical process that is used to analyse the correlation between the variables. In this thesis, regression is used to determine the relationship among the dependent variable and the independent variables. Based on this analysis, it helps to identify whether the variables have relations among each other or not. Likewise, regression is also used to understand which IV is related to the DV and explore the form of the relationship. It also helps to estimate the conditional expectation or prediction for the future continuance LMS usage intention by the users for their teaching and learning purpose.

3.5.4 Correlation

The correlation analysis is another statistical technique that is used to describe the strong relationship of the two continuance variables. It helps to determine how much strong the pairs of variables are related to each other. This technique can only be used on the quantitative

data, where the numbers are meaningful to produce or interpret a logical outcome. By using the Pearson correlation coefficient, this thesis indicates the strength of linear relationship between the variables whether or not it is significant. Based on the scatterplots that are produced by the analysis, the data can judge the linearity of the relationship between the variables.

3.6 Pilot Test Result

As stated earlier, before conducting the actual analysis; the questionnaire was sent as a pre-test study. Three academicians were selected to analyse the questionnaire and give a few comments. Based on the comments, several changes has been made to the questionnaire. Then, a pilot test was conducted on 13th September 2015. The pilot study was conducted in UUM only by selecting 40 users, involving 10 lecturers and 30 students. Generally, the pilot test is performed to determine the reliability of the questionnaire. Specifically, it helps to discover whether the items that are selected for each variable are relevant or not. Besides, it also helps to indicate the strength and constancy of the questionnaire.

Based on the pilot test, the outcome shows that the Cronbach's alpha has higher internal consistency, where the value is more than 0.5. The Cronbach's alpha reliability coefficient values that were captured in this pilot test range from .687 to .950. All the six variables used in this pilot test are sufficiently adequate for this thesis. None of the items were deleted during the pilot test.

3.7 Summary

All in all, this chapter concentrates on data collection. It has discussed the general procedures used to gather data from the universities with regards to users' intention on LMS. The quantitative method was also utilised for this thesis because as stated earlier, it is the most efficient and effective method to analyse the users' expectations on the continuance intention to use LMS.

Moreover, all the variables that are used in this thesis are very much relevant to understand the users' perceptions on LMS usage. Each variable contains several listed items to form the questionnaire. This thesis used the discrete variable and ordinal measurement for the analysis. In addition, it also used the five-point Likert scale to measure each item based on the users' expectation and behaviour towards the LMS usage for their teaching and learning purpose.

CHAPTER 4

DATA ANALYSIS AND HYPOTHESIS TESTING

4.0 Chapter Overview

This section presents the detailed result of data analysis and discusses the findings. This data analysis is carried out by utilising SPSS 20.0. This chapter begins with discussing the response rate of the study. Then, it continues with the respondents' demographic details, goodness of measurement, descriptive analysis, correlation analysis, regression analysis, and hypothesis testing. At the end, the summary of the chapter is given.

4.1 Response Rate

Data collection has been conducted on 21st September 2015 till 31st December 2015. Due to the large number of the sample, it took approximately four months to complete the data collection. The length of the questionnaire is six pages long and the respondents gave good cooperation to provide their point of view towards the LMS usage for their teaching and learning process based on their personal knowledge and satisfaction.

For the actual data collection, there were approximately 1,200 questionnaires printed out. In order to gather out the total required data from 727 lecturers and students, 76 questionnaires were missing, 247 questionnaires were inappropriate, and 50 were not in use. Several attempts have been made to collect the expected amount of questionnaires from the lecturers and students. At the end of first attempt, 480 questionnaires were valid and 247 unusable. Due to that, 247 questionnaires had to be recollected again. There was no difference in the respondents' response even when the questionnaires had to be recollected. At the end of thr data collection, 727 respondents gave response to the questionnaire. This thesis involved the

undergraduate and postgraduate students and lecturers from all the faculties or departments without prejudice.

Table 4.1: Response Rate

Description	Result
Appropriate questionnaire	727
Inappropriate questionnaire	247
Missing questionnaire	176
Empty questionnaire	50
Total printed questionnaire	**1200**
Overall response rate	**100%**

4.2 Respondents' Profile

4.2.1 Gender

As discussed in the previous Section 4.0, the total number of the respondents involved in this research was 727 respondents, comprising 381 students and 346 lecturers. When it comes to gender, there were 469 female and 258 male respondents. This shows that female participants are higher than male participants.

Table 4.2: Summary of Respondents by Gender

Items (Variable)		Frequency Total = 727	Percentage (%)
Gender	Female	469	64.5%
	Male	258	35.5%
Total		**727**	**100%**

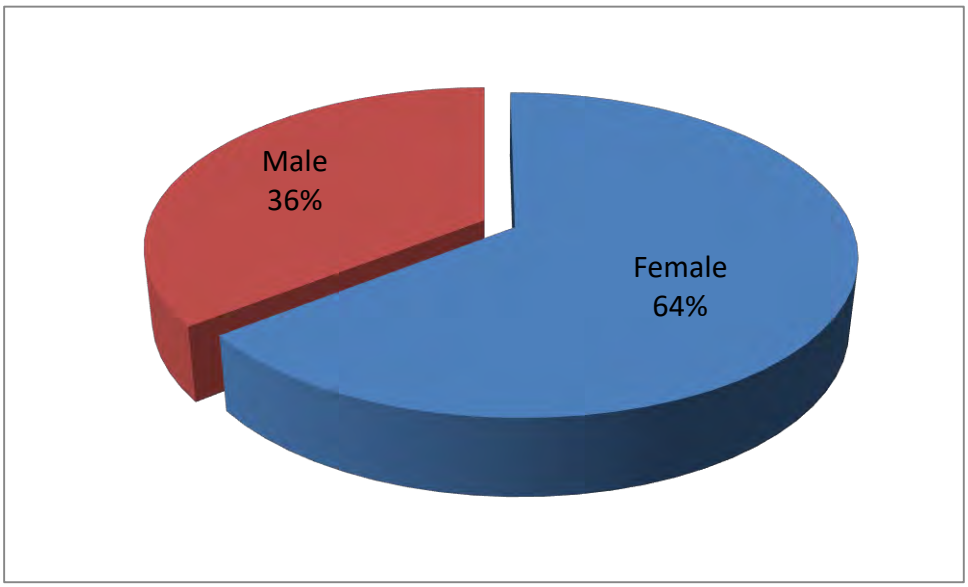

Figure 4.1: Respondent Distribution (Gender)

4.2.2 Age

The respondents were categorized under five groups of age range. The respondents of between 20 to 29 years old are the largest respondent group with a percentage of 53.3%. Students were the majority respondents in the age range of 20 to 29 years old. The second largest age group range was 40 to 49 years old, where lecturers are the respondents in this group with a percentage of 21.6%. The respondents who were below 19 were the lowest with a percentage of 0.1%.

Table 4.3: Summary of Respondents by Age

Items (Variable)		**Frequency Total = 727**	**Percentage (%)**
Age	Below 19	1	0.1%
	20–29	380	52.3%
	30–39	135	18.6%
	40–49	157	21.6%
	Above 50	54	7.4%
Total		**727**	**100%**

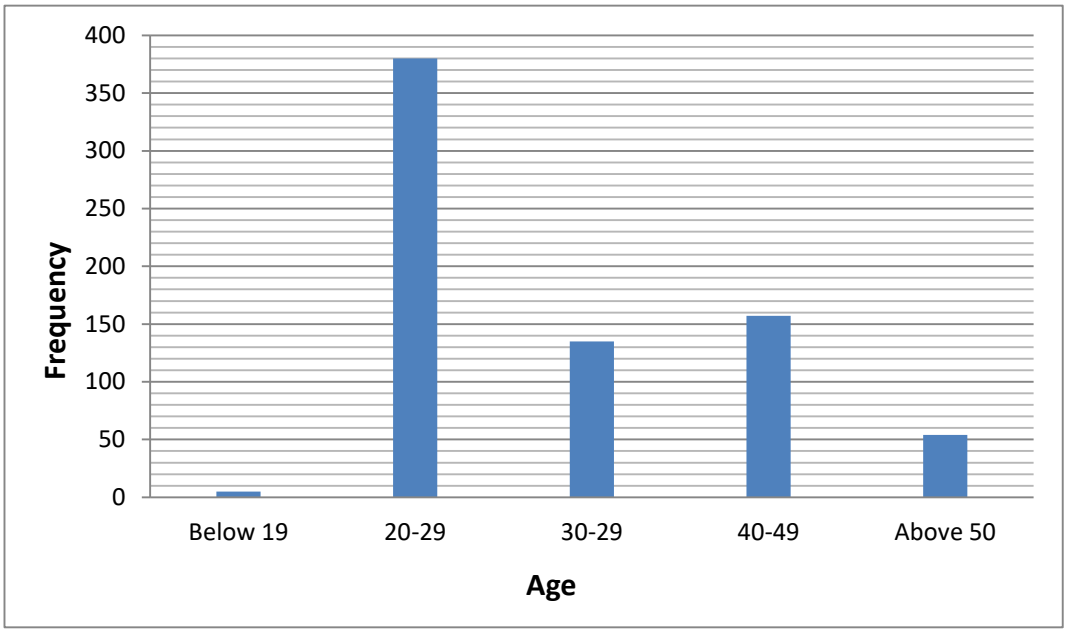

Figure 4.2: Respondents Distribution (Age)

4.2.3 Nationality

The data collection was open to all the students and lecturers without concern of their nationality. There were 671 local respondents and 56 foreign respondents who participated in the data collection. Malaysians achieved around 92.3% and non-Malaysians achieved 7.7%.

Table 4.4: Summary of Respondents by Nationality

Items (Variable)	**Frequency Total = 727**	**Percentage (%)**
Nationality Malaysian	671	92.3%
Non-Malaysian	56	7.7%
Total	**727**	**100%**

4.2.4 University

As mentioned earlier, UUM, USM, and UniMAP are the three northern public universities involved in this thesis. The respondents from USM were the highest on the list with 41.4%, whereas the respondents from UniMAP were the least with 21.7%. UUM is in the middle of USM and UniMAP, where it is only less 4.5% from USM.

Table 4.5: Summary of Respondents by University

Items (Variable)		Frequency Total =727	Percentage (%)
University	USM	**301**	**41.4%**
	Students	139	
	Lecturers	162	
	UUM	**268**	**36.9%**
	Students	165	
	Lecturers	103	
	UniMAP	**158**	**21.7%**
	Students	77	
	Lecturers	81	
Total		**727**	**100%**

4.2.5 Career

As discussed above, this thesis involves two different parties, where the careers are divided into two: one for students and another for lecturers. Under the students section, it helps to collect data regarding the students' educational level and their current semester of study. The students from a degree background show the highest response with 305 students. While the diploma level is the least, with only 9 students. Overall, the majority of the students were from the fifth semester.

On the other hand, the lecturers column presents the lecturers' position and their experience in their working place. The senior lecturers and lecturers' position score the highest numbers

of respondents with 160 lecturers and 108 lecturers, respectively. Adding to that, the mode for the lecturers' working experience is 6 years.

4.2.6 Importance of LMS in teaching and learning

Even though all the respondents have experience using LMS, only 15.3% users denied that LMS is not important for teaching and learning. However, 84.7% of the students and lecturers accept that LMS is an appropriate system in their learning environment. This shows that LMS has its positive point of view among the northern public university users.

4.2.7 Approximate LMS usage

The students and lecturers' approximate LMS usage helps to determine the amount of time given to LMS for their teaching and learning process. The approximate LMS usage per day is identified based on five divisions. The highest LMS usage is 10–30 minutes, with 40.6% of usage. The least is 1.4%, with an LMS usage of more than 120 minutes (> 2 hours). Based on this, it can be concluded that the students and lecturers are comfortable using LMS for 30 minutes or below than that. The respondents' (students and lecturers) demographic information is summarised in Table 4.6.

Table 4.6: Summary of Respondents' Demographic Information

Demographic variables	Categories	Students	Lecturers	Frequency	Percentage (%)
Gender	Female	257	212	**469**	**64.5**
	Male	124	134	**258**	**35.5**
Age	<19 years	1	0	**1**	**0.1**
	20-29 years	356	24	**380**	**52.3**
	30-39 years	19	116	**135**	**18.6**
	40-49 years	5	152	**157**	**21.6**
	>50 years	0	54	**54**	**7.4**
Nationality	Malaysian	336	335	**671**	**92.3**
	Non-Malaysian	45	11	**56**	**7.7**
University	UUM	165	103	**268**	**36.9**
	USM	139	162	**301**	**41.4**
	UniMAP	77	81	**158**	**21.7**
Career	Lecturer			**346**	**47.6**
	Prof	14	1.9		
	Ass. Prof	64	8.8		
	Snr. Lecture	160	22.0		
	Lecture	108	14.9		
	Students			**381**	**52.4**
	Diploma	9	1.2		
	Bachelor	305	42		
	Master	54	7.4		
	Phd	13	1.8		
Important of LMS	No	26	85	**111**	**15.3**
	Yes	355	261	**616**	**84.7**
Approximate LMS usage	<10 minutes	87	171	**258**	**35.5**
	10-30 minutes	188	107	**295**	**40.6**
	31-60 minutes	78	59	**137**	**18.8**
	61-120 minutes	21	6	**27**	**3.7**
	>120 minutes	7	3	**10**	**1.4**

4.3 Goodness of Measurement

4.3.1 Reliability

Reliability is an assessing tool that is used to identify the consistency of a research or as the first procedure in a measurement test. The reliability analysis can also indicate the stability and consistency of the measurement instrument, where the researcher is able to estimate the errors and evaluate the goodness of measurement (Sekaran, 2003; Cavana et al., 2000). The fundamental explanation for conducting the realiability test is to decide how suitable a set of components might fit into some sources of variability measured using Cronbach's alpha coefficient.

Cronbach's alpha (α) is an indicator of reliabity that is able to provide a measure of an internal consistency of a test or scale; which points out the inter-relatedness of the items to one another (Tavakol & Dennick, 2011). The alpha coefficient range is normally expressed as a number in between 0 and 1 (Tavakol & Dennick, 2011; Santos 1999). If the Cronbach's alpha is closer to 1, the internal consistency will be higher. Nunnally (1979) also stated that a Cronbach's alpa value between 0.5 and 1 has a higher internal consistency.

However, Sekaran (2003) stated that the reliabilities that are less than 0.6 is poor, while 0.7 is in acceptable range, and a value above 0.8 is considered as reliable in a behavioural research. This thesis pointed out the Cronbach's alpha reliability coefficient values were captured from a range of 0.962 to 0.971. At the point where the reliability testing of Cronbachs' alpha value is higher than 0.5 for all the items, it shows that they are sufficiently adequate for this thesis. Therefore, the information (data) is acceptable in leading further process.

All the users' perception in this thesis was measured by using the five-point Likert scale ranking from strongly disagree to stongly agree. Each and every variable has a higher value

in the Cronbach's alpha reliability, where it is more than 0.5 and is sufficient for this study. Table 4.7 in below illustrates the reability of each variable. The SPSS output of the reliability test can be referred to in Appendix B.

Variables	No. of items	Cronbach's alpha
Perceived Ease of Use	6	.922
Perceived Usefulness	6	.921
Perceived Enjoyment	10	.617
Confirmation	3	.874
Satisfaction	5	.935
Continuous LMS Usage Intention	4	.907

Table 4.7: Reliability of each variable of this study

4.3.2 Content Validity

As mentioned in the previous chapter, the data collection method for this thesis is a questionnaire. Before conducting the actual data collection, a pre-test and a pilot study were conducted in UUM. The questionnaire was sent to three academic professionals for the pre-test to ensure the quality, language, adequacy, clarity, comprehensibility, comfort level, and appropriate structure design of the questions that relate to the variables.

The academic professionals reviewed the questionnaire and provided several suggestions to improve the questionnaire. They mainly suggested to use suitable words to avoid the respondents being confused because the questionnaire is in bilingual form. Afterwards, the corrected questionnaire was used for a pilot study. A total of 10 lecturers and 30 students (including undergraduates and postgraduates) was involved for the pilot test within UUM due to time and space constraints (refer Sub-Chapter 3.6).

4.4 Descriptive Analysis

This descriptive analysis was conducted in this study to describe the responses on the variables in this thesis. This section discusses the mean, minimum, maximum, frequency, and standard deviation of the variables.

Table 4.8: Mean Value and Standard Deviation of Variables

Variables	Mean	Std. Deviation
Perceived Ease of Use (PEOU)	3.717	.921
Perceived Usefulness (PU)	3.748	.879
Perceived Enjoyment (PE)	3.272	.473
Confirmation (CON)	3.590	.931
Satisfaction (SAT)	3.647	.972
Continuance LMS Intention (CI)	3.797	.915

Table 4.8 displayed the mean value and standard deviation for the variables. The total sample value for this analysis is 727 (N=727). The table is divided into independent variable that contain five variables (PEOU, PU, PE, CON, and SAT) and dependent variable, Continuous LMS intention (CI). Each variable has its sub-item (refer Sub-Chapter 4.5.1).

As shown in the table, the mean value of the five independent variables ranged between 3.272 to 3.748 and the standard deviation ranged between .473 to .972. The standard deviation of PE is .473 due to the redundant items in the variable. At the same time, for the dependent variable, CI's mean value is 3.797 and standard deviation is .915. The standard deviation is important to indicate the straightliners whether the question is answered seriously or not. The SPSS 20.0 output is attached in Appendix C.

4.4.1 Descriptive Analysis on Independent Variable

As stated before, this thesis used 727 respondents to answer the 34 item in total from the six variables. Based on the analysis, the overall mean value for PEOU is 3.717 and the standard deviation is .921, where the mean and standard deviation of the sub-items ranged between 3.56 to 3.90, and the standard deviation ranged between 1.043 to 1.158. Next, the mean value for PU is 3.748 and the standard deviation is .879. The mean and standard deviation of PU's sub-items ranged between 3.65 to 3.83 and .997 to 1.087, respectively.

Continuously, PE shows that the mean value is 3.272 and the standard deviation is .473 in general. Whereas, the range of the mean value and standard deviation is between 2.35 to 3.63 and .895 to 1.200, respectively. CON only has three items, so the range of the mean value is 3.55 to 3.61 and the standard deviation ranged between 1.018 to 1.077. The last independent variable is satisfaction (SAT). The mean value ranged between 3.57 to 3.77 and the standard deviation ranged between 1.075 to 1.112. Table 4.9 shows the mean value and standard deviation of each of the sub-items in the variables.

Based on these findings, it might be obvious that PU has the highest mean value (3.748) compared to other independent variables and the lowest mean value goes to PE (3.272). However, SAT has the highest value in standard deviation, which is .972, and PE has the lowest, which is around .473. In summary, PE has the lowest mean value and standard deviation among the other independent variables.

Table 4.9 : Mean Value and Standard Deviation of Sub-Item in Independent Variable

Variables	Sub-Item	Mean	Std. Deviation
Perceived Ease of Use (PEOU)	PEOU 1	3.71	1.158
	PEOU 2	3.70	1.043
	PEOU 3	3.63	1.078
	PEOU 4	3.56	1.101
	PEOU 5	3.90	1.065
	PEOU 6	3.80	1.066
Perceived Usefulness (PU)	PU 1	3.83	.997
	PU 2	3.81	1.087
	PU 3	3.69	1.013
	PU 4	3.65	1.024
	PU 5	3.70	1.061
	PU 6	3.80	1.046
Perceived Enjoyment (PE)	PE 1	3.63	1.200
	PE 2	3.62	1.198
	PE 3	2.37	1.168
	PE 4	3.57	.895
	PE 5	3.46	.945
	PE 6	3.56	1.160
	PE 7	2.35	1.158
	PE 8	3.15	1.077
	PE 9	3.48	1.004
	PE 10	3.61	1.009
Confirmation (CON)	CON 1	3.61	1.018
	CON 2	3.61	1.036
	CON 3	3.55	1.057
Satisfaction (SAT)	SAT 1	3.77	1.082
	SAT 2	3.59	1.112
	SAT 3	3.57	1.075
	SAT 4	3.61	1.092
	SAT 5	3.70	1.097

4.4.2 Descriptive Analysis on Dependent Variable

Continuous LMS usage is the dependent variable in this thesis. The overall mean value and standard deviation of this variable is 3.797 and .915. This variable has four sub–items, where the range of mean value is 3.73 to 3.91 and the range of standard deviation is between .996 to

1.106. If the mean value of IV is to be compared with the mean value of DV, DV (CI) has the highest value. Table 4.10 displays the mean value and standard deviation for CI.

Table 4.10: Mean Value and Standard Deviation of Sub-Item in Dependent Variable

Variable	Sub-Item	Mean	Std. Deviation
Continuous LMS Intention (CI)	CI 1	3.91	.999
	CI 2	3.81	.996
	CI 3	3.73	1.036
	CI 4	3.74	1.106

4.5 Factor Analysis

Factor analysis is also known as the construct validity to determine the reliability of measurement instruments. The factor analysis is used as another method in goodness of measurement. According to Hair et al. (2009), the factor analysis is a statistical approach that is used to analyse the inter-relationship among a large number of variables and explain it in terms of their common underlying dimensions.

It is necessary to decide the number of factors and the sample size because it can influence the performance of the factor analysis (Ledesma & Valero-Mora, 2007; Costello & Osborne, 2005). The disregard on selecting the number of factors might significantly alter the solution and create difficulty in interpretation. As the sample size increases (larger), the more confidence is gained in the factor analysis. Moreover, all the items from the variables need to fulfil the thumb rule where the eigenvalues must be greater than one (< 1), which can only be retained for the interpretation (Ledesma & Valero-Mora, 2007).

The factor analysis is also mainly used as a data reduction method, where it reads the large sample size and produces the generalisable findings or is used as structure detection (McCroskey & Young, 1979; Hair et al., 1995). Simultaneously, the output from the factor

analysis can also reasonably stabilise the correlations. There are three main purposes of factor analysis: (i) to examine the validity of measurement; (ii) to reduce the variable number; and (iii) to determine the structure of relationship between variables, by specifying a set of underlying dimensions (Cooper, Schindler, & Sun, 2003).

The sample size of this thesis is large enough with 727 LMS users. This thesis has six variables and each has five to ten items per variable to measure the users' continuance intention in LMS. Therefore, this thesis needs to conduct the factor analysis for an effective output. Besides, the factor analysis method also helps to examine the correlation (or covariance) matrix.

4.5.1 Process of Factor Analysis

As mentioned above, this thesis used the questionnaire (quantitative method) as a tool to determine the users' continuance intention on using LMS that contains 34 items overall from the six variables. There are five independent variables, which are Perceived Ease Of Use (6 questions), Perceived Usefulness (6 questions), Perceived Enjoyment (10 questions), Confirmation (3 questions), and Satisfaction (5 questions), and one dependent variable represented by Continuous LMS Intention (4 questions).

Each and every variable applied in thesis has its own terms to determine the users' expectation and mindset towards the continuous use of LMS. There are six variables in this thesis. Firstly, the PEOU variable is used to determine the users' belief on LMS that would make them free from the effort, while PU is applied to enhance the users' job performance.

Whereas, PE is particularly added in this study to check the users' enjoyment while using the LMS system. CON is used to identify the users' desire and expectation, where it can help the SAT variable to determine the users' satisfaction using LMS. All these variables directly and

indirectly help to measure the users' positive or negative CI on using LMS by determining their future intention and expectation.

All of the users' point of view have been assessed by using the five-point Likert scale in the forms of "strongly disagree, slightly disagree, neutral, slightly agree, and strongly agree" (refer Appendix A). Based on the scale, the factor analysis process was performed to figure out the positive and negative responses of the LMS users with the content validity. By usingd the collected data, the factor analysis was conducted and the summary of the factor analysis is displayed in Table 4.11 and Table 4.12.

After calculating the factor analysis, items that have a value below than 0.4 are omitted from the analysis. This is because, the value above 0.50 is acceptable and the value below 0.4 is not acceptable (Hair et al., 1995). Additionally, the value that is above 0.50 or higher from a particular item in the factor analysis is used to identify and interpret the factor. Therefore, in this analysis, there were two items that have been omitted because their values are less than the target.

During the factor analysis, items that do not achieve the required value will be deleted one by one for each factor loading due to the violations of sample structure. If not, the double loading (delete more than one item) might make it difficult to interpret the output. The double loading should be repeated till the value is at least 0.50 or more than one factor. In detail, Hair et al. (1995) and Nunnally (1978) stated that the item that theoretically seems unreasonable for the component to be associated with other items in the coefficient should be removed to produce a clear output.

Confirmation Factor Analysis (CFA) was conducted in this study to test the validity of the item. In this analysis, 34 items were examined and only 32 items were left, where two items were detected to have lower values than 0.50 and have been deleted during CFA. Both the

items are from the same independent variable PE. The first variable that was removed from the list for the factor loading is item no. PE 9 because it has the least value of 0.467. Later, from the same variable, the second item, item no. PE 8, has a low value of 0.468 and has been removed. Finally, after omitting both items from the list, the factor loading was conducted again and it has received an appropriate value. There was no item deleted from any other variable because all the items were identified above 0.50.

This study also used the anti-image correlation matrix to determine whether a group of variables substantially correlated between each other or not. Moreover, McCroskey and Young (1979) stated that if the factor loading approaches -1.00 or +1.00, the association between the variable and the factor becomes greater. Hence, this thesis ensured that the sampling adequacy for all the variables that appear in the diagonal anti-image correlation matrix was at the acceptable level, which is above 0.50.

Table 4.11: Factor Analysis for Independent Variable

Code	Item	Loading
	Perceived Ease of Use (PEOU)	
PEOU 1	Learning to operate LMS is easy for me	.644
PEOU 2	It is easy for me to become skilled at using LMS	.672
PEOU 3	My reaction with LMS is clear and understandable	.665
PEOU 4	I find it is easy to get LMS to do what I want it to do Gathering information from LMS is easy	.675
PEOU 5	In overall, I believe that LMS is easy to use	.637
PEOU 6		.758
	Eigenvalue : 4.051 Variance : 30.558 Reliability : .922	
	Perceived Usefulness (PU)	
PU 1	The LMS usage improves my teaching and learning process	.677
PU 2	The LMS usage is able to enhance my effectiveness in the teaching and learning process	.705
PU 3	The LMS usage could increase my productivity in	.659

	teaching and learning	
PU 4	The LMS usage allows me to accomplish the teaching and learning tasks more quickly	.605
PU 5	The LMS usage makes it easier to teach and learn in the university	.652
PU 6	In overall, I find LMS to be useful in my teaching and learning process	.683
	Eigenvalue : 3.981 Variance : 27.840 Reliability : .921	
	Perceived Enjoyment (PE)	
PE 1	Learning online using LMS would be fun for its own sake	.849
PE 2	Learning online using LMS would make me feel good	.844
PE 3	Learning online using LMS would be boring	.802
PE 4	Learning online using LMS would involve me in the teaching and learning process	.611
PE 5	Learning online using LMS would be exciting	.520
PE 6	Learning online using LMS would be enjoyable	.874
PE 7	Learning online using LMS would be uncomfortable	.782
PE 10	In overall, learning online using LMS would be interesting	.546
	Eigenvalue : 5.828 Variance : 14.322 Reliability : .617	
	Confirmation (CON)	
CON 1	My experience with using LMS is better than what I expected	.657
CON 2	The service level provided by LMS is better than what I expected	.568
CON 3	In overall, most of my expectations from using LMS are confirmed	.663
	Eigenvalue : 1.888 Variance : 7.795 Reliability : .874	

	Satisfaction (SAT)	
SAT 1	I am pleased to use LMS	**.753**
SAT 2	I am contented in using LMS	**.764**
SAT 3	I am delighted to use LMS	**.695**
SAT 4	I am satisfied with the use of LMS	**.718**
SAT 5	My decision to use LMS is a wise one	**.747**
	Eigenvalue : 3.677 Variance : 23.637 Reliability .935	

Table 4.11 shows the factor analysis results for independent variables. The output from the first variable, which is PEOU, indicates the loading range is between .637 to .758 and it is above the minimum value of 0.50. There are six measuring items used in PEOU and all the items explained the communalities variance at 30.558% with an eigenvalue of 4.051. Next, the PU variable also used six items, where all the values are higher than the standard value of 0.5 and its communality variance is 27.840% with an eigen value around 3.981.

PE used 10 items to measure the factor analysis. However, there were two item that have lower loading values and they have been deleted. Therfore, the remaining eight items were measured and produced the expected loading value that is above 0.50, while the variance is 14.322% and the eigenvalue for PE is 5.828. Continuously, CON also fulfiled the requirement value, where the range of the loading value is .568 to .663. It has an eigen value of 1.888, which is above 1 and the total variance is 7.795% at a reliability of .874.

SAT is the last independent variable that has the loading value ranging between .695 to .764, which is higher than the standard value. The eigenvalue is 3.677 and the communality variance is 23.637%. Adding to that, SAT has the higest reliability value of .935, which is really high and near to 1.

Table 4.12: Factor Analysis for Dependent Variable

Code	Item	Loading
	Continuous LMS Usage Intention (CI)	
CI 1	I plan to continue using LMS to teach and learn about the new technology	.662
CI 2	I intend to increase the LMS usage for the teaching and learning process	.686
CI 3	I intend to continue using LMS in future	.692
CI 4	I will strongly recommend others to use LMS	.673
	Eigenvalue : 2.713 Variance : 13.406 Reliability : .907	

Based on the table above, the loading value for the dependent variable (CI) of LMS usage is in the range of .662 to .692 . It has 13.406% variance through varimax rotation and the eigen value is 2.713. As expected, all the loading values are above 0.5 and it is acceptable in this factor analysis.

4.6 Correlation Analysis

Correlation is a statistical measuring tool that demonstrates the degree to which two or more variables fluctuate together. The relationship among the variables can develop a positive or negative correlation, which helps to indicate the variation between the variables. Besides that, the correlation analysis is also used to explain the strength, nature, and direction significance of the bivariate relationship of the variable.

According to Sekaran (2003), any problems that are associated with multicollinearity can be detected by conducting this correlation analysis. Adding to Hair et Al. (2009), he correlation method is also used to predict the dependent variable by using the independent variables to indicate the degree of relationship between the variables and regression. Due to that, this

thesis also conducted and examined the correlation between PEOU, PU, PE, CON, SAT and CI on LMS usage.

The correlation cofficient that ranges between 0.30 to 0.80 is the most preferred value used to determine the relationship among the variable (Hair et al., 2009; Pallant, 2010). Besides that, the correlation coefficient value that is above 0.90 helps to identify the multicollinearity problem in the analysis (Tabachnick & Fidell, 1996). Table 4.13 shows the summary of the correlation value between the variables.

Table 4.13: Inter-Correlation on Variables of Study

Variables	PEOU	PU	PE	CON	SAT	CI
PEOU	1.00					
PU	.848**	1.00				
PE	.712**	.768**	1.00			
CON	.692**	.700**	.716**	1.00		
SAT	.755**	.794**	.754**	.778**	1.00	
CI	.755**	.807**	.719**	.712**	.827**	1.00

Note: ** *Correlation is significant at the 0.01 level (1 tailed)*

As discussed, the output of this correlation analysis indicated that none of the variable is highly correlated with any other variable. Thus, this thesis assumed that there is no multicollinearity problem between the variables. Moreover, the patterns of the correlation table and its value proved that the relationship among the variables are positively and significantly correlated with each other variable. The SPSS 20.0 output is attached in Appendix D.

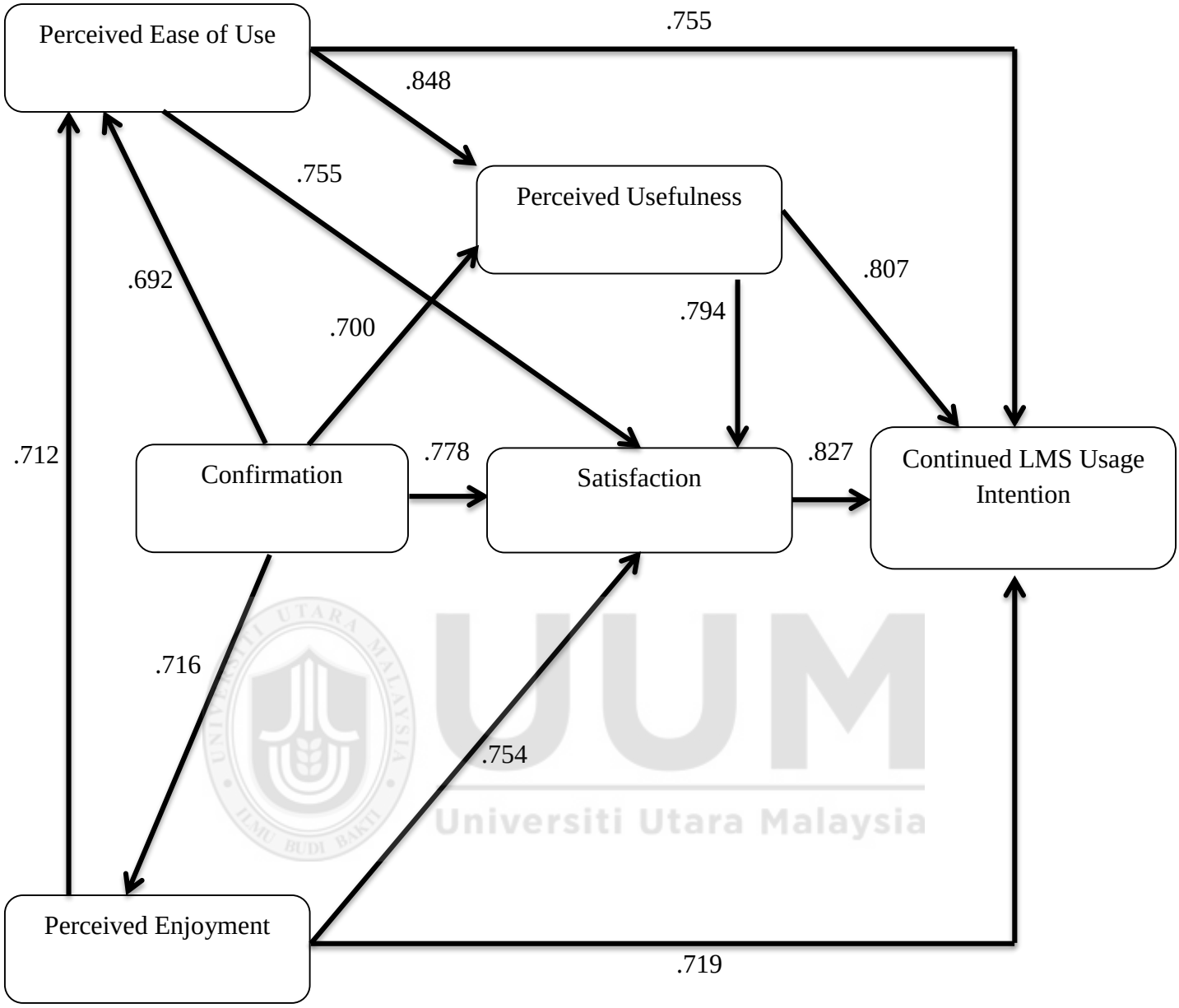

Figure 4.3: Correlation of Research Model

4.7 Regression Analysis

Regression is a technique especially used to determine the statistical relationship between two or more variables, where the changes in the dependent variable are always associated with the changes in the independent variables. However, this thesis used the multiple regression analysis to understand and analyse the relationship between the six variables of this study. Simple linear regression is used to predict the value of a dependent variable based on the independent variable. Besides, this simple regression analysis is also used to test the hypotheses of this study.

4.7.1 Hypothesis Testing

As stated earlier, there are five independent variables and one dependent variable in this framework. This thesis tested the relationship between the independent variables (PEOU, PU, CON, PE, SAT) and dependent variable (CI) to determine the LMS usage acceptance among the users (lecturers and students). Based on the six variables, there are thirteen hypotheses formulated in this thesis. There is no mediating or moderating variable in this thesis. Due to that, all of the thirteen hypotheses are developed to determine the direct relationship between each other variable.

4.7.1.1 The Relationship between Satisfaction and Continued LMS Usage Intention

The first hypothesis that is developed in this thesis is to examine the direct relationship between the independent variable (Satisfaction) and dependent variable (Continued LMS Usage Intention). The (R^2) value is used to indicate how the coefficient of the variable is able to predict the specific outcome. The result of this hypothesis is shown in Table 4.14. The analysis indicates that the coefficient (R^2) is .684, which means the satisfaction explains 68.4% variance of the continued LMS usage intention.

The beta value is (β = .827, $p < 0.00$), which indicates there is a positive and significant relationship between SAT and CI. This result also proved that the overall model is statistically significant, where (F = 1567.147) and has a significant value of 0.000, which is less than 0.5. Therefore, Hypothesis 1 is supported. The SPSS 20.0 output is attached in Appendix E.

Table 4.14: Regression Analysis of the Relationship between Satisfaction and Continued LMS Usage Intention

Dependent Variable: Continued LMS Usage Intention	
Variable	**Standardized Beta**
Independent Variable: Satisfaction	.827
R^2	.684
Adjusted R^2	.683
F Value	1567.147
Sig. F Change	.000

** $p < 0.000$

4.7.1.2 The Relationship between Confirmation and Satisfaction

This section discusses the next relationship testing between the confirmation and satisfaction variables. Confirmation is considered as the independent variable, and satisfaction is referred to as the dependent variable. Based on this result, the R^2 is .605, which indicates that the confirmation variable explains 60.5% variance of the satisfaction.

The overall relationship of the model is statistically significant, where ($F = 1111.417$, $p < 0.000$). Meanwhile, the beta value ($\beta = .778$) indicates that the confirmation and satisfaction relationship has a positive significant. Thus, the result assumes that Hypothesis 2 is also supported. The summary of the result is shown in Table 4.15 below. The SPSS 20.0 output is attached in Appendix F.

Table 4.15: Regression Analysis of the Relationship between Confirmation and Satisfaction

Dependent Variable: Satisfaction	
Variable	**Standardized Beta**
Independent Variable: Confirmation	.778
R^2	.605
Adjusted R^2	.605
F Value	1111.417
Sig. F Change	0.000

** $p < 0.000$

4.7.1.3 The Relationship between Perceived Usefulness and Satisfaction

The third hypothesis is tested between perceived usefulness as the independent variable and satisfaction as the dependent variable. The regression of fit is (R^2 = .631), which indicates perceived usefulness has 63.1 % of the variance in the satisfaction. The relationship among the variables is statistically significant, where the $p < 0.000$.

The beta value (β) is .794, which produces a higher value, therefore there is a significant relationship between perceived usefulness and satisfaction. In addition, PU and SAT have significant values at 0.000, which is the perfect value. Therefore, Hypothesis 3 is positively supported. Table 4.16 summarises the test result for this relationship. The further analysis detail from SPSS 20.0 is attached in Appendix G.

Table 4.16: Regression Analysis of the Relationship between Perceived Usefulness and Satisfaction

Dependent Variable: Satisfaction	
Variable	**Standardized Beta**
Independent Variable: Perceived Usefulness	.794
R^2	.631
Adjusted R^2	.630
F Value	1237.189
Sig. F Change	0.000

** $p < 0.000$

4.7.1.4 The Relationship between Perceived Usefulness and Continued LMS Usage Intention

Continuously, the next regression analysis involved perceived usefulness as the independent variable and continued LMS usage intention as the dependent variable to identify the relationship among these variables. Based on the result, the R^2 of this variable is .651, whereby perceived usefulness shows 65.1% variance of the continued LMS usage intention.

Adding to that, the beta value is (β = .807), which positively and significantly influences the continued LMS usage intention. The overall model is statistically significant (F = 1350.370, p < 0.000). Thus, it is assumed that Hypothesis 4 is supported, where PU has a positive relationship with CI. Table 4.17 shows the summary of the analysis and the SPSS 20.0 output can be referred to in Appendix H.

Table 4.17: Regression Analysis of the Relationship between Perceived Usefulness and Continued LMS Usage Intention

Dependent Variable: Continued LMS Usage Intention	
Variable	**Standardized Beta**
Independent Variable: Perceived Usefulness	.807
R^2	.651
Adjusted R^2	.650
F Value	1350.370
Sig. F Change	0.000

** p < 0.000

4.7.1.5 The Relationship between Confirmation and Perceived Usefulness

The relationship between confirmation (independent variable) and perceived usefulness (dependent variable) is the next variable relationship focused in this section. Table 4.18 below stated that the regression of fit is (R^2 = .490), which means confirmation has accounted for 49% of the variance in perceived usefulness. This indicates that confirmation and perceived usefulness have the highest predictive power in the LMS usage acceptance among the users.

The overall model is statistically significant, where the F= 695.773. Based on the table below, confirmation is also statistically significant with perceived usefulness at $p < 0.000$. Therefore, Hypothesis 5 is considered as supported. Further detail regarding the analysis can be referred to in Appendix I.

Table 4.18: Regression Analysis of the Relationship between Confirmation and Perceived Usefulness

Dependent Variable: Perceived Usefulness	
Variable	**Standardized Beta**
Independent Variable: Confirmation	.700
R^2	.490
Adjusted R^2	.489
F Value	695.773
Sig. F Change	0.000

** $p < 0.000$

4.7.1.6 The Relationship between Perceived Ease of Use and Satisfaction

Perceived ease of use and satisfaction are the next variables used in the regression analysis to determine the relationship between the variables. Perceived ease of use is referred to as the independent variable and satisfaction point as the dependent variable. The R^2 of this analysis is .570, where it proves that perceived ease of use explains 57% variance of satisfaction.

The output of this analysis found that perceived ease of use positively and significantly influences satisfaction with p <0.000. The beta value for perceived ease of use also shows it is significant (β = .755). Hence, Hypothesis 6 also proves to be supported. Table 4.19 displays the summary of the analysis and the SPSS 20.0 output can be referred to in Appendix J.

Table 4.19: Regression Analysis of the Relationship between Perceived Ease of Use and Satisfaction

Dependent Variable: Satisfaction	
Variable	**Standardized Beta**
Independent Variable: Perceived Ease of Use	.755
R^2	.570
Adjusted R^2	.570
F Value	962.868
Sig. F Change	0.000

** p < 0.000

4.7.1.7 The Relationship between Perceived Ease of Use and Continued LMS Usage Intention

Perceived ease of use also has a direct relationship with continued LMS usage intention. The summary of the regression analysis stated that there is a significant relationship between the independent variable (perceived ease of use) and dependent variable (continued LMS usage intention), where the regression of fit is (R^2 = .570), which means perceived ease of use has influenced 57% of variance in continued LMS usage intention.

The beta value (β) from this analysis is .755, which proves that there is a significant relationship between perceived ease of use and continued LMS usage intention. Adding to that, PEOU and CI also have significant values (p) at 0.000, which are less than 0.5. Therefore, Hypothesis 7 is supported. Table 4.20 shows the summary of the analysis and Appendix K contains the further detail from SPSS 20.0.

Table 4.20: Regression Analysis of the Relationship between Perceived Ease of Use and Continued LMS Usage Intention

Dependent Variable: Continued LMS Usage Intention	
Variable	**Standardized Beta**
Independent Variable: Perceived Ease of Use	.755
R^2	.570
Adjusted R^2	.569
F Value	960.616
Sig. F Change	0.000
Durbin-Watson	1.834

** $p < 0.000$

4.7.1.8 The Relationship between Perceived Ease of Use and Perceived Usefulness

Perceived ease of use (independent variable) and perceived usefulness (dependent variable) is another relation of two variables in the regression analysis. The output of this analysis indicates that the R^2 is .719, where perceived ease of use explains 71.9% variance of perceived usefulness.

The beta value from this analysis shows that there is a positive significant relation between the variables, where (β = .848). Other than that, perceived ease of use is statistically significant with perceived usefulness at p < 0.000. Hence, Hypothesis 8 is also supported. A clear summary of the analysis is displayed in Table 4.21 and the SPSS 20.0 output can be referred to in Appendix L.

Table 4.21: Regression Analysis of the Relationship between Perceived Ease of Use and Perceived Usefulness

Dependent Variable: Perceived Usefulness	
Variable	**Standardized Beta**
Independent Variable: Perceived Ease of Use	.848
R^2	.719
Adjusted R^2	.718
F Value	1851.172
Sig. F Change	0.000

** p < 0.000

4.7.1.9 The Relationship between Confirmation and Perceived Ease of Use

Table 4.22 below shows the summary of the regression analysis between confirmation and perceived ease of use. In this analysis, confirmation stands as the independent variable, whereas perceived ease of use is the dependent variable. The goodness of fit is (R^2 = .478), indicating that the confirmation variable explains 47.8% variance of perceived ease of use. The overall model is statistically significant at F= 664.875.

The outcome of the beta value is β = .692, which proves that confirmation is significantly related to perceived ease of use. Both variables have a positive relationship, thus, Hypothesis 9 is supported. A complete analysis for this relationship can be referred to in Appendix M.

Table 4.22: Regression Analysis of the Relationship between Confirmation and Perceived Ease of Use

Dependent Variable: Perceived Ease of Use	
Variable	**Standardized Beta**
Independent Variable: Confirmation	.692
R^2	.478
Adjusted R^2	.478
F Value	664.875
Sig. F Change	0.000

** p < 0.000

4.7.1.10 The Relationship between Perceived Enjoyment and Satisfaction

Perceived enjoyment as the independent variable and satisfaction as the dependent variable are used for the regression analysis. The R^2 is .569, which indicates that the independent variable explains 56.9% of variance that influences the dependent variable. This shows that PE has a moderate predictive power to determine the users' LMS acceptance.

The overall model is statistically significant at ($F = 956.506$, $p < 0.000$). While perceived enjoyment is also significantly related to satisfaction at $\beta = .754$. Therefore, Hypothesis 10 is assumed as supported. Table 4.23 below details the summary of the analysis and further information can be referred to in Appendix N.

Table 4.23: Regression Analysis of the Relationship between Perceived Enjoyment and Satisfaction

Dependent Variable: Satisfaction	
Variable	**Standardized Beta**
Independent Variable: Perceived Enjoyment	.754
R^2	.569
Adjusted R^2	.568
F Value	956.506
Sig. F Change	0.000

** $p < 0.000$

4.7.1.11 The Relationship between Perceived Enjoyment and Continued LMS Usage Intention

Perceived enjoyment and continued LMS usage intention are the next combination of variables used to determine the relationship. In this regression analysis, perceived enjoyment is the independent variable, whereas continued LMS usage intention is the dependent variable. The output of this analysis indicates that the R^2 is .518, where perceived enjoyment influences 51.8% variance of continued LMS usage intention.

The beta value from this analysis stated that (β = .719), which indicates there is a significant relationship between both variables. Besides, it also has significant value and is statistically significant at (F = 777.607, p < 0.000). Due to that, Hypothesis 11 is supported. The summary of the analysis can be seen in Table 4.24 below, whereas the SPSS 20.0 output can be referred to in Appendix O.

Table 4.24: Regression Analysis of the Relationship between Perceived Enjoyment and Continued LMS Usage Intention

Dependent Variable: Continued LMS Usage Intention	
Variable	**Standardized Beta**
Independent Variable: Perceived Enjoyment	.719
R^2	.518
Adjusted R^2	.517
F Value	777.607
Sig. F Change	0.000

** p < 0.000

4.7.1.12 The Relationship between Perceived Enjoyment and Perceived Ease of Use

In this section, perceived enjoyment is the independent variable and perceived ease of use is the dependent variable in order to determine the relationship. The output from the regression analysis for R^2 is .507, where it indicates that perceived enjoyment influences 50.7% of variance in perceived ease of use. The relationship between these two variables is also statistically significant (F = 746.084).

Besides that, the beta value for this analysis is β = .712. where it has a positive and significant influence on the variables. The results reveal that both of the variables have a positive relationship, thus, Hypothesis 12 is supported. Table 4.25 illustrates the output of the regression analysis. Further information from SPSS 20.0 can be seen in Appendix P.

Table 4.25: Regression Analysis of the Relationship between Perceived Enjoyment and Perceived Ease of Use

Dependent Variable: Perceived Ease of Use	
Variable	**Standardized Beta**
Independent Variable: Perceived Enjoyment	.712
R^2	.507
Adjusted R^2	.506
F Value	746.084
Sig. F Change	0.000

** p < 0.000

4.7.1.13 The Relationship between Confirmation and Perceived Enjoyment

The last regression analysis involves confirmation as the independent variable and perceived enjoyment as the dependent variable to determine the positive or negative relationship between the variables. Based on the output of the analysis, the R^2 is .512, indicating that the confirmation variable explains 51.2% variance of perceived enjoyment. The overall output is statistically significant, where the F = 761.281 and $p < 0.000$.

The beta value of this analysis is $\beta = .716$, which means that confirmation and perceived enjoyment have a positive significant relation. Thus, Hypothesis 13 is supported. Table 4.26 displays the summary of the regression analysis. The SPSS 20.0 output is attached in Appendix Q.

Table 4.26: Regression Analysis of the Relationship between Confirmation and Perceived Enjoyment

Dependent Variable: Perceived Enjoyment	
Variable	**Standardized Beta**
Independent Variable: Confirmation	.716
R^2	.512
Adjusted R^2	.512
F Value	761.281
Sig. F Change	0.000

** $p < 0.000$

4.8 Summary

This chapter discussed the continuous intention on using LMS for educational purpose among the northern regional public universities. This study used the quantitative method to collect data from 727 respondants who include the lecturers and students from three northern regional universities, namely UUM, USM, and UniMAP. Based on the analysis, 84.7% of respondents stated that LMS is important for the teaching and learning purpose, while 15.3% did not agree.

In this thesis, the Cronbach's alpha coefficient is really high at 0.964, which is near to 1. This shows that the users' continuance intention on LMS has a high reliability. Adding to that, the study also conducted the factor analysis in order to measure the factorability of all 34 measuring items. The finding shows that all of the variables have greater contribution to the continuous LMS usage among the lecturers and students, except one variable that is perceived enjoyment because it has the lowest value among the rest of variables.

Continuously, the correlation analysis was also conducted in this chapter. Based on the patterns from the correlation table, it can be concluded that all the variables are positively and significantly correlated and there is no instance of a multicollinearity problem. Besides that, the regression analysis was also discussed in this chapter and it is confirmed that all the hypotheses have a positive relationship. The result of the hypothesis testing is summarised in Table 4.27.

Table 4.27 : The Result of Hypothesis Testing

Hypothesis	Statement of hypothesis	Result
H1	Satisfaction has a positive influence on Continued LMS Usage Intention	Supported
H2	Confirmation has a positive influence on Satisfaction	Supported
H3	Perceived Usefulness has a positive influence on Satisfaction	Supported
H4	Perceived Usefulness has a positive influence on Continued LMS Usage Intention	Supported
H5	Confirmation has a positive influence on Perceived Usefulness	Supported
H6	Perceived Ease of Use has a positive influence on Satisfaction	Supported
H7	Perceived Ease of Use has a positive influence on Continued LMS Usage Intention	Supported
H8	Perceived Ease of Use has a positive influence on Perceived Usefulness	Supported
H9	Confirmation has a positive influence on Perceived Ease of Use	Supported
H10	Perceived Enjoyment has a positive influence on Satisfaction	Supported
H11	Perceived Enjoyment has a positive influence on Continued LMS Usage Intention	Supported
H12	Perceived Enjoyment has a positive influence on Perceived Ease of Use	Supported
H13	Confirmation has a positive influence on Perceived Enjoyment	Supported

CHAPTER 5

SUMMARY AND CONCLUSION

5.0 Introduction

This chapter discusses the statistical findings that have been stated in the previous chapter (Chapter 4) regarding the continuous intention on using LMS for teaching and learning purposes among the lecturers and students. The chapter begins with recapitulations of the findings in this thesis. Then, it is followed by discussing the hypothesis testing result that explains in detail about the relationship between the variables. Next, the contribution of the research is discussed, which includes both theoretical and practical contributions. Finally, a conclusion is presented after explaining the limitation of this thesis and the suggestion for future research.

5.1 Recapitulations of the Study's Findings

This thesis is mainly aimed to achive the thirteen objectives that are parallel with the research questions. This thesis is aimed to identify the relationship of the users' satisfaction on continued LMS intention in the teaching and learning process among the students and lecturers from the three northern regional public universities. This thesis also used the expanded Expectation Confirmation Theory (ECT) to find the users' expectation on continuous LMS usage. Adding to that, the findings for the thirteen research questions as stated below are also discussed in this chapter.

i. To examine the relationship between users' satisfaction and continuance LMS usage intention.
ii. To examine the relationship between the users' confirmation of expectation and satisfaction on LMS.

iii. To investigate the influence of users' perceived usefulness on satisfaction.

iv. To investigate the relationship between the users' perceived usefulness and continuance LMS usage intention.

v. To determine the connection between the users' confirmation of expectations and perceived usefulness.

vi. To determine the users' perceived ease of use on their satisfaction.

vii. To investigate the users' perceived ease of use on continuance LMS usage intention.

viii. To examine the relationship between users' perceived ease of use and perceived usefulness.

ix. To determine the users' confirmation of expectation on perceived ease of use.

x. To identify whether users' perceived enjoyment of LMS can influence their satisfaction.

xi. To identify whether users' perceived enjoyment of LMS can influence the continuance LMS usage intention.

xii. To identify whether users' perceived enjoyment of LMS can influence the perceived ease of use.

xiii. To clarify the connection between confirmation and perceived enjoyment of LMS.

Based on the data analysis, all the six variables that were used in this study have the potential to manipulate the users' continuous intention on using LMS for their teaching and learning process. The six variables are Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Perceived Enjoyment (PE), Confirmation (CON), Satisfaction (SAT), and Continued LMS Usage Intention (CI). Additionally, the research hypotheses were developed based on the six variables. Surprisingly, all the variables had a good relationship between each other.

5.2 Discussion

As mentioned above, this thesis contrived to explore the LMS usage continuity among the users' for teaching and learning purposes. Due to that, this thesis tested the empirical relationship between PEOU, PU, PE, CON, SAT, and CI. The findings from the data analysis proved that there is a significant correlation between the six variables. The discussion on the results begins by addressing the first relationship (Hypothesis 1) between SAT and CI. Then, it is followed by discussing each hypothesis separately to clarify the impact of users' satisfaction on continued LMS intention. In this study, 13 hypothesis were discussed as below.

5.2.1 Satisfaction and Continued LMS Usage Intention

As discussed in Chapter 2, satisfaction is the end users' feeling towards a product or service. Besides that, satisfaction is also stated as an variable that is used to measure and determine the users' thoughts after purchase or use (Oliver, 1989; Orehovacki & Babic, 2014). The users' positive satisfaction on the product or service greatly helps to increase the long-term relationship among the users and has a significant influence on continuance usage intention.

This relationship between satisfaction and continuance has been shown in a number of related studies by Almahamid and Abu Rub (2011), Limayem and Cheung (2008), Flavin, Guinaliu, and Gurrea (2006), Roca, Chiu, and Martinez (2006), and Song (2010). Whereas, there are a few studies that used the same ECT theory as per in this thesis to understand the students' satisfaction on e-learning to determine the continuance intention (Chow & Shi, 2014). Based on the studies, satisfaction is an essential variable because it can determine the continued intention of the users. This is because, the satisfaction of users has a direct relation towards their continuous intention.

As stated earlier, the students and lecturers' satisfaction in this study were analysed on the LMS usage in the teaching and learning environment. The first hypothesis of this thesis is satisfaction and continued LMS usage intention. The relationship between SAT and CI can be described as the main relationship to understand the satisfaction influence on LMS continuous usage in order to achieve the best result. This is because, SAT is a good predictor in enhancing the LMS usage widely and supports the past studies. Besides that, this hypothesis also is theoretically supported with the conveyed information in Chapter 2.

Moreover, the users did not find much difference in the teaching method whether it is traditional learning or online learning because they still find their self-satisfaction with the online learning method (So & Brush, 2008). Besides that, the several systems in LMS also influence the users' satisfaction and their intention to use it continuously (Kadir & Aziz, 2016). Adding to that, the users in public organisations also have high complacency in using e-learning for their services and intend to use it continuously (Pereira, Ramos, Gouvea, & Costa, 2015).

At last, the empirical findings and statistical result of this hypothesis confirm that SAT has a significant relationship with CI. The output also helps to indicate that the users' satisfaction on LMS influenced their continuance intention. This shows that the users had a positive feeling towards the LMS usage in the teaching and learning process, which is able to increase their educational level.

5.2.2 Confirmation and Satisfaction

The second hypothesis discussed the relationship between confirmation and satisfaction. Confirmation is a feeling that involves the users' desire and expectation on a product or service before experiencing the reality. In general, there is a positive and negative expectation

on every usage of a product or service from the users. The fulfilment of their desire is the main point to elect the users' satisfaction on the product or service.

This thesis involved the LMS system that is used among the users for their education purpose. According to Sahin (2014), the perceived performance or the users' expectation of an product or service is always the cause to determine the users' satisfaction. Moreover, confirmation is generally influenced by the features in the system, especially in online environments (Bolliger & Wasilik, 2009).

Besides, there are different expectations from each and every user which do not match in common; thus, it is really hard to measure the users' expectation (Palvia, 1996). Similarly. the users who were involved in this thesis are also from distinctive backgrounds, where they had to explore or use different types of the LMS system for their teaching and learning process. Nonetheless, the users' expression on using LMS is more likely the same even though they do not use the same LMS system.

However, this thesis is able to indicate the users' satisfaction because the users expressed well their expected benefit from using LMS. The prior studies also supported that the direct and positive relationship between the users' expectation always increases the users' satisfaction (Zviran, Glezer, & Avni, 2006; Lin, Wu, Hsu, & Chou, 2012, Wang, Butler, An Hsieh, & Hsun Hsu, 2008).

Apart from that, the findings of this thesis stated that confirmation is significantly correlated with users' satisfaction. Whereas, the empirical evidence also clearly shows that the users' expectation on using LMS for their teaching and learning process totally influenced the users' satisfaction. Therefore, confirmation and satisfaction have a strong relationship to determine the continuous LMS usage among the users.

5.2.3 Perceived Usefulness and Satisfaction

The third hypothesis of this thesis is to determine the users' perceived usefulness with their satisfaction on using LMS. Perceived usefulness is the most comman variable that is generally used to determine the performance and it is largely used in the TAM model. Briefly, it can be stated that, PU helps to define the intensity of the users' belief on using a system that would enhance their job performance (Davis, 1989; Rocker, 2009; Karahanna & Straub, 1999).

Previous studies used certain features in LMS to indicate the users' performance; where the features are referred to as PU and it greatly helps to determine the effectiveness on the system (Juhary, 2014). Besides that, the PU quality and attributes are also able to increase the learners' self-regulation (Tabak & Nguyen, 2013). LMS can also be referred to as an important system among the users to share or gather their details regarding their studies. Due to that, LMS is really useful for the users in their teaching and learning process.

Adding to that, this thesis stated that perceived usefulness has a positive influence with the users' satisfaction. This is because the LMS system is higly useful and helps to improve their performance. Besides that, the users' belief on using the LMS system for their education purpose, which can improve their productivity, is also considered as convenient for the users to use (Song, 2010). Whereas, the users' involvement in using LMS directly confirms that they are satisfied with using the LMS system.

5.2.4 Perceived Usefulness and Continued LMS Usage Intention

As discussed above, perceived usefulness is a variable that is used to measure the users' productivity on using a system. The advanced applications in a system always help to improvise the users' performance. The next hypothesis is about perceived usefulness and

continued LMS usage intention. There are several past studies that support that perceived usefulness has a relationship with continuance intention. The studies that support the relationship are conducted by Khalid (2014), Brahmasrene and Lee (2012), Limayem and Cheung (2008), Juhary (2014), and Saade and Bahli (2005).

A well developed technology or system generally helps to improve the users' performance and effectiveness in their teaching and learning process rather than the actual use of a normal system (Al-adwan, Al-adwan, & Smedley, 2013). Other than that, the effective system is always able to increase productivity or improve the performance of the users, which tends to influence the continuance use of the system (Saade & Bahli, 2005).

As a result, from the findings of this thesis, it is confirmed that perceived usefulness has a significant relationship with continued LMS usage intention. This is because the findings of the analysis stated that the LMS system is effective among the users. Due to that, the improvement in the users' performance directly builds their intention to use the LMS system continuously for their teaching and learning process.

5.2.5 Confirmation and Perceived Usefulness

Continuously, the next hypothesis of this thesis involved confirmation and perceived usefulness. The findings of this thesis revealed that confirmation influenced perceived usefulness. This section discusses the relationship between the users' confirmation on using the LMS system and its perceived usefulness. As explained before, confirmation refers to the users' expectation on using the system. While perceived usefulness refers to the improvisation in the users' performance.

According to Lam, Lee, Chan, and McNaught, (2011), new strategies that are built in perceived usefulness mostly have positive experiences on using a system constantly, which

can build a good perception on that system. Adding to that, the fulfilment on using the system also increases the users' intention to use the system to improve the performance. In other words, the confirmation of users on using a system is really important because that is the most core variable to determine the usefulness and satisfaction of the users based on their experience (expectation) (Limayem & Cheung, 2008).

Adding to that, the fulfilment of the initial expectation in the end of the process to develop the performance is also one of the reasons CON has a relationship with PU (Sorebo, Halvari, Gulli, & Kristiansen, 2009). Based on this, it is clear that the users' confirmation influenced the users' perceived usefulness. The findings of this thesis also confirm that confirmation is correlated with perceived usefulness. This can be stated as follows: if the users' satisfaction complies with their expectation, then the users' opinion to use LMS to improve their performace will be in a high level.

5.2.6 Perceived Ease of Use and Satisfaction

The next hypothesis is regarding perceived ease of use and satisfaction. Perceived ease of use is also one of the most common variables used in a TAM model. This perceived ease of use is normally used to determine the users' belief on using a particular system that can reduce their effort and free them from hardwork (Davis, 1989). As stated above, satisfaction is related to the users' contentment on using a certain system as per their wish.

Besides that, the system should not only need to reduce the effort, but it needs to be convenient to the users, so, this can improve the users' satisfaction (Ozturk, Bilgihan, Nusair, & Okumus, 2016). In consonace with the previous statement, the LMS system in this thesis is really convenient for the users. The findings indicate that the LMS system helps the users to complete their work easily with less effort. This action increases the users' satisfaction level.

Adding to that, the findings of this thesis confirm that perceived ease of use has a significant relationship with satisfaction. The LMS system that is used in this thesis greatly helps the users to share and gather information or notes regarding their study easily. Likewise, the system also helps to retrieve important details as soon as possible. Moreover, all these advantages from this system directly increase the users' satisfaction. It seems the LMS system is more suitable for the teaching and learning process.

5.2.7 Perceived Ease of Use and Continued LMS Usage Intention

As stated above, perceived ease of use is a variable that explains the users' effortlessness when using a system. Additionally, it can be defined as the users' own perception on using a system that might help them to complete a task easily (Bugembe, 2010; Shen, Laffey, Lin & Huang, 2006). Besides, the LMS system that is studied in this thesis is known as a formal system that every student and lecturer need to apply in their teaching and learning system. It is because the LMS system is declared as the most easiest system to be used by the users.

Adding to that, the system greatly helps the users to interact with each other and aids them to complete their assessment without any cognitive burden (Saade & Bahli, 2005). More likely, the users feel free to use the system due to its simplicity. Sometimes, perceived ease of use is known as less mental effort, less frustration, flexibility, less rigid, and easy to understand; and the helpful guidance in performing tasks is the main point for the users to have continued intention to further use the LMS system (Al-alak & Alnawas, 2011). Other than that, the LMS system also helps them to save their most valuable time to do or to complete their teaching and learning process on time.

At last, the output from this findings declares that perceived ease of use has a significant relationship with continued LMS usage intention and this is supported by Ong and Lai (2006). This is because the simplicity of the LMS system leads the users to have high level

gratification. Hence, this directly shows the inclination of the users' continuance intention to use the LMS system for their teaching and learning process.

5.2.8 Perceived Ease of Use and Perceived Usefulness

The next hypothesis involves perceived ease of use and perceived usefulness. Both of these variables are most commonly analysed in prior studies especially in TAM models. However, this thesis is more focused on the ECT model, where it includes both of the variables to determine the relationship between perceived ease of use and perceived usefulness. There are prior studies that stated perceived ease of use influences perceived usefulness, which are conducted by Venkatesh and Davis (2000), Thong, Hong and Tam (2002), Saade and Bahli (2005), Elkaseh, Wong, and Fung (2016), Shen, Laffey, Lin, and Huang, (2006), and Cho, Cheng, and Lai (2009).

Both perceived ease of use and perceived usefulness have similar definitions. PEOU can be defined as as the extent at which the users believe that using LMS will free them from cognitive effort; while PU can be defined as the extent of the users' belief that using LMS would enhance their performance (Davis, 1989). This can be concluded that the pleasure of using the LMS system can improve the users' performance in their teaching and learning process.

Adding to that, the finding of this thesis also found that there is a significant relationship between PEOU and PU. However, the users used different types of the LMS system in this thesis; they admitted that their effortless work when using the LMS system developed the users' belief that it would increase their job performance in the teaching and learning process.

5.2.9 Confirmation and Perceived Ease of Use

Continuously, the next hypothesis that is developed in this thesis is to determine the users' confirmation of expectation on perceived ease of use. As stated above, confirmation is the users' expectation and fulfilment after using a product, service or system. Perceived ease of use depends more on its actual implementation rather that its functionality (Rocker, 2009). There are several studies that discuss this relation, where Solechan (2012) stated that perceived ease of use is a benchmark to determine the users' confirmation for further use.

According to Bhattacherjee (2001), confirmation is more focused on the users' post adoption of a system. Normally, the fulfilment of users' expectation after their experience with a system will influence the users' perception about the system. Whereas, the comfort the users feel after using the LMS system will develop and help the users to understand the ease of the system. This is where the users' positive perception on the LMS system increases the intention to understand the content and easiness of using the LMS system.

Ultimately, the final finding from the analysis declared that confirmation has a significant relationship with perceived ease of use. This is proven that the users' expectation on LMS has satisfied them and the system is also easy to use where it reduces their workload. Hence, the users are more convenient on using the LMS system in their teaching and learning process.

5.2.10 Perceived Enjoyment and Satisfaction

The next hypothesis involves the perceived enjoyment and satisfaction variables to determine the users' satisfaction on LMS. Perceived enjoyment is defined as the extent of the enjoyment by using the computer that does not include any consequences from the activity (Davis, Bagozzi, & Warshaw, 1992). This thesis intends to understand the users' enjoyment on using LMS for their teaching and learning process.

Generally, most of the users really enjoy using a certain technology. However, it is unsure that the users still have the same perception when using the technology for educational purpose. Due to that, this perceived enjoyment is used in this thesis to determine the users' perception and satisfaction when using the LMS system. This is because understanding the users' enjoyment on using the system might give several ideas on increasing the usage. Other than that, the users' high level of enjoyment automatically increases their satisfaction level.

This thesis shows that the users enjoyed using the LMS system for their teaching and learning purposes and it is confirmed from the finding of this thesis. Therefore, with the empirical evidence, perceived enjoyment has a significant relationship with the users' satisfaction on using LMS for their teaching and learning purposes.

5.2.11 Perceived Enjoyment and Continued LMS Usage Intention

Perceived enjoyment has been used to determine the users' continued intention on using LMS. As stated earlier, perceived enjoyment can refer to a feeling among the users that build their belief on the system and take their thoughts to the next level (Ramayah & Ignatius, 2005). {erceived enjoyment is more focused on the intrinsic motivation, where it helps to predict the users' further intention on the usage (Heijden, 2004).

In this thesis, perceived enjoyment directly and indirectly influenced the users' continued intention to use LMS. The users' excitement when using the LMS system to upload or retrieve information for their studies directly satisfied them. Meanwhile, the high level of enjoyment and satisfaction of the users definitely strengthen their thoughts to use LMS continuously for their teaching and learning process.

Adding to that, the users' involvement in using LMS with their favourable perception totally increases their satisfaction and directly leads to their continuous intention (Balog & Pribeanu,

2010). The findings of this thesis verify that the users enjoyed using LMS and are willing to use more for their educational purpose. Thus, perceived enjoyment has a significant relationship with continued LMS usage intention.

5.2.12 Perceived Enjoyment and Perceived Ease of Use

The next hypothesis is to determine the users' perceived enjoyment on perceived ease of use in using LMS. As discussed before, perceived enjoyment can also refer to the users; their intellectual, playfulness, spontaneous, and imaginative characteristics in using the computer or technology (Anandarajan, Igbaria, & Anakwe, 2002). Perceived ease of use refers to a technology or system that is "user-friendly" (Ramayah & Ignatius, 2005).

The findings stated that perceived enjoyment directly influences perceived ease of use. This clearly shows the users' desire on using the LMS system and their affection that helped them to involve and understand the ease of the system (Liaw & Huang, 2003). Due to the enjoyment, they are willing to spend more time on the system (Sun & Zhang, 2004; Mahmood, Burn, Gemoets, & Jacquez, 2000). Moreover, they are able to find a way to complete their work effortlessly.

Hence, the findings of this thesis provide evidence that perceived enjoyment is an important variable that tends to influence the users' interest. Sometimes, the interest leads to their involvement in using the system, where they are able to conduct the task in an easy way without any struggle. Therefore, perceived enjoyment has a significant relationship with perceived ease of use.

5.2.13 Confirmation and Perceived Enjoyment

The last hypothesis of this thesis involves confirmation and perceived enjoyment. As explained before, confirmation can refer to the users' satisfaction on their expectation after

using the LMS system. Whereas, perceived enjoyment refers to their excitement or the users' involvement in using LMS. As mentioned earlier, confirmation is used as the core variable in the ECT model, which is able to influence the other variables.

According to Thong, Hong, and Tam (2006), the confirmation (users' post-expectation) after using LMS directly can show effects on the users' perceived enjoyment. Besides that, Kim (2010) also supported that confirmation has a positive relationship with perceived enjoyment in using mobile data continuously among the users. In short, the convenience that the users face when exploring the LMS system automatically develops the users' exhilaration.

In the end, based on the findings of this thesis, it is declared that confirmation has a significant relationship with perceived enjoyment. Adding to that, the users' positive expectation on LMS directly leads to the users' enjoyment, where it is able to influence the users' further intention on using the system for their teaching and learning process.

5.3 Contribution

This section discusses more on the contribution of this thesis. The contribution of this study is divided into two categories, which are theoretical contribution and practical contribution. The theoretical contribution is more focused on the field, development, and adoption that are related to the theory and framework. Whereas the practical contribution explains the benefit from this thesis to the society and reader.

5.3.1 Theoretical Contribution

Theoretically, this thesis adopted the expanded Expectation Confirmation Theory (ECT) model from Thong, Hong, and Tam (2006). As discussed in Chapter 2, this model is developed by Oliver (1980) and adapted by Bhattacherjee (2001). This expanded ECT model

from Thong, Hong, and Tam (2006) is used to determine the information technology continuance; however, this thesis applied the model to determine the users' LMS continuance for their teaching and learning process. This expanded ECT theory confirms that users are satisfied using the LMS system continuously.

The next contribution is the instrument of data collection. The data for this thesis has been collected through questionnaires. The questionnaire for this thesis is adapted from several studies to understand and enhance the users' acceptance on using LMS for educational purpose. The questions were structured by referring to the questionnaires from five authors, namely Bettayeb (2014), Hashim (2011), Thong, Hong, and Tam (2006), Childers, Carr, Peck, and Carson (2001), and Liao, Tsou, and Shu (2008). There were a total of 36 items developed based on the prior studies (refer Appendix A).

Other than that, this thesis also focused more on the Learning Management System (LMS). It is because, there is a lack of studies on understanding the users' expectation and importance to use LMS successfully in education. The LMS system is specially developed for students and lecturers to use it for their teaching and learning process. Additionally, it costs a large number of amount to develop the system. However, the lack of attention and usage among the users give some effects and this thesis has studied about that. Besides that, the northern regional public university students and lecturers have been involved in this thesis to gain a proper output to determine their continuous intention on using LMS.

5.3.2 Practical Contribution

This thesis has also shown that there are a few practical contributions for the administration, users, and society. Firstly, the finding of this thesis proved that the users are satisfied using LMS for their teaching and learning process while in the beginning, there was a few problems

in using LMS. However, the findings from this thesis shows that the users have positive expectation and perception on using LMS continuously.

As discussed in Chapter 1, the Higher Education Ministry (KPT) has developed DePAN, a policy that is specially planned to provide good quality in online learning to students and lecturer. The main aim of this policy is to provide good infrastructure, develop the expertise, and stabilise and sustain the LMS usage in teaching and learning (Asia e University, 2010). Comprehensively, it can be stated that, it is its target to produce productive users in the learning sector.

In detail, this study was first conducted in 2014, where the researcher found a lot of problems in the early stages of the study (Asad, Abdullah-Al-Mamun, & Clement, 2012; Cheung, Chiu, & Lee, 2011; Hew, 2011; Forkosh-Baruch & Hershkotz, 2011; Hurt et al., 2012; Irwin, Ball, & Desbrow, 2012; Lampe, Wohn, & Vitak, 2011; Paul, Baker, & Cochran, 2012; Zaidieh, 2012). Meanwhile, DePAN is also in the last matured phase (*fasa matang*) in implementing the e-learning system among higher education institutions. The findings from this thesis reveals that there was no problem for the users to use LMS in their teaching and learning process. These findings can simplify that the DePAN policy (2011 – 2015) has achieved its aim where the users are ready and intend to use LMS continuously as a platform for their teaching and learning process.

Other than that, most of the prior studies involved the students or lecturers separately, and a few combined the students and lecturers; however, the contexts are different if compared to this thesis. This is because, this thesis involved the students and lecturers in the Malaysian context. According to this thesis, both of the participants do not have differing perceptions on using the LMS system. It is because the lecturers are more focused on administering their

classroom, and uploading and sharing the information to the students. Besides, the students require an attractive platform to communicate with their peers and lecturers.

All the users that participated in this study are from different backgrounds, where the LMS system can vary by the type of open source, design, features, and applications. Several changes and modification have been done on the LMS system at the period of data collection. The improvement on the system can also catogorised as another point that satisfies the users to use the system for educational purpose.

Apart from that, the findings of this thesis shows that the users are satisfied using their LMS and are still willing to use it continuously. This helps the administration to understand the users' acceptance on using the LMS system. Moreover, the DePAN policy also succeeded in implementing an effective e-learning system for the users. The readers can also understand the importance of using LMS for educational purpose. It is because LMS is the formal platform where they can secure their communication and share information safely.

5.4 Limitation

This thesis has limitations in its time frame to collect the required data for the analysis. This is because the total number of respondents in this thesis is 727 respondents. It includes the students and lecturers; both parties need to determine their perception on using the LMS system for their teaching and learning process. Moreover, the thesis also incorporated three public universeties in the northern region of Malaysia. The list of universities are UUM, USM, and UniMAP.

The thesis has been conducted based on a survey approach. A survey approach is generally used to understand the users' approximate perception and it involves a large number of individuals. There are two types of survey method in a quantitative research such as questionnaire and interview. Questionnaire has been found to be one of the practical approaches in this type of study. However, this approach faces difficulties when collecting data from a large scope sample.

Connecting to the previous statement, collecting the required number of data using questionnaires from both students and lecturers in a short period of time really took a lot of effort to finish the data collection. Besides that, most of the time, it is hard to gather information from the professionals. Due to that, the data collection was repeated several times till it completely achieved the required amount of respondents and it took a long duration of time.

Other than that, keying data in the SPSS 20.0 system correctly is time consuming. Since a few data was found to be not relevant to the study, it is important to recheck the questionnaire to verify the information whether it is correct or not. Eventually, the large scope of the sample is the main limitation in this thesis.

5.5 Suggestion for Future Research

Firstly, this thesis proved that the DePAN policy has been accomplished where the users are satisfied and sustained the LMS usage. Currently, the Higher Education Ministry is moving towards their next plan where they aim to upgrade the e-learning usage globally. Due to that, for future research, determining the success on using the LMS system globally can be discussed.

Furthermore, the prior literature has shown that there are several types of ECT framework used to determine the users' continuance intention. This thesis used the expanded ECT model that only involved six variables such as perceived ease of use, perceived usefulness, perceived enjoyment, confirmation, satisfaction, and continued LMS usage intention. All these variables helped to determine the objectives of the thesis.

However, a second suggestion would relate to new variables that might suitable for the theory. A few other variables would be suggested to be used to modify the framework according to the objectives of the research. The recommended variables that have been used before in this ECT theory can be listed as perceived value, perceived usability, performance expentancy, perceived risk, unexpectedness, content, and service quality (Hsu & Lin, 2014; Oghuma et al., 2015; Hsu, Lin, & Hung, 2015; Chou et al., 2010; Eveleth, Baker-Eveleth, & Stone, 2014; Ayanso, Herath, & O'Brien, 2015).

The next suggestion is related to the theories that can be combined with the ECT theory. This is because combining the ECT model with another theory might be able to determine the objectives of the research in-depth. According to the literature, there are a few theories that have been combined before with the ECT model such as the Value-Based Adoption Model (VAM), Technology Acceptance Model (TAM), Herzberg's Two-Factor Theory, Kano's Satisfaction Model, Post-Adoption Expectation (PAE), Delone & Mclean Information

System (IS) Model, and Theory of Planned Behaviour (TPB) (Lin, Wu, Chieh Hsu, & Chou, 2012; Norsidah Mohamed et al., 2014; Najmul Islam, 2013; Chow & Shi, 2014; Cheng, 2014; Kim, 2010).

Apart from that, the third suggestion is regarding the scope where this thesis has a limited scope of study, which focused only the northern public universities in Malaysia only due to the time limitation. However, it is suggested to enhance the scope a bit larger alike analysing the whole Malaysian public universities to understand the users' (students and lecturers) perception and expectation on using the LMS system in their teaching and learning process.

The next recommendation is related to the features and design in the LMS system. In future, comparing or studying the various design, features, and applications might be able to specify the advantages and disadvantages of the LMS system. All of these suggestions can be focused for the future studies related to the ECT theory and LMS.

5.6 Conclusion

The main aim of this thesis is to identify the users' satisfaction and continuance intention on using LMS among the northern regional public university students and lecturers. Based on the findings from the thesis, it is highlighted that most of the users agreed that their confirmation on the LMS system plays a vital role that has direct and indirect influences on the users' satisfaction and continuance intention.

Moreover, LMS helps the users to complete their complex tasks in the easiest way where they can conduct all their educational-related jobs in a single platform. Adding to that, all their teaching and learning materials will also be secured because LMS is a system that is used for educational purpose. The LMS system also helps the users to reduce their burden.

The limitation and suggestion for future studies have been discussed above in Section 5.4 and Section 5.5. The main limitation of this thesis is the limited time frame to collect a large number of sample. Besides, the study itself suggested a few ideas for the future studies with regards to LMS. Other than that, the relationship among the variables are also discussed in Section 5.2.

In short, all the relationships between the six variables that developed 13 hypotheses significantly have positive relationships. The figure below shows the summary for the full expanded ECT model.

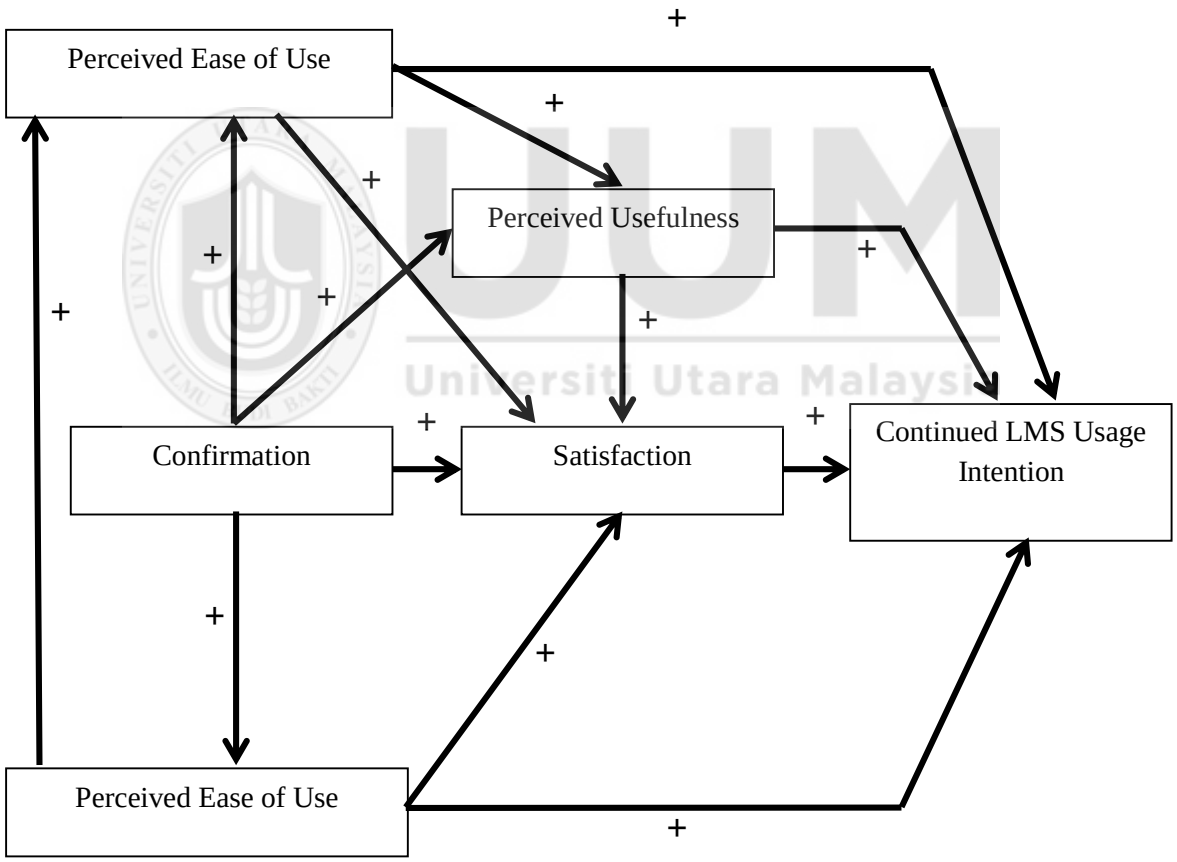

Figure 5.1: An expanded ECT model (shows the relationship between the variables)

As a conclusion, the framework and methodology proposed in this thesis have potential to be replicated for other domains of research and other populations of respondents. However, due to the different backgrounds and scopes, the findings might be different. Furthermore, the respondents' demographic details such as age, gender, and environment, as well as other new variables that are possible to be added in the research, can influence the findings that are beyond the scope of this thesis.

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Appendix A

UNIVERSITI UTARA MALAYSIA

06010 Sintok, Kedah

Dear participant:

The aim of this questionnaire is to determine the expectation of the Northern Public Universities users' continuous usage of Learning Management System (LMS) for their teaching and learning process. The LMS is the medium that use to support the information and the knowledge transfer between the instructors and students. By filling this form, you will help us to understand your perception on this LMS application and shed some lights on the area of concern. Please answer honestly and carefully all items in the questionnaire as it will influence the results of the research. All the information obtained from this questionnaire WILL BE KEPT STRICTLY CONFIDENTIAL and will be used solely for academic purpose. Your participation in completing the attached questionnaire is highly appreciated and my gratitude in advance for your support. Please do not hesitate to contact; if you have any queries about the questionnaire to angle_agi@yahoo.com.

Thank you for your kind cooperation.

Yours Sincerely,

Aggilanda Easwary D/O Muruthy (817569)
MSc. Technology Management,
School of Othman Yeop Abdullah (OYA),
Universiti Utara Malaysia (UUM).

Section 1: Background information

In this section, we would like to know about your personal information in general. Please fill the box by ticking (√) and writing in the space below.

<table>
<tr><td>1. Gender</td><td>Female ☐</td><td colspan="4">Male ☐</td></tr>
<tr><td>2. Age</td><td>Below 19 ☐</td><td>20-29 ☐</td><td>30-39 ☐</td><td>40-49 ☐</td><td>Above 50 ☐</td></tr>
<tr><td>3. Nationality</td><td>Malaysian ☐</td><td colspan="4">Non-Malaysian ☐</td></tr>
<tr><td>4. University</td><td>UUM ☐</td><td>USM ☐</td><td colspan="3">UniMap ☐</td></tr>
<tr><td>5. Career

*Note:
Please focus on the section that relate to your field.</td><td colspan="2">Lecturer ☐
a). Current position:
▪ Professor ☐
▪ Associate Professor ☐
▪ Senior Lectures ☐
▪ Lectures ☐
b). Experience: _____ years</td><td colspan="3">Student ☐
a). Current educational level:
▪ Diploma ☐
▪ Bachelor ☐
▪ Master ☐
▪ Doctorate ☐
b). Current Semester: _____ semester</td></tr>
<tr><td>6. Do you feel LMS is important for the teaching and learning process?</td><td colspan="2">No ☐
Why?
_____
_____
_____
_____.</td><td colspan="3">Yes ☐
Why?
_____
_____
_____
_____.</td></tr>
<tr><td>7. On average, approximately how many minutes per day do you spend on using the LMS?</td><td>Less than 10 minutes ☐</td><td>10–30 minutes ☐</td><td>31–60 minutes ☐</td><td>61–120 minutes ☐</td><td>More than 120 minutes (> 2 hours) ☐</td></tr>
</table>

Section 2: Factors affecting the continuous usage of Learning Management System (LMS)

Please indicate your opinion to each of the following statements by ***ticking*** (√) the box that represents your level of agreement or disagreement with it. Please make sure that you respond to each and every statement below, and tick ***only one*** box for each statement.

Perceived Ease of use (PEOU)					
Determine the users' believe on a particular systems that would be free from effort *Menentukan kepercayaan pengguna terhadap penggunaan sistem tertentu akan berbebas daripada usaha*	Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Strongly Agree
	1	2	3	4	5
Learning to operate the LMS is easy for me *Belajar untuk mengendalikan LMS adalah mudah bagi saya*					
It is easy for me to become skilled at using the LMS *Ia adalah mudah bagi saya untuk menjadi mahir dalam menggunakan LMS*					
My reaction with the LMS is clear and understandable *Reaksi saya dengan LMS adalah jelas dan mudah difahami*					
I find it is easy to get the LMS to do what I want it to do *Saya mendapati penggunaan LMS memudahkan saya melakukan apa yang ingin dilakukan*					
Gathering information from the LMS is easy *LMS memudahkan pengumpulan maklumat*					
In overall, I believe that LMS is easy to use *Secara keseluruhannya, saya percaya bahawa LMS adalah mudah untuk digunakan*					

Perceived Usefulness (PU)					
Determine the users' believe on a particular system would enhance the job performance *Menentukan kepercayaan pengguna terhadap penggunaan sistem tertentu akan meningkatkan prestasi kerja*	Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Strongly Agree
	1	2	3	4	5
The LMS usage improves my teaching and learning process *Penggunaan LMS menambah baik proses pengajaran dan pembelajaran saya*					

The LMS usage able to enhance my effectiveness in teaching and learning process *Penggunaan LMS dapat meningkatkan keberkesanan proses pengajaran dan pembelajaran saya*					
The LMS usage would increase my productivity in teaching and learning *Penggunaan LMS akan meningkatkan produktiviti pengajaran dan pembelajaran saya*					
The LMS usage allow me to accomplish the teaching and learning task more quickly *Penggunaan LMS membolehkan saya menyelesaikan tugas pengajaran dan pembelajaran dengan lebih cepat*					
The LMS usage makes it easier to teach and learn in the university *Penggunaan LMS menjadikan pengajar dan pembelajar di universiti lebih mudah*					
In overall, I find LMS to be useful in my teaching and learning process *Secara keseluruhan, saya mendapati LMS berguna dalam proses pengajaran dan pembelajaran saya*					

Perceived Enjoyment (PE)					
Determine the users' enjoyment in using a particular system that perceived to be enjoyable *Menentukan keseronokan pengguna dalam menggunakan sistem tertentu yang dilihat sebagai meyeronokan*	Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Strongly Agree
	1	2	3	4	5
Learning online using the LMS would be fun for its own sake *Pembelajaran dalam talian dengan menggunakan LMS adalah seronok*					
Learning online using the LMS would make me feel good *Pembelajaran dalam talian dengan menggunakan LMS membuat saya berasa selesa*					
Learning online using the LMS would be boring *Pembelajaran dalam talian dengan menggunakan LMS membosankan*					
Learning online using the LMS would involve me in the teaching and learning process *Pembelajaran dalam talian dengan menggunakan LMS akan melibatkan saya dalam proses pengajaran dan pembelajaran*					
Learning online using the LMS would be exciting *Pembelajaran dalam talian dengan menggunakan LMS akan mengujakan*					

Learning online using the LMS would be enjoyable *Pembelajaran dalam talian dengan menggunakan LMS akan menjadi menyeronokkan*					
Learning online using the LMS would be uncomfortable *Pembelajaran dalam talian dengan menggunakan LMS akan menjadi saya tidak selesa*					
Learning online using the LMS is the good way to spend my leisure time *Pembelajaran dalam talian dengan menggunakan LMS adalah cara yang baik untuk menghabiskan masa lapang saya*					
The variety of service in LMS arouses my curiosity *Kepelbagaian perkhidmatan dalam LMS menimbulkan rasa ingin tahu saya*					
In overall, learning online using the LMS would be interesting *Secara keseluruhan, pembelajaran dalam talian dengan menggunakan LMS akan menjadi menarik*					

Confirmation (CON)					
Determine the users' high or low desirable or not as expected during using a particular system *Menentukan keingginan pengguna yang tinggi atau rendah atau tidak seperti yang diharapkan semasa menggunakan sistem tertentu*	Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Strongly Agree
	1	2	3	4	5
My experience with using the LMS was better than what I expected *Pengalaman saya dalam menggunakan LMS adalah lebih baik daripada apa yang saya harapkan*					
The service level provided by the LMS better than what I expect *Tahap perkhidmatan yang ditawarkan oleh LMS adalah lebih baik daripada apa yang saya harapkan*					
In overall, most of my expectation from using the LMS were confirmed *Secara keseluruhan, sebahagian besar daripada jangkaan saya berkenaan dengan penggunaan LMS telah disahkan*					

F. Satisfaction (SAT)					
Determine the users' expression after implementing or using a particular system *Menentukan reaksi pengguna selepas melaksanakan atau menggunakan sistem tertentu*	Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Strongly Agree
	1	2	3	4	5
I am pleased to use the LMS *Saya gembira untuk menggunakan LMS*					
I am contented in using the LMS *Saya berasa berpuas dalam menggunakan LMS*					
I am delighted to use the LMS *Saya berasa bahagia untuk menggunakan LMS*					
I am satisfy with the use of LMS *Saya berpuas hati dengan penggunaan LMS*					
My decision to use the LMS is a wise one *Keputusan saya untuk menggunakan LMS adalah tindakan yang bijak*					

Section 3: Users' LMS Continuous Intention

Please indicate your opinion to each of the following statements by ***ticking*** (√) the box that represents your level of agreement or disagreement with it. Please make sure that you respond to each and every statement below, and tick ***only one*** box for each statement.

G. Continuous LMS Usage Intention (CI)					
Determine the users' expectation and their future intention to use a particular system continuously *Menentukan jangkaan pengguna dan hasrat masa depan mereka untuk menggunakan sistem tertentu secara berterusan*	Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Strongly Agree
	1	2	3	4	5
I plan to continue using the LMS to teach and learn about new technology *Saya bercadang untuk terus menggunakan LMS untuk mengajar dan belajar tentang teknologi baru*					
I intend to increase the LMS usage for the teaching and learning process *Saya bercadang untuk meningkatkan penggunaan LMS untuk proses pengajaran dan pembelajaran*					
I intend to continue using the LMS in future *Saya bercadang untuk terus menggunakan LMS pada masa akan datang*					
I will strongly recommend others to use LMS *Saya sangat akan mengesyorkan orang lain untuk menggunakan LMS*					

Thank you for your cooperation

Appendix B

FREQUENCIES OF RESPONDENT PROFILE

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	469	64.5	64.5	64.5
	Male	258	35.5	35.5	100.0
	Total	727	100.0	100.0	

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 19	1	.1	.1	.1
	20-29	380	52.3	52.3	52.4
	30-39	135	18.6	18.6	71.0
	40-49	157	21.6	21.6	92.6
	Above 50	54	7.4	7.4	100.0
	Total	727	100.0	100.0	

Nationality

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Malaysian	671	92.3	92.3	92.3
	Non-Malaysian	56	7.7	7.7	100.0
	Total	727	100.0	100.0	

University

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	UUM	268	36.9	36.9	36.9
	USM	301	41.4	41.4	78.3
	UniMap	158	21.7	21.7	100.0
	Total	727	100.0	100.0	

Career

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lecturer	346	47.6	47.6	47.6
	Student	381	52.4	52.4	100.0
	Total	727	100.0	100.0	

Lecturer's current posltion

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Professor	14	1.9	4.0	4.0
	Associate Professor	64	8.8	18.5	22.5
	Senior Lecturer	160	22.0	46.2	68.8
	Lecturer	108	14.9	31.2	100.0
	Total	346	47.6	100.0	
Missing	System	381	52.4		
Total		727	100.0		

Student's current educational level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	9	1.2	2.4	2.4
	Bachelor	305	42.0	80.1	82.4
	Master	54	7.4	14.2	96.6
	Doctorate	13	1.8	3.4	100.0
	Total	381	52.4	100.0	
Missing	System	346	47.6		
Total		727	100.0		

Lecturer experince

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	20	2.8	7.0	7.0
	1.50	2	.3	.7	7.7
	2.00	18	2.5	6.3	14.0
	3.00	13	1.8	4.6	18.6
	4.00	14	1.9	4.9	23.5
	5.00	14	1.9	4.9	28.4
	6.00	21	2.9	7.4	35.8
	7.00	15	2.1	5.3	41.1
	8.00	17	2.3	6.0	47.0
	9.00	18	2.5	6.3	53.3
	10.00	10	1.4	3.5	56.8
	11.00	12	1.7	4.2	61.1
	12.00	18	2.5	6.3	67.4
	13.00	12	1.7	4.2	71.6
	14.00	8	1.1	2.8	74.4
	15.00	14	1.9	4.9	79.3
	16.00	8	1.1	2.8	82.1
	17.00	7	1.0	2.5	84.6
	18.00	5	.7	1.8	86.3
	19.00	5	.7	1.8	88.1
	20.00	4	.6	1.4	89.5
	21.00	6	.8	2.1	91.6
	22.00	3	.4	1.1	92.6
	23.00	6	.8	2.1	94.7
	24.00	4	.6	1.4	96.1
	25.00	2	.3	.7	96.8
	26.00	2	.3	.7	97.5

	27.00	1	.1	.4	97.9
	29.00	3	.4	1.1	98.9
	31.00	1	.1	.4	99.3
	32.00	1	.1	.4	99.6
	33.00	1	.1	.4	100.0
	Total	285	39.2	100.0	
	99.00	61	8.4		
Missing	System	381	52.4		
	Total	442	60.8		
Total		727	100.0		

Student current semester

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	46	6.3	12.3	12.3
	2	19	2.6	5.1	17.4
	3	78	10.7	20.9	38.2
	4	33	4.5	8.8	47.1
	5	145	19.9	38.8	85.8
	6	16	2.2	4.3	90.1
	7	32	4.4	8.6	98.7
	8	5	.7	1.3	100.0
	Total	374	51.4	100.0	
	99	7	1.0		
Missing	System	346	47.6		
	Total	353	48.6		
Total		727	100.0		

Feeling toward LMS important

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	111	15.3	15.3	15.3
	Yes	616	84.7	84.7	100.0
	Total	727	100.0	100.0	

Approximate LMS usage per day

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 10 minutes	258	35.5	35.5	35.5
	10-30 minutes	295	40.6	40.6	76.1
	31-60 minutes	137	18.8	18.8	94.9
	61-120 minutes	27	3.7	3.7	98.6
	More than 120 minutes (> 2 hours)	10	1.4	1.4	100.0
	Total	727	100.0	100.0	

Appendix C

RELIABILITY ANALYSIS

Case Processing Summary

		N	%
Cases	Valid	727	100.0
	Excluded[a]	0	.0
	Total	727	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.964	.965	34

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
Perceived ease of use 1	118.08	557.768	.757	.	.962
Perceived ease of use 2	118.09	562.352	.749	.	.962
Perceived ease of use 3	118.16	562.650	.717	.	.962
Perceived ease of use 4	118.23	560.691	.740	.	.962
Perceived ease of use 5	117.89	563.918	.700	.	.962
Perceived ease of use 6	117.99	558.383	.813	.	.962
Perceived usefulness 1	117.96	562.097	.791	.	.962
Perceived usefulness 2	117.98	557.432	.816	.	.962
Perceived usefulness 3	118.10	562.198	.776	.	.962
Perceived usefulness 4	118.14	565.417	.699	.	.962
Perceived usefulness 5	118.09	562.011	.743	.	.962
Perceived usefulness 6	117.99	560.162	.792	.	.962
Perceived enjoyment 1	118.16	553.833	.801	.	.962
Perceived enjoyment 2	118.17	553.829	.802	.	.962
Perceived enjoyment 3	119.43	645.126	-.775	.	.971
Perceived enjoyment 4	118.22	566.960	.768	.	.962
Perceived enjoyment 5	118.34	568.846	.682	.	.962
Perceived enjoyment 6	118.23	555.220	.804	.	.962
Perceived enjoyment 7	119.44	643.842	-.760	.	.971
Perceived enjoyment 8	118.64	569.862	.573	.	.963
Perceived enjoyment 9	118.31	569.930	.617	.	.963
Perceived enjoyment 10	118.18	565.033	.718	.	.962
Confirmation 1	118.18	563.692	.740	.	.962
Confirmation 2	118.24	565.917	.685	.	.962
Confirmation 3	118.19	560.448	.762	.	.962
Satisfaction 1	118.02	557.060	.827	.	.962
Satisfaction 2	118.20	557.367	.797	.	.962
Satisfaction 3	118.22	560.743	.758	.	.962
Satisfaction 4	118.18	558.746	.786	.	.962
Satisfaction 5	118.09	556.754	.821	.	.962
Continuous LMS usage intention 1	117.88	562.831	.773	.	.962
Continuous LMS usage intention 2	117.98	562.730	.778	.	.962
Continuous LMS usage intention 3	118.06	561.687	.769	.	.962
Continuous LMS usage intention 4	118.05	558.927	.771	.	.962

Appendix D

DESCRIPTIVE ANALYSIS

Descriptive Statistics

		PEOU	PU	PE	CON	SAT	CI
N	Valid	727	727	727	727	727	727
	Missing	0	0	0	0	0	0
Mean		3.7171	3.7483	3.2715	3.5896	3.6470	3.7968
Median		4.0000	4.0000	3.3750	4.0000	4.0000	4.0000
Std. Deviation		.92133	.87939	.47305	.93065	.97237	.91535
Range		4.00	4.00	2.63	4.00	4.00	4.00
Minimum		1.00	1.00	1.75	1.00	1.00	1.00
Maximum		5.00	5.00	4.38	5.00	5.00	5.00

Appendix E

CORRELATION ANALYSIS

Correlations

		PEOU	PU	PE	CON	SAT	CI
PEOU	Pearson Correlation	1	.848**	.712**	.692**	.755**	.755**
	Sig. (1-tailed)		.000	.000	.000	.000	.000
	N	727	727	727	727	727	727
PU	Pearson Correlation	.848**	1	.768**	.700**	.794**	.807**
	Sig. (1-tailed)	.000		.000	.000	.000	.000
	N	727	727	727	727	727	727
PE	Pearson Correlation	.712**	.768**	1	.716**	.754**	.719**
	Sig. (1-tailed)	.000	.000		.000	.000	.000
	N	727	727	727	727	727	727
CON	Pearson Correlation	.692**	.700**	.716**	1	.778**	.712**
	Sig. (1-tailed)	.000	.000	.000		.000	.000
	N	727	727	727	727	727	727
SAT	Pearson Correlation	.755**	.794**	.754**	.778**	1	.827**
	Sig. (1-tailed)	.000	.000	.000	.000		.000
	N	727	727	727	727	727	727
CI	Pearson Correlation	.755**	.807**	.719**	.712**	.827**	1
	Sig. (1-tailed)	.000	.000	.000	.000	.000	
	N	727	727	727	727	727	727

**. Correlation is significant at the 0.01 level (1-tailed).

Appendix F

The Relationship between Satisfaction and Continued LMS Usage Intention

Descriptive Statistics

	Mean	Std. Deviation	N
CI	3.7968	.91535	727
SAT	3.6470	.97237	727

Correlations

		CI	SAT
Pearson Correlation	CI	1.000	.827
	SAT	.827	1.000
Sig. (1-tailed)	CI	.	.000
	SAT	.000	.
N	CI	727	727
	SAT	727	727

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	SAT[b]	.	Enter

a. Dependent Variable: CI
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.827[a]	.684	.683	.51515	.684	1567.147

Model Summary[b]

Model	Change Statistics			Durbin-Watson
	df1	df2	Sig. F Change	
1	1[a]	725	.000	1.783

a. Predictors: (Constant), SAT
b. Dependent Variable: CI

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	415.886	1	415.886	1567.147	.000[b]
	Residual	192.399	725	.265		
	Total	608.285	726			

a. Dependent Variable: CI
b. Predictors: (Constant), SAT

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.958	.074		12.909	.000
	SAT	.778	.020	.827	39.587	.000

Coefficients[a]

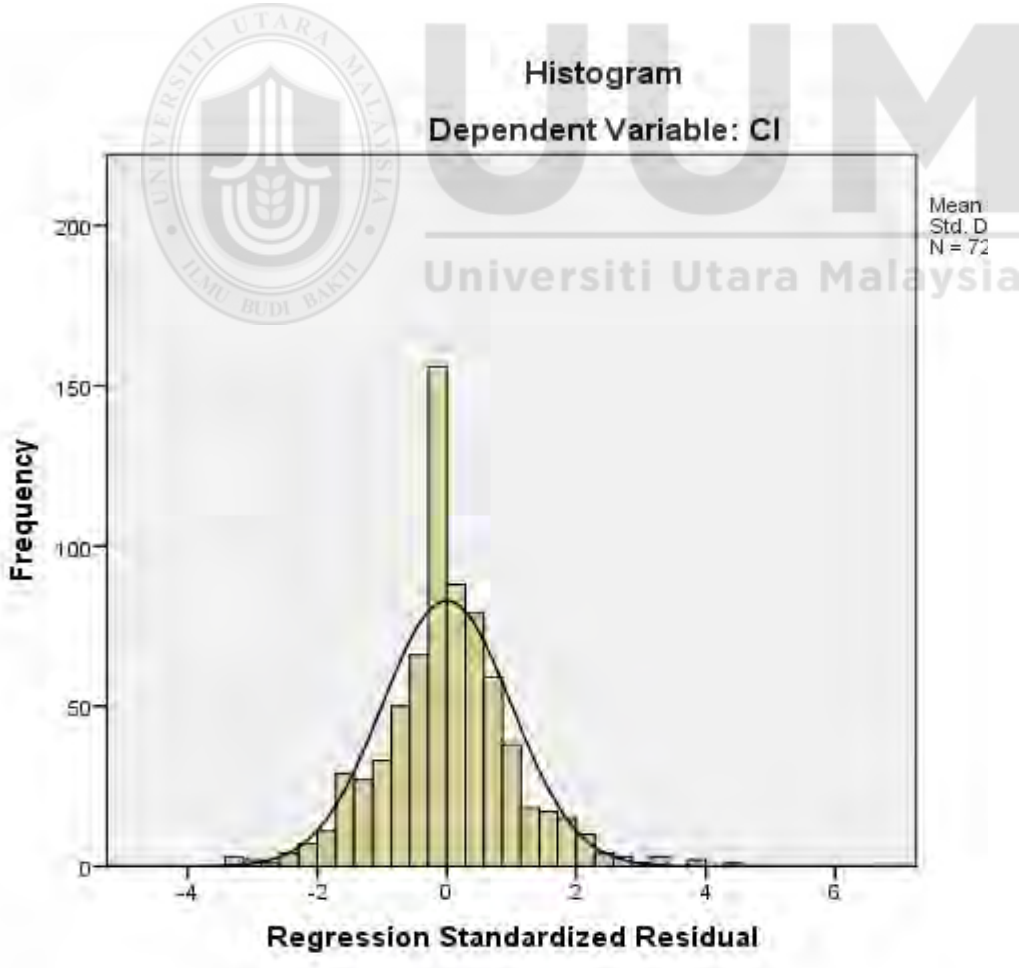
Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	.812	1.104
	SAT	.740	.817

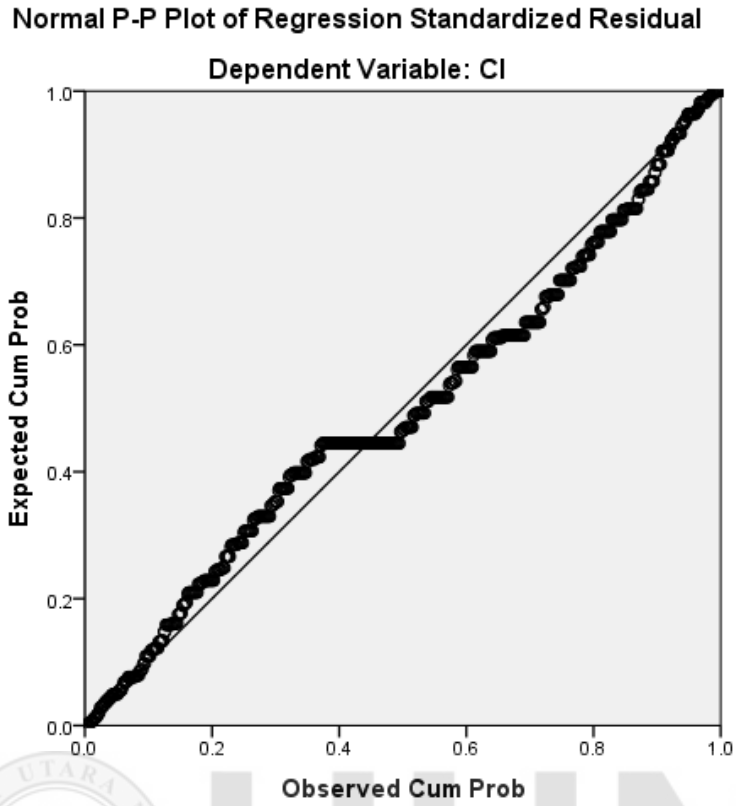
a. Dependent Variable: CI

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.7364	4.8499	3.7968	.75687	727
Residual	-1.72718	2.32957	.00000	.51479	727
Std. Predicted Value	-2.722	1.391	.000	1.000	727
Std. Residual	-3.353	4.522	.000	.999	727

a. Dependent Variable: CI





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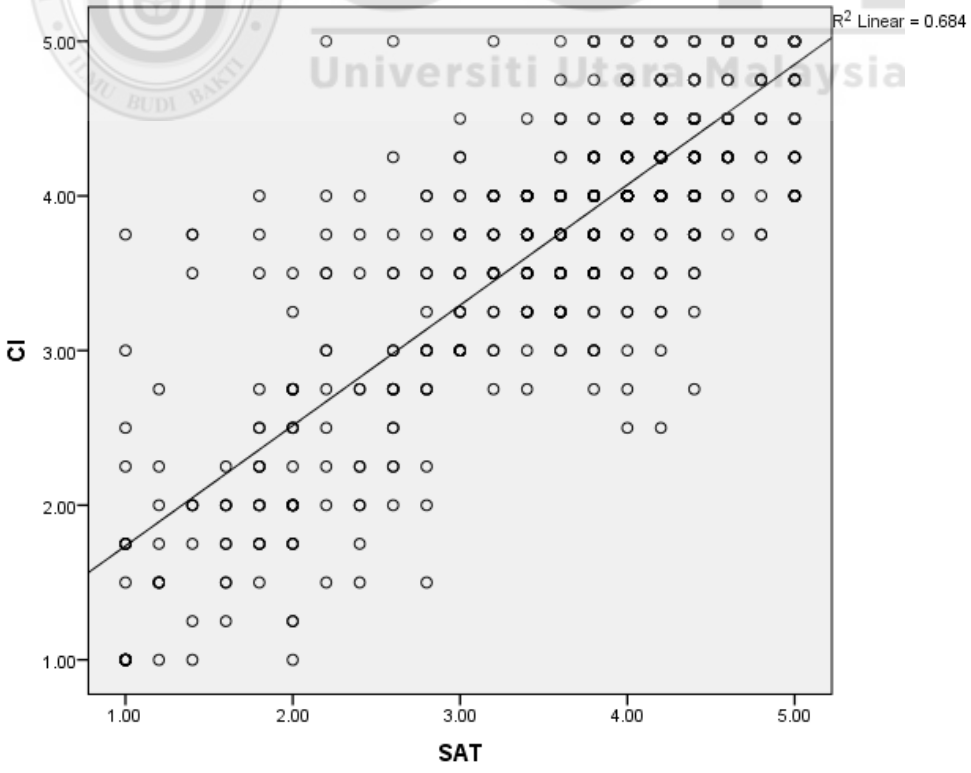


Appendix G

The Relationship between Confirmation and Satisfaction

Descriptive Statistics

	Mean	Std. Deviation	N
SAT	3.6470	.97237	727
CON	3.5896	.93065	727

Correlations

		SAT	CON
Pearson Correlation	SAT	1.000	.778
	CON	.778	1.000
Sig. (1-tailed)	SAT	.	.000
	CON	.000	.
N	SAT	727	727
	CON	727	727

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	CON[b]	.	Enter

a. Dependent Variable: SAT
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.778[a]	.605	.605	.61138	.605	1111.417

Model Summary[b]

Model	Change Statistics			Durbin-Watson
	df1	df2	Sig. F Change	
1	1[a]	725	.000	1.826

a. Predictors: (Constant), CON
b. Dependent Variable: SAT

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	415.435	1	415.435	1111.417	.000[b]
	Residual	270.996	725	.374		
	Total	686.431	726			

a. Dependent Variable: SAT
b. Predictors: (Constant), CON

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.729	.090		8.067	.000
	CON	.813	.024	.778	33.338	.000

Coefficients[a]

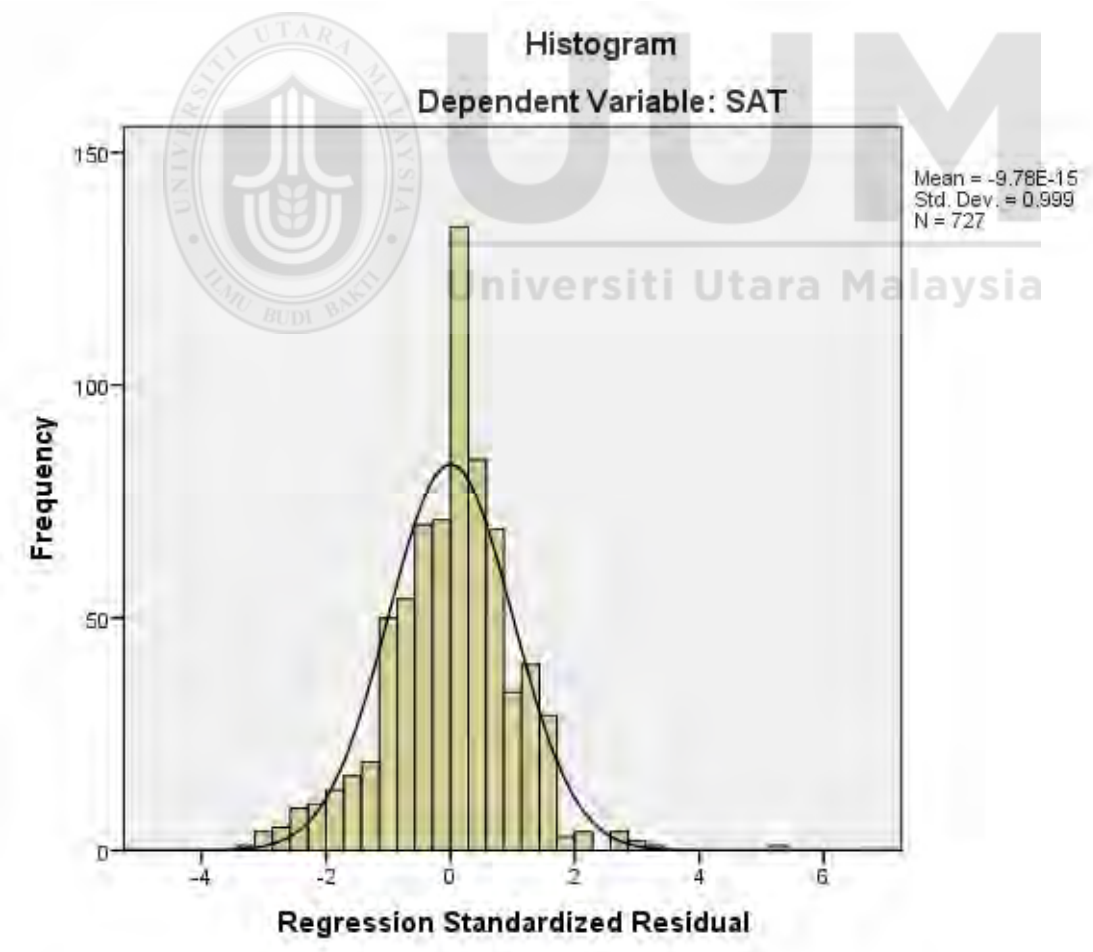
Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	.552	.907
	CON	.765	.861

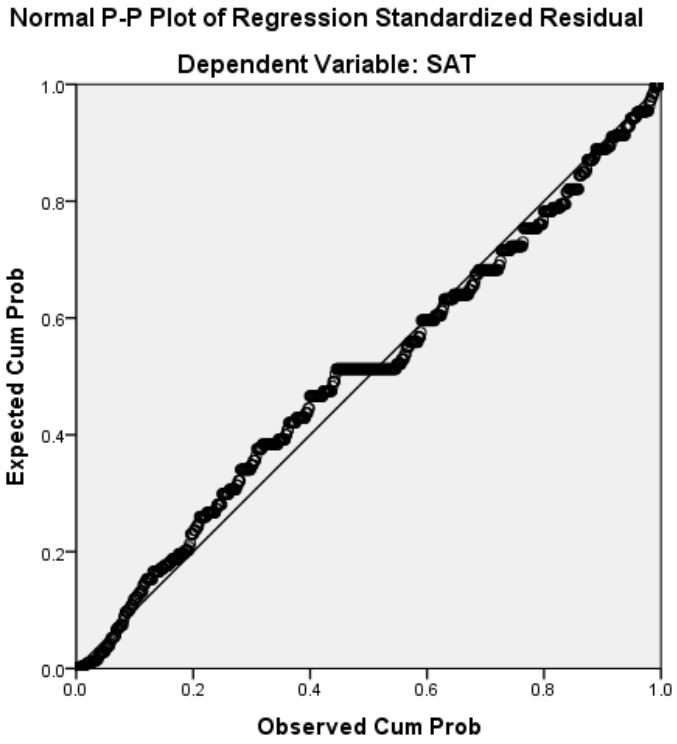
a. Dependent Variable: SAT

Residuals Statistics[a]

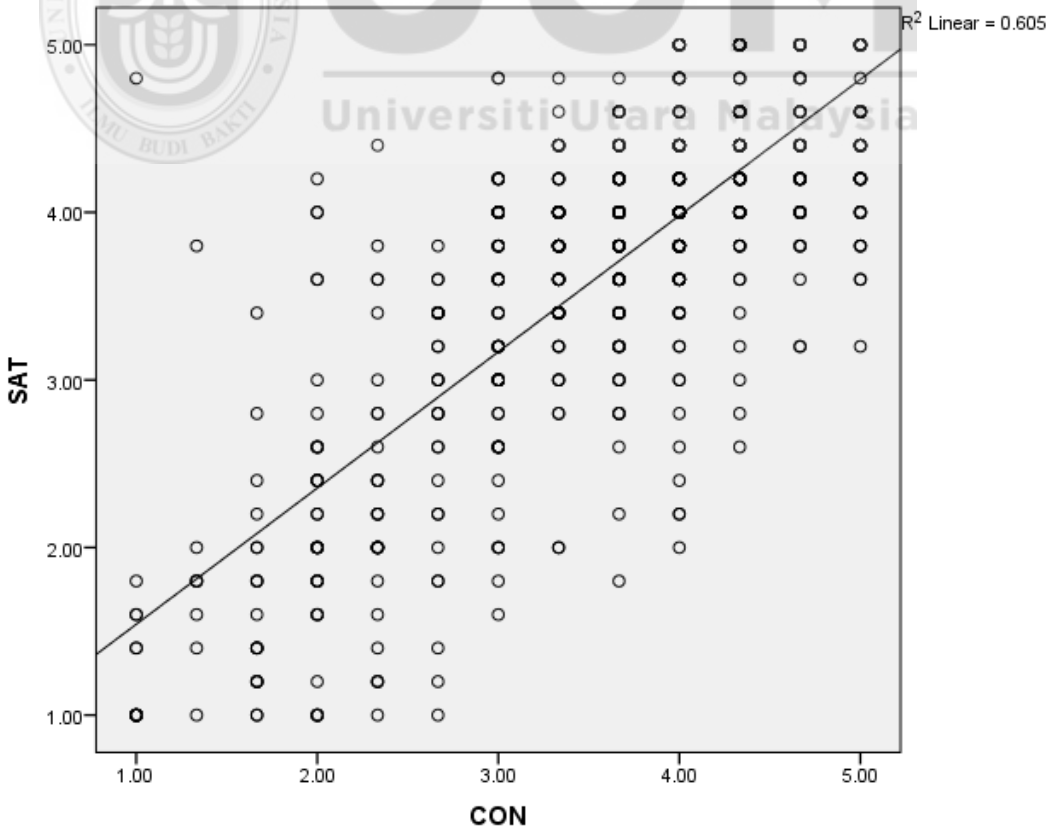
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.5421	4.7934	3.6470	.75645	727
Residual	-1.98059	3.25787	.00000	.61096	727
Std. Predicted Value	-2.783	1.515	.000	1.000	727
Std. Residual	-3.240	5.329	.000	.999	727

a. Dependent Variable: SAT





Scatter plot



Appendix H

The Relationship between Perceived Usefulness and Satisfaction

Descriptive Statistics

	Mean	Std. Deviation	N
SAT	3.6470	.97237	727
PU	3.7483	.87939	727

Correlations

		SAT	PU
Pearson Correlation	SAT	1.000	.794
	PU	.794	1.000
Sig. (1-tailed)	SAT	.	.000
	PU	.000	.
N	SAT	727	727
	PU	727	727

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PU[b]	.	Enter

a. Dependent Variable: SAT
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.794[a]	.631	.630	.59146	.631	1237.189

Model Summary[b]

Model	Change Statistics			Durbin-Watson
	df1	df2	Sig. F Change	
1	1[a]	725	.000	1.887

a. Predictors: (Constant), PU
b. Dependent Variable: SAT

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	432.805	1	432.805	1237.189	.000[b]
	Residual	253.626	725	.350		
	Total	686.431	726			

a. Dependent Variable: SAT
b. Predictors: (Constant), PU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.356	.096		3.705	.000
	PU	.878	.025	.794	35.174	.000

Coefficients[a]

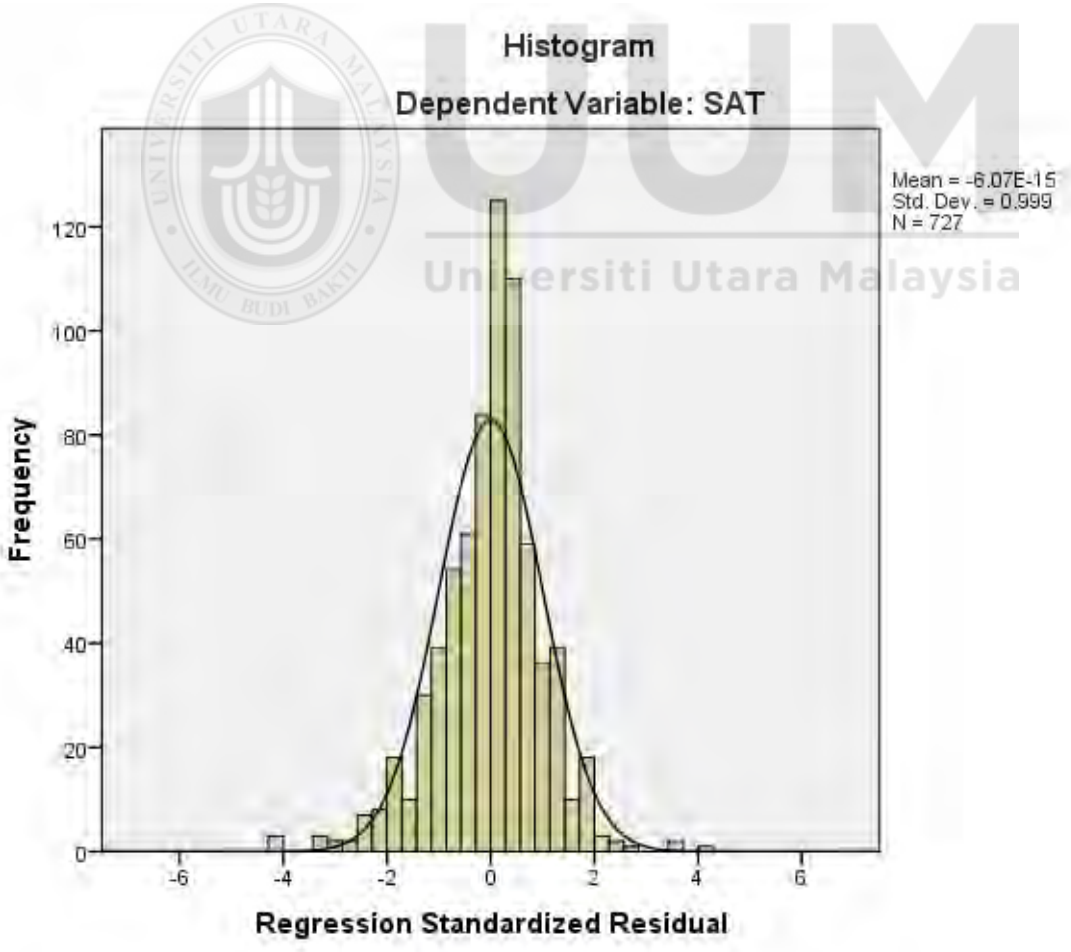
Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	.167	.545
	PU	.829	.927

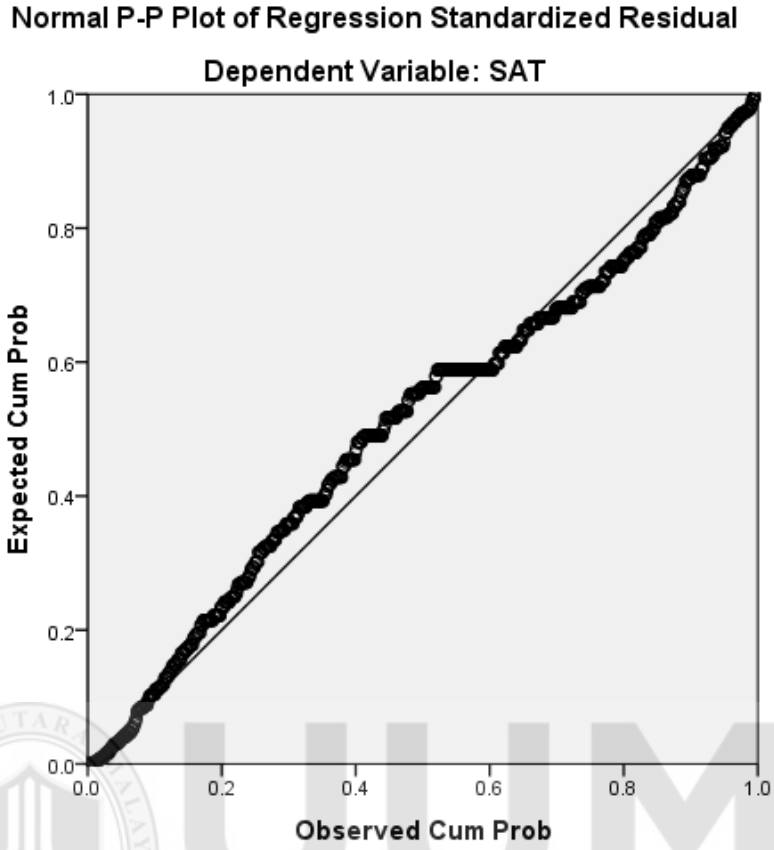
a. Dependent Variable: SAT

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.2340	4.7461	3.6470	.77211	727
Residual	-2.52172	2.52696	.00000	.59106	727
Std. Predicted Value	-3.125	1.423	.000	1.000	727
Std. Residual	-4.264	4.272	.000	.999	727

a. Dependent Variable: SAT





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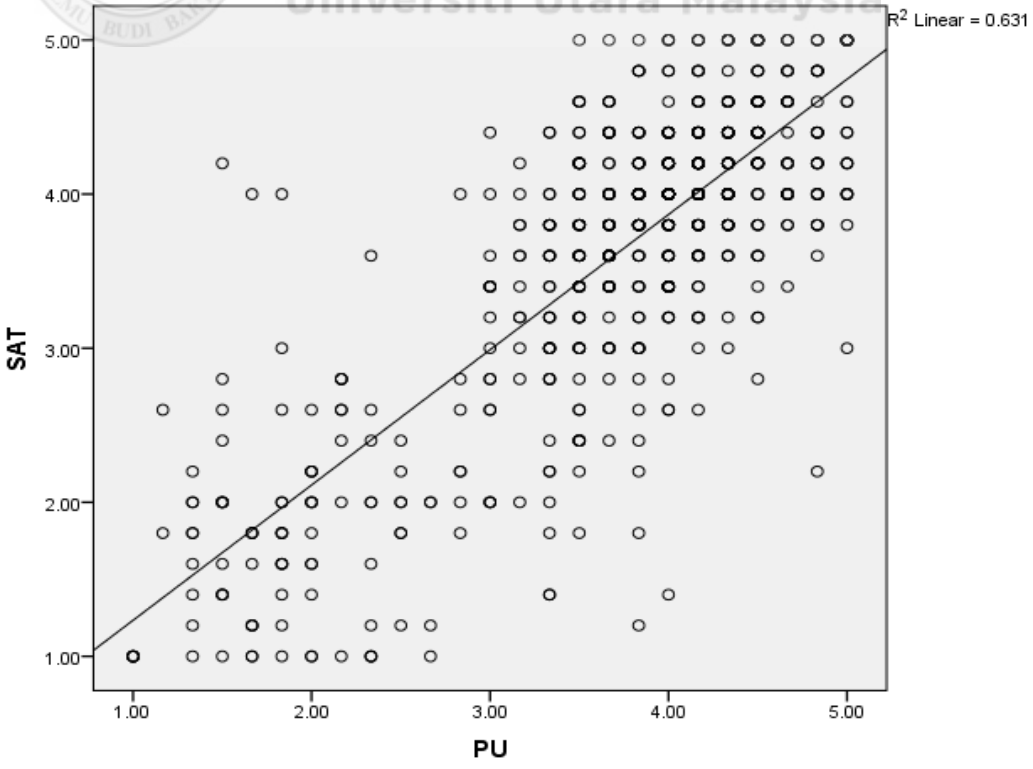


Appendix I

The Relationship between Perceived Usefulness and Continued LMS Usage Intention

Descriptive Statistics

	Mean	Std. Deviation	N
CI	3.7968	.91535	727
PU	3.7483	.87939	727

Correlations

		CI	PU
Pearson Correlation	CI	1.000	.807
	PU	.807	1.000
Sig. (1-tailed)	CI	.	.000
	PU	.000	.
N	CI	727	727
	PU	727	727

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PU[b]	.	Enter

a. Dependent Variable: CI
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.807[a]	.651	.650	.54138	.651	1350.370

Model Summary[b]

Model	Change Statistics			Durbin-Watson
	df1	df2	Sig. F Change	
1	1[a]	725	.000	1.880

a. Predictors: (Constant), PU
b. Dependent Variable: CI

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	395.790	1	395.790	1350.370	.000[b]
	Residual	212.495	725	.293		
	Total	608.285	726			

a. Dependent Variable: CI
b. Predictors: (Constant), PU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.650	.088		7.385	.000
	PU	.840	.023	.807	36.747	.000

Coefficients[a]

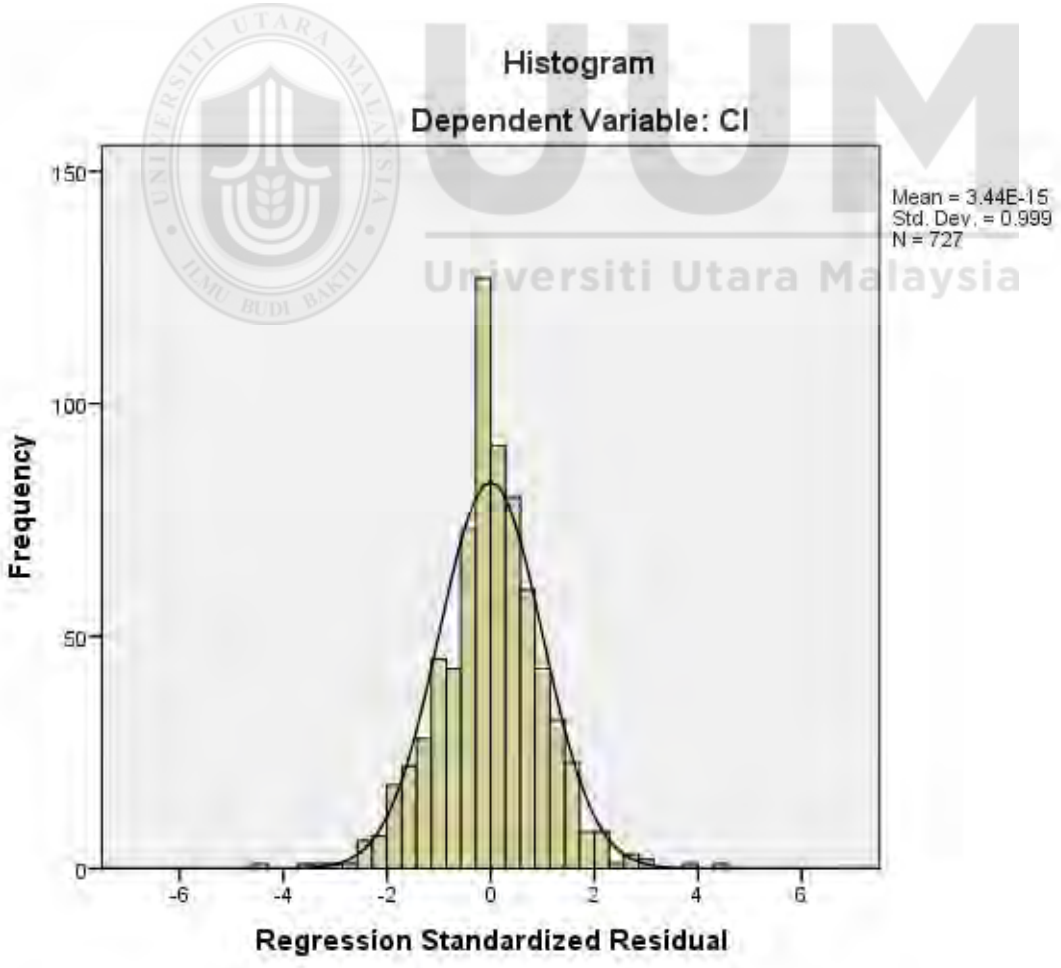
Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	.477	.822
	PU	.795	.884

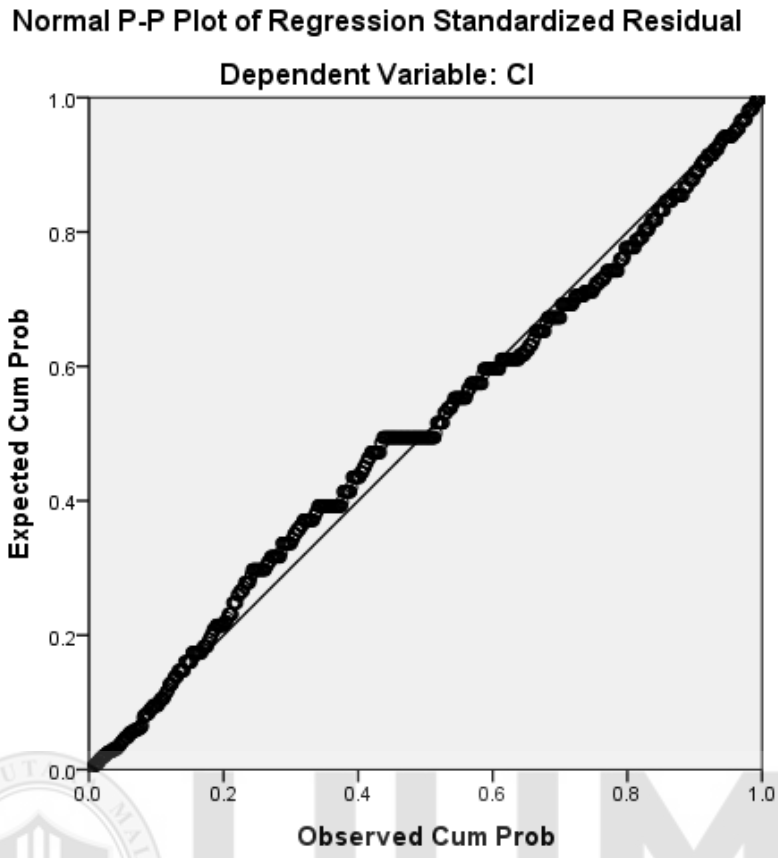
a. Dependent Variable: CI

Residuals Statistics[a]

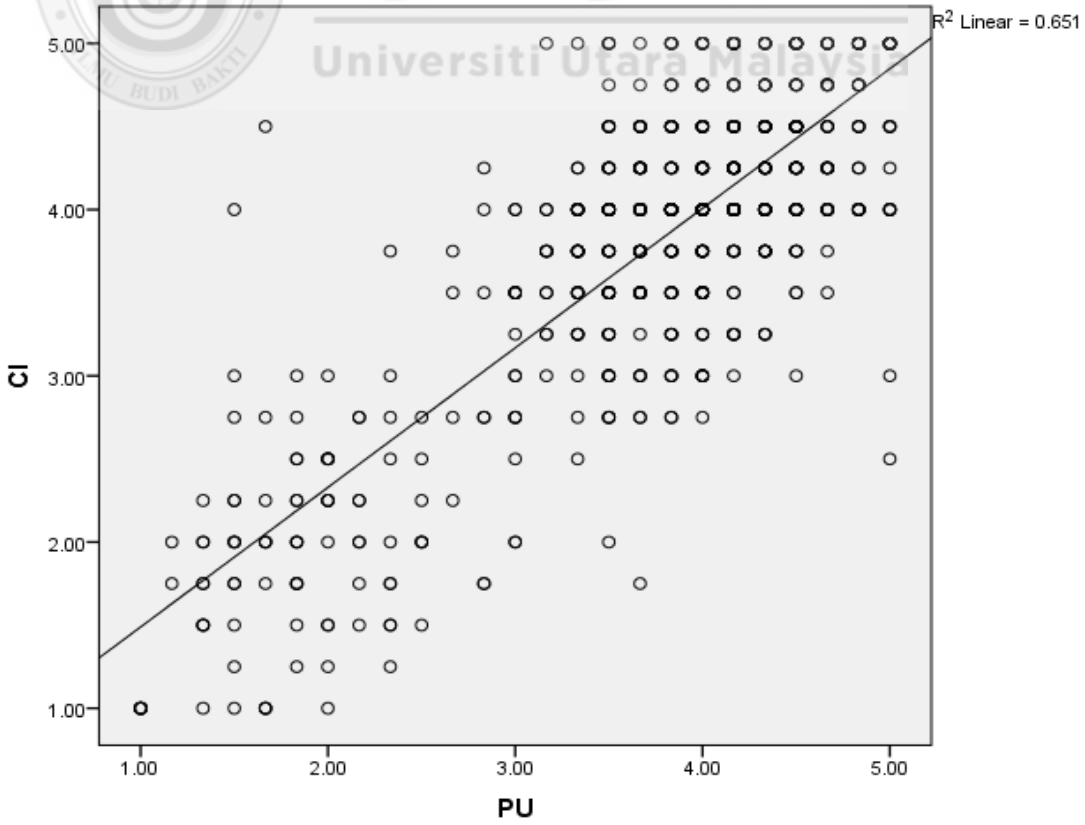
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.4893	4.8477	3.7968	.73835	727
Residual	-2.34773	2.45100	.00000	.54101	727
Std. Predicted Value	-3.125	1.423	.000	1.000	727
Std. Residual	-4.337	4.527	.000	.999	727

a. Dependent Variable: CI





Scatter plot



Appendix J

The Relationship between Confirmation and Perceived Usefulness

Descriptive Statistics

	Mean	Std. Deviation	N
PU	3.7483	.87939	727
CON	3.5896	.93065	727

Correlations

		PU	CON
Pearson Correlation	PU	1.000	.700
	CON	.700	1.000
Sig. (1-tailed)	PU	.	.000
	CON	.000	.
N	PU	727	727
	CON	727	727

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	CON[b]	.	Enter

a. Dependent Variable: PU
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.700[a]	.490	.489	.62862	.490	695.773

Model Summary[b]

Model	Change Statistics			Durbin-Watson
	df1	df2	Sig. F Change	
1	1[a]	725	.000	1.785

a. Predictors: (Constant), CON
b. Dependent Variable: PU

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	274.943	1	274.943	695.773	.000[b]
	Residual	286.492	725	.395		
	Total	561.435	726			

a. Dependent Variable: PU
b. Predictors: (Constant), CON

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.375	.093		14.788	.000
	CON	.661	.025	.700	26.378	.000

Coefficients[a]

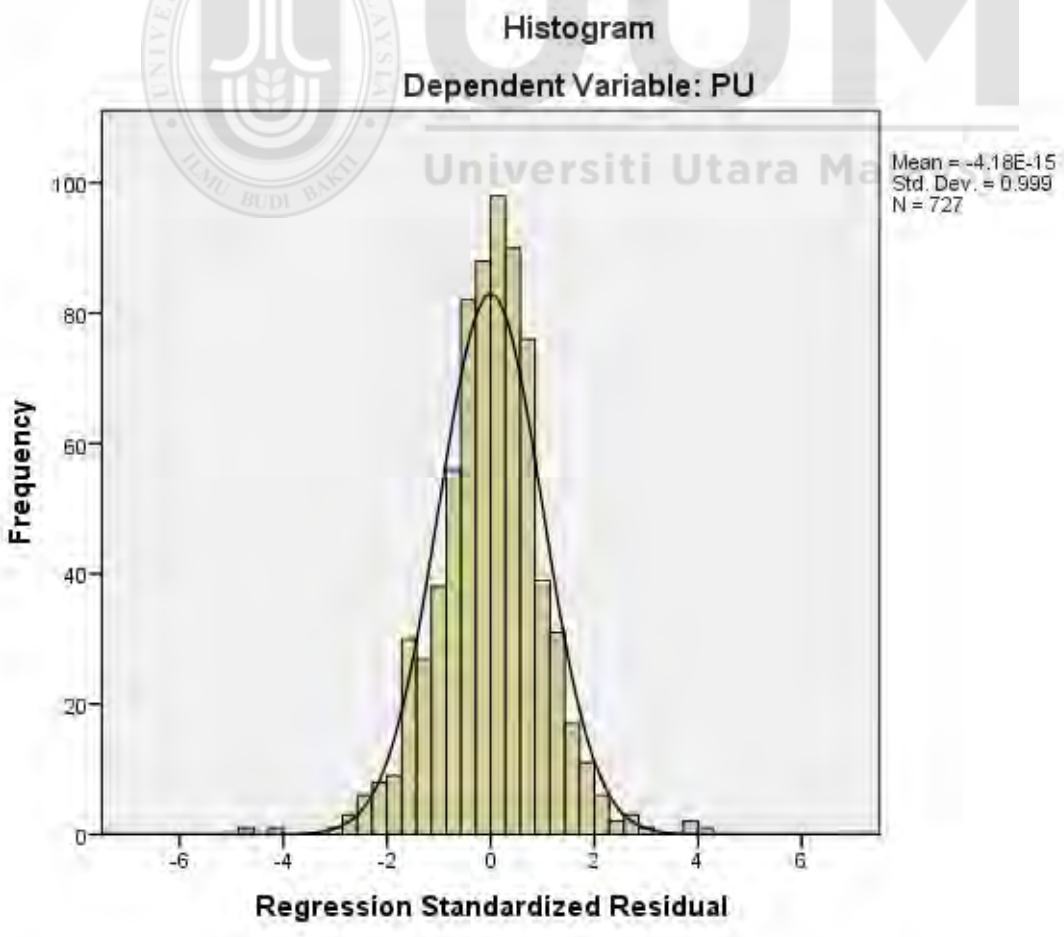
Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	1.192	1.557
	CON	.612	.710

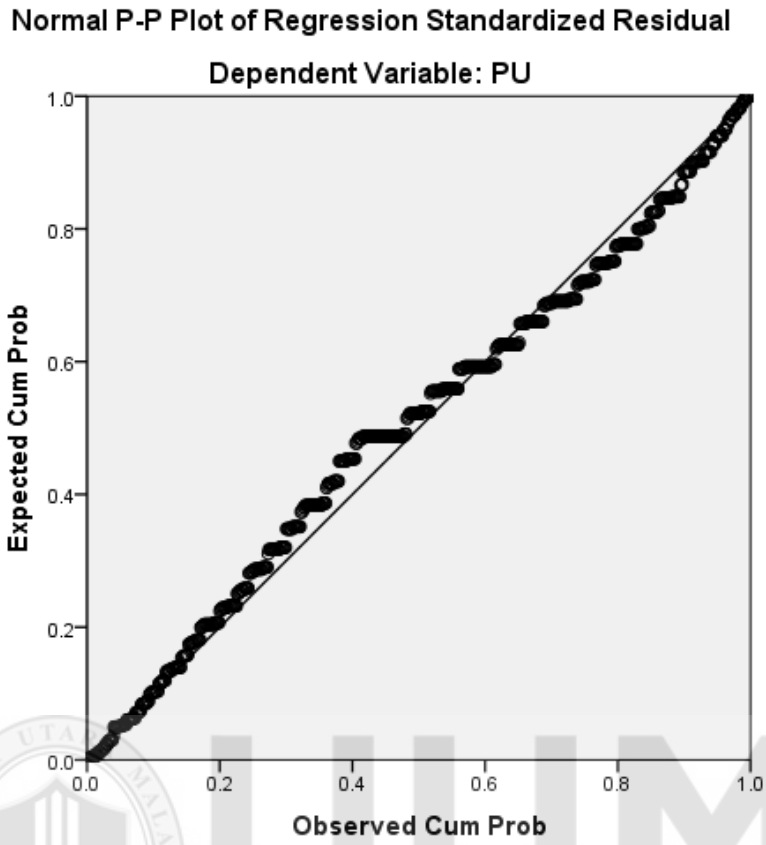
a. Dependent Variable: PU

Residuals Statistics[a]

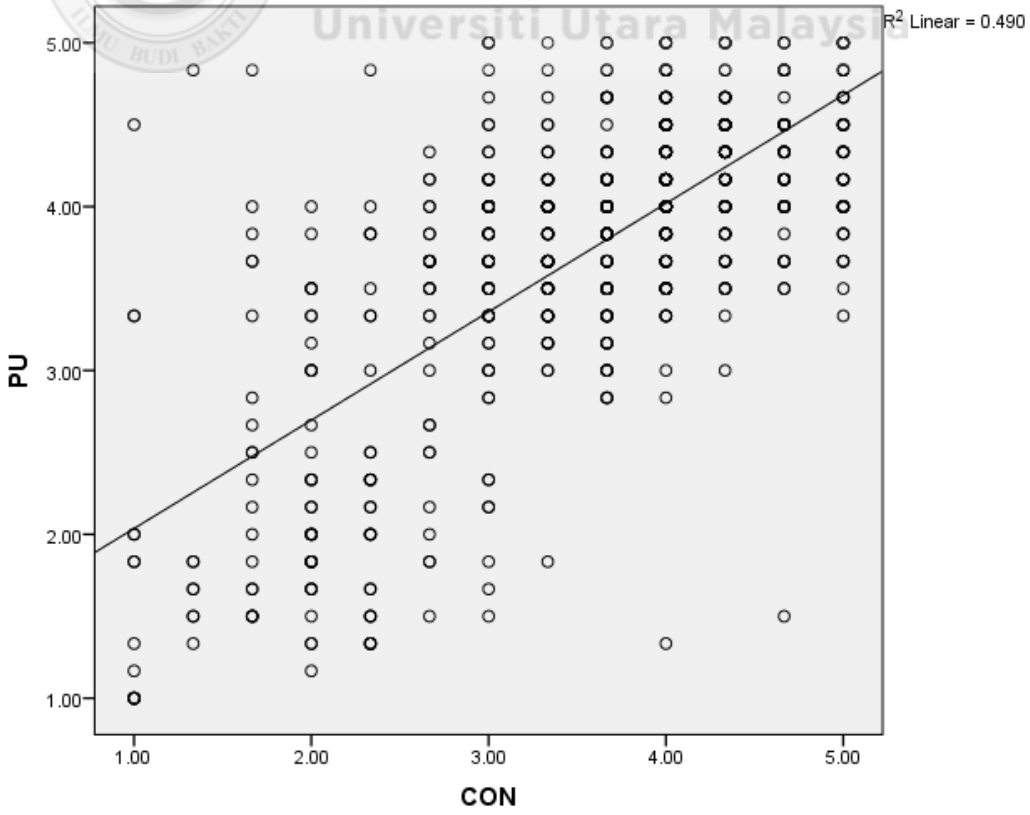
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.0359	4.6809	3.7483	.61539	727
Residual	-2.96047	2.57703	.00000	.62819	727
Std. Predicted Value	-2.783	1.515	.000	1.000	727
Std. Residual	-4.709	4.100	.000	.999	727

a. Dependent Variable: PU





Scatter plot



Appendix K

The Relationship between Perceived Ease of Use and Satisfaction

Descriptive Statistics

	Mean	Std. Deviation	N
SAT	3.6470	.97237	727
PEOU	3.7171	.92133	727

Correlations

		SAT	PEOU
Pearson Correlation	SAT	1.000	.755
	PEOU	.755	1.000
Sig. (1-tailed)	SAT	.	.000
	PEOU	.000	.
N	SAT	727	727
	PEOU	727	727

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PEOU[b]	.	Enter

a. Dependent Variable: SAT
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.755[a]	.570	.570	.63772	.570	962.868

Model Summary[b]

Model	Change Statistics			Durbin-Watson
	df1	df2	Sig. F Change	
1	1[a]	725	.000	1.772

a. Predictors: (Constant), PEOU
b. Dependent Variable: SAT

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	391.584	1	391.584	962.868	.000[b]
	Residual	294.847	725	.407		
	Total	686.431	726			

a. Dependent Variable: SAT
b. Predictors: (Constant), PEOU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.684	.098		6.953	.000
	PEOU	.797	.026	.755	31.030	.000

Coefficients[a]

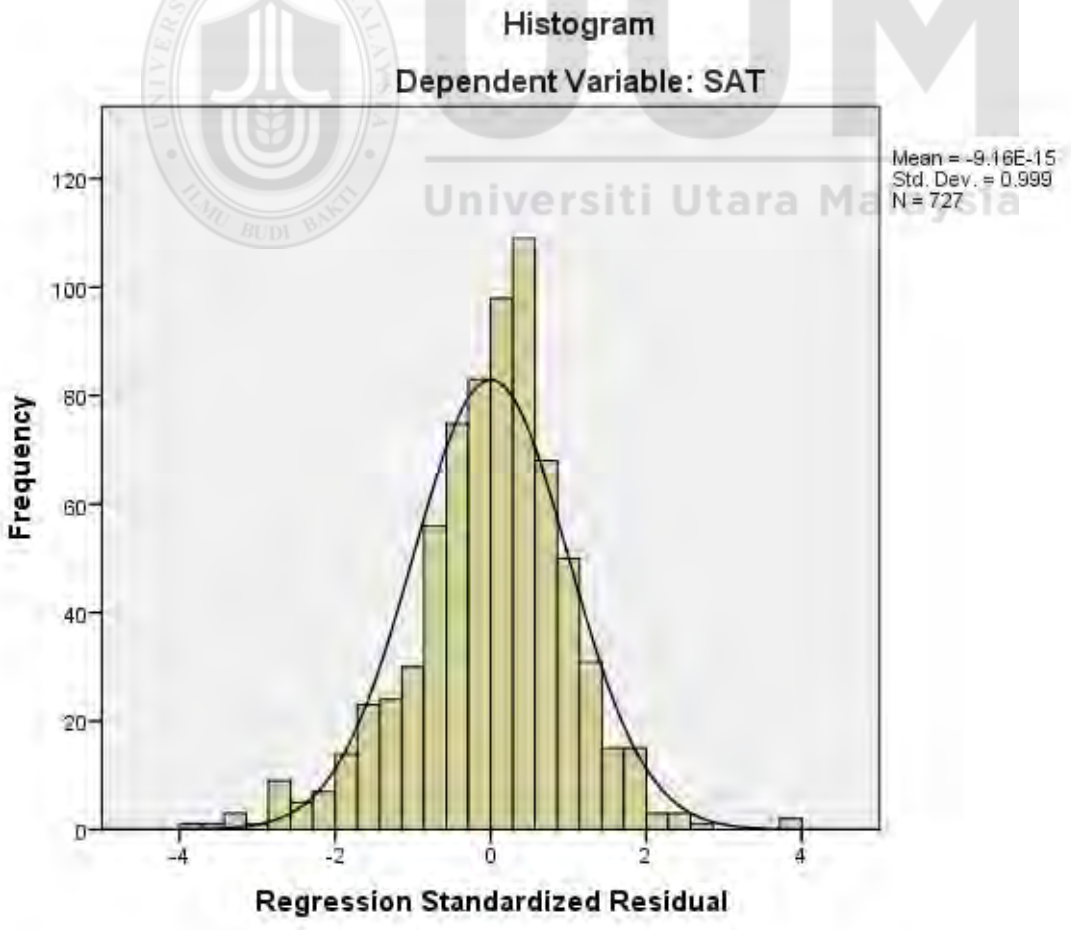
Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	.491	.877
	PEOU	.747	.848

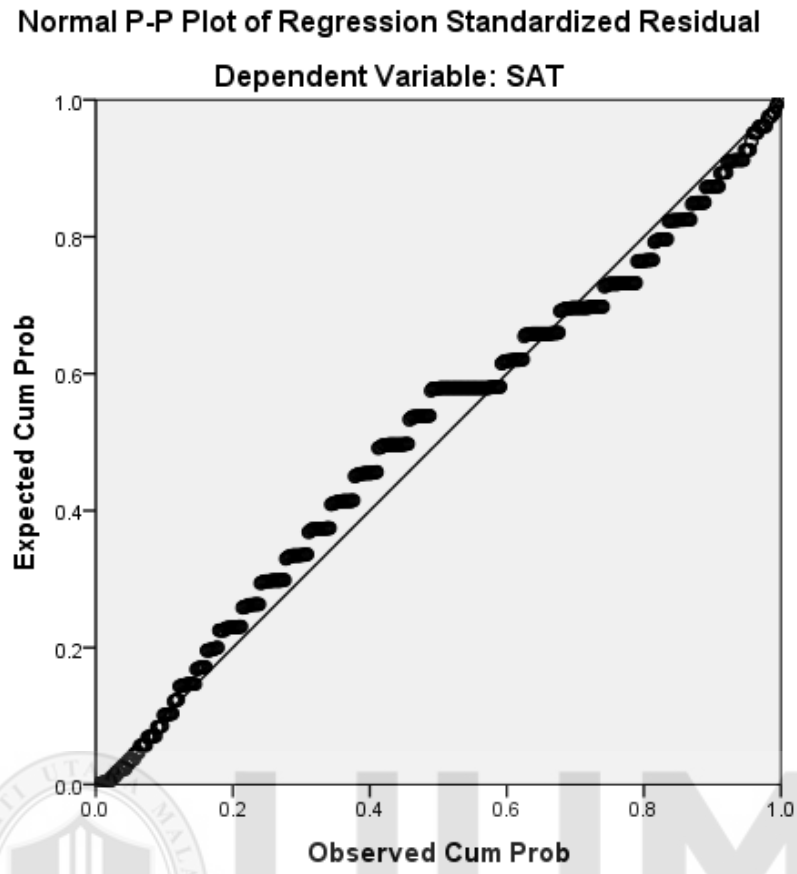
a. Dependent Variable: SAT

Residuals Statistics[a]

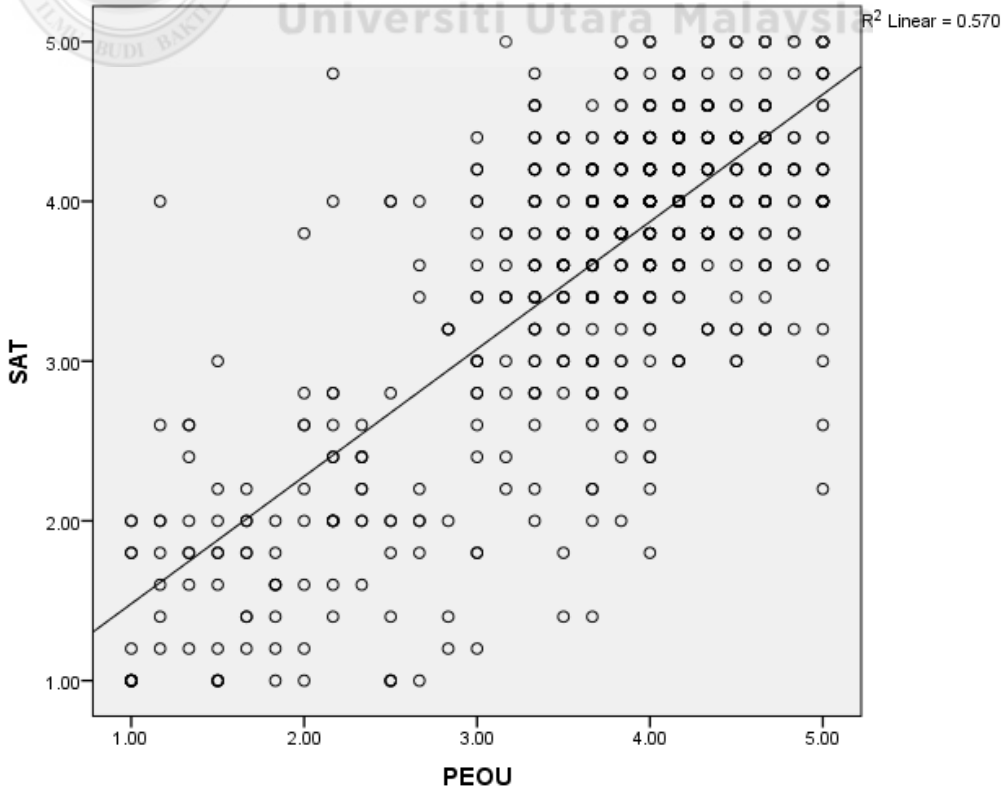
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.4812	4.6697	3.6470	.73442	727
Residual	-2.46968	2.38886	.00000	.63728	727
Std. Predicted Value	-2.949	1.392	.000	1.000	727
Std. Residual	-3.873	3.746	.000	.999	727

a. Dependent Variable: SAT





Scatter plot



Appendix L

The Relationship between Perceived Ease of Use and Continued LMS Usage Intention

Descriptive Statistics

	Mean	Std. Deviation	N
CI	3.7968	.91535	727
PEOU	3.7171	.92133	727

Correlations

		CI	PEOU
Pearson Correlation	CI	1.000	.755
	PEOU	.755	1.000
Sig. (1-tailed)	CI	.	.000
	PEOU	.000	.
N	CI	727	727
	PEOU	727	727

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PEOU[b]	.	Enter

a. Dependent Variable: CI
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.755[a]	.570	.569	.60072	.570	960.616

Model Summary[b]

Model	Change Statistics			Durbin-Watson
	df1	df2	Sig. F Change	
1	1[a]	725	.000	1.834

a. Predictors: (Constant), PEOU
b. Dependent Variable: CI

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	346.656	1	346.656	960.616	.000[b]
	Residual	261.629	725	.361		
	Total	608.285	726			

a. Dependent Variable: CI
b. Predictors: (Constant), PEOU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.009	.093		10.887	.000
	PEOU	.750	.024	.755	30.994	.000

Coefficients[a]

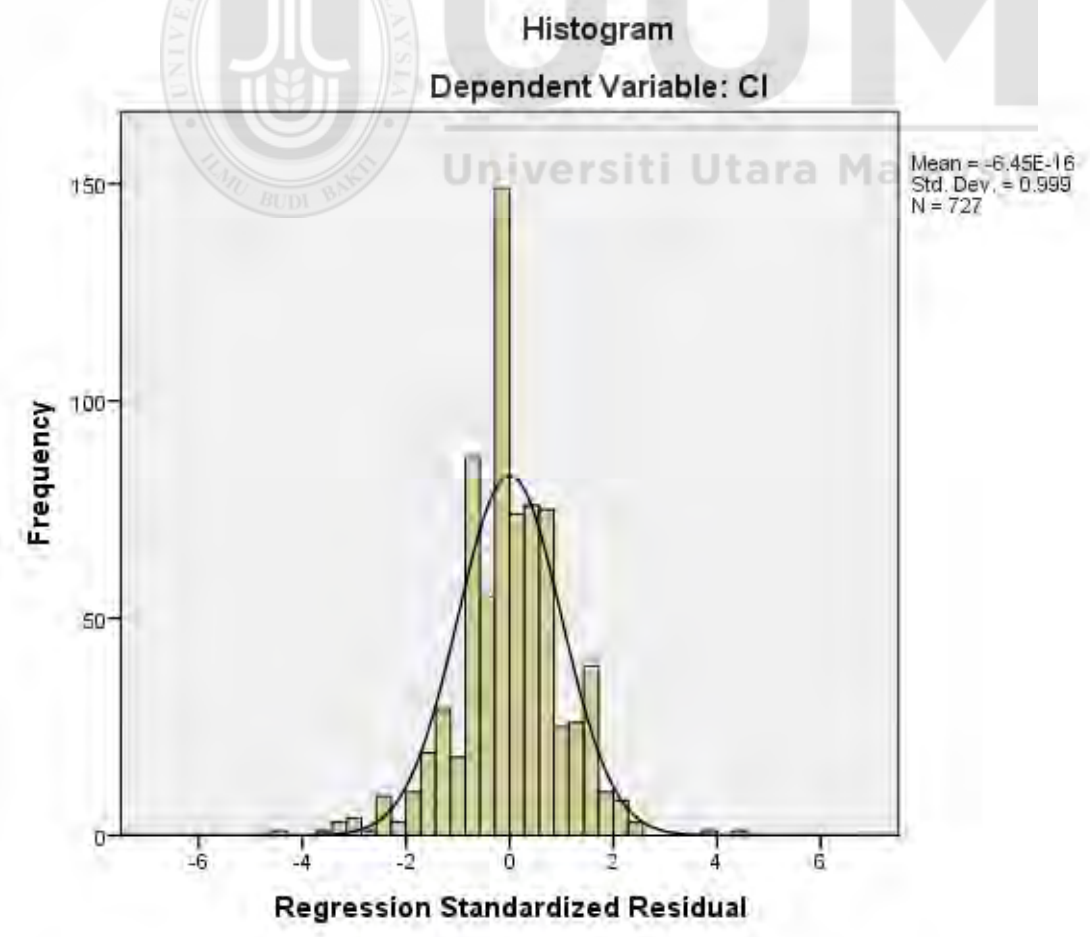
Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	.827	1.191
	PEOU	.703	.798

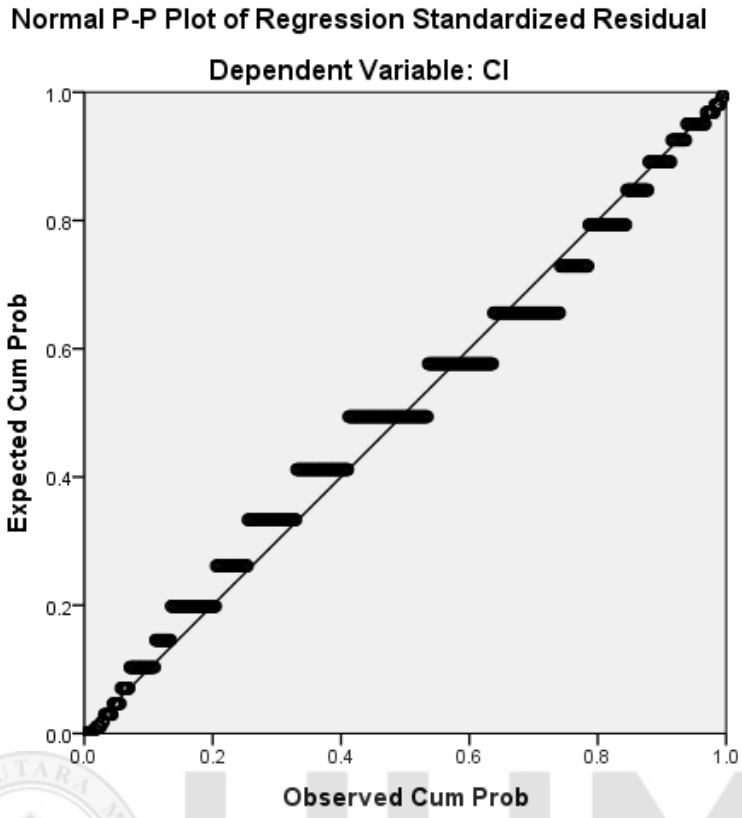
a. Dependent Variable: CI

Residuals Statistics[a]

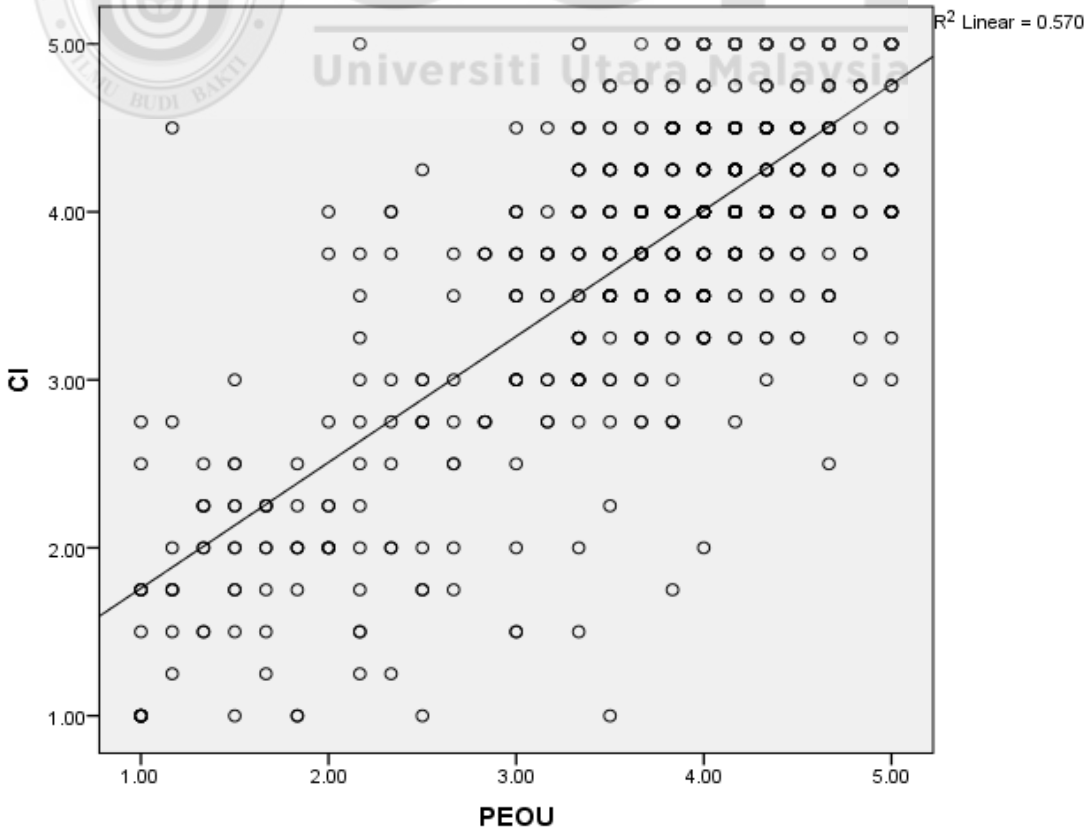
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.7589	4.7590	3.7968	.69100	727
Residual	-2.63394	2.61608	.00000	.60031	727
Std. Predicted Value	-2.949	1.392	.000	1.000	727
Std. Residual	-4.385	4.355	.000	.999	727

a. Dependent Variable: CI





Scatter plot



Appendix M

The Relationship between Perceived Ease of Use and Perceived Usefulness

Descriptive Statistics

	Mean	Std. Deviation	N
PU	3.7483	.87939	727
PEOU	3.7171	.92133	727

Correlations

		PU	PEOU
Pearson Correlation	PU	1.000	.848
	PEOU	.848	1.000
Sig. (1-tailed)	PU	.	.000
	PEOU	.000	.
N	PU	727	727
	PEOU	727	727

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PEOU[b]	.	Enter

a. Dependent Variable: PU
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.848[a]	.719	.718	.46683	.719	1851.172

Model Summary[b]

Model	Change Statistics			Durbin-Watson
	df1	df2	Sig. F Change	
1	1[a]	725	.000	1.952

a. Predictors: (Constant), PEOU
b. Dependent Variable: PU

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	403.433	1	403.433	1851.172	.000[b]
	Residual	158.002	725	.218		
	Total	561.435	726			

a. Dependent Variable: PU
b. Predictors: (Constant), PEOU

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.741	.072		10.286	.000
	PEOU	.809	.019	.848	43.025	.000

Coefficients[a]

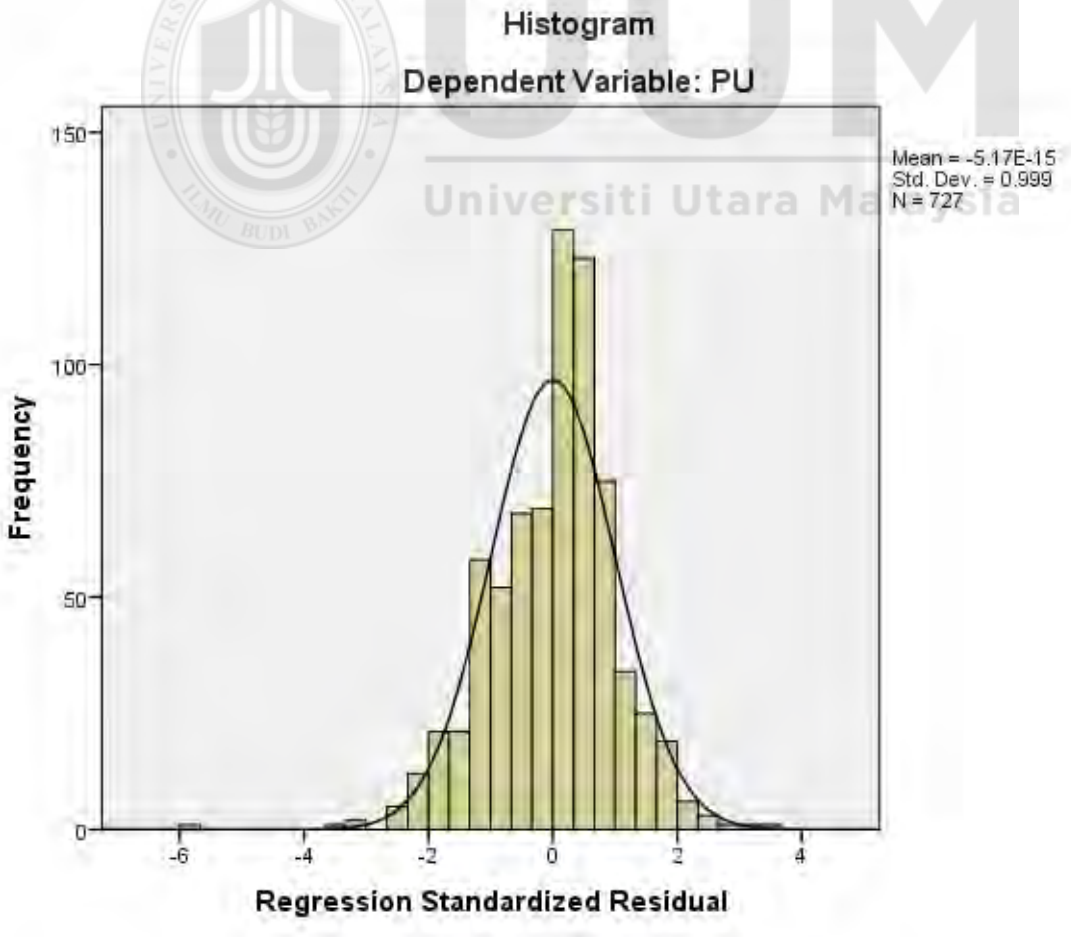
Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	.599	.882
	PEOU	.772	.846

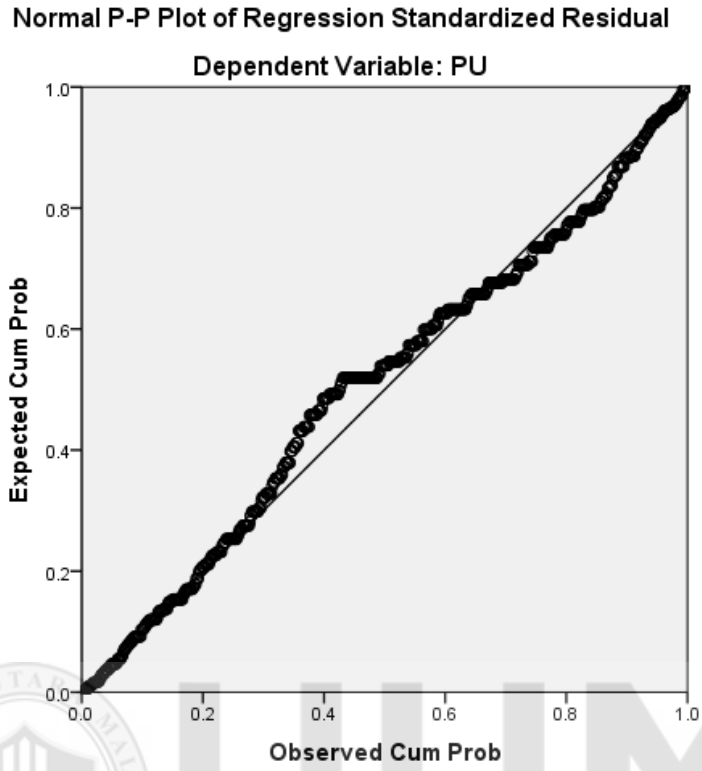
a. Dependent Variable: PU

Residuals Statistics[a]

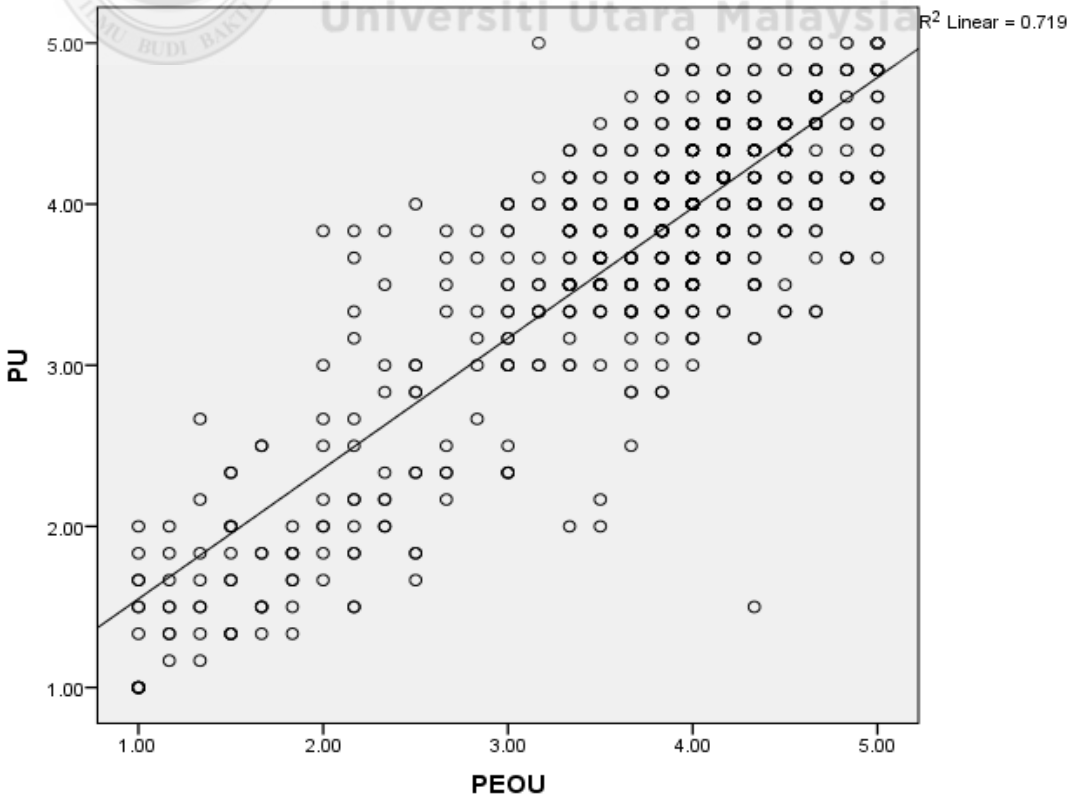
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.5499	4.7863	3.7483	.74545	727
Residual	-2.74687	1.69708	.00000	.46651	727
Std. Predicted Value	-2.949	1.392	.000	1.000	727
Std. Residual	-5.884	3.635	.000	.999	727

a. Dependent Variable: PU





Scatter plot



Appendix N

The Relationship between Confirmation and Perceived Ease of Use

Descriptive Statistics

	Mean	Std. Deviation	N
PEOU	3.7171	.92133	727
CON	3.5896	.93065	727

Correlations

		PEOU	CON
Pearson Correlation	PEOU	1.000	.692
	CON	.692	1.000
Sig. (1-tailed)	PEOU	.	.000
	CON	.000	.
N	PEOU	727	727
	CON	727	727

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	CON[b]	.	Enter

a. Dependent Variable: PEOU
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.692[a]	.478	.478	.66588	.478	664.875

Model Summary[b]

Model	Change Statistics			Durbin-Watson
	df1	df2	Sig. F Change	
1	1[a]	725	.000	1.668

a. Predictors: (Constant), CON
b. Dependent Variable: PEOU

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	294.801	1	294.801	664.875	.000[b]
	Residual	321.460	725	.443		
	Total	616.262	726			

a. Dependent Variable: PEOU
b. Predictors: (Constant), CON

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.259	.098		12.788	.000
	CON	.685	.027	.692	25.785	.000

Coefficients[a]

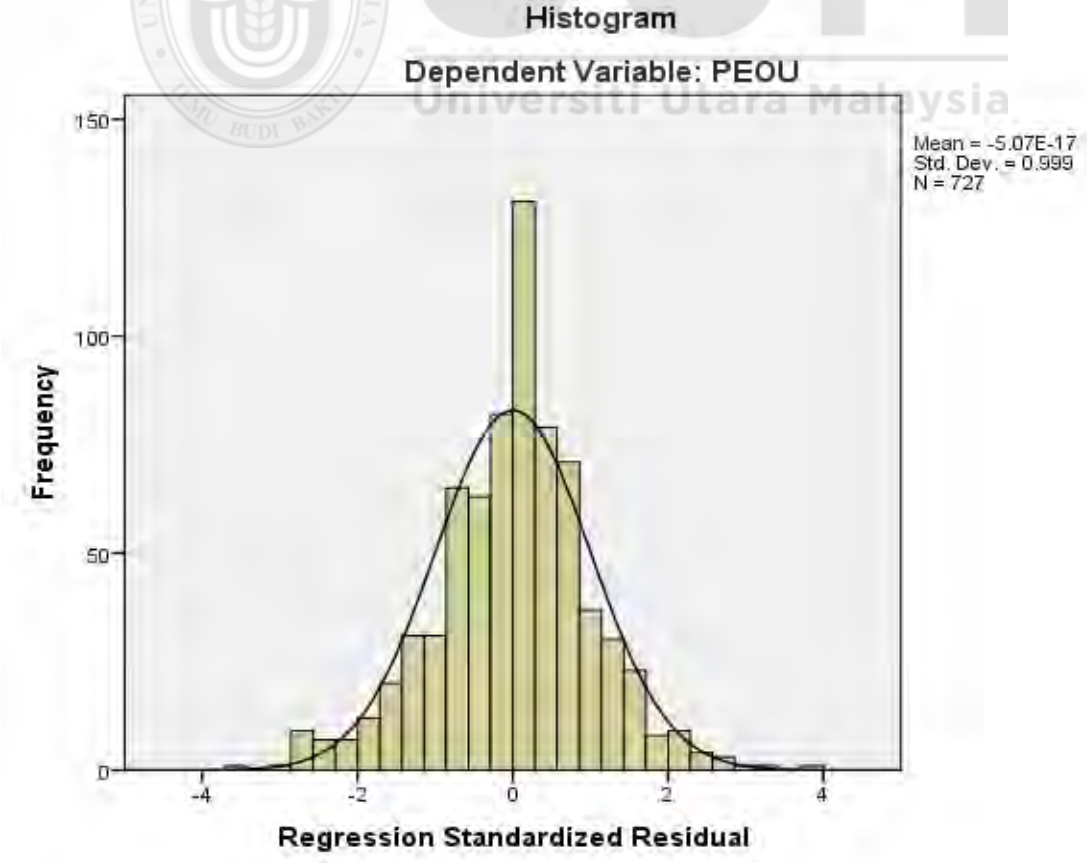
Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	1.066	1.453
	CON	.633	.737

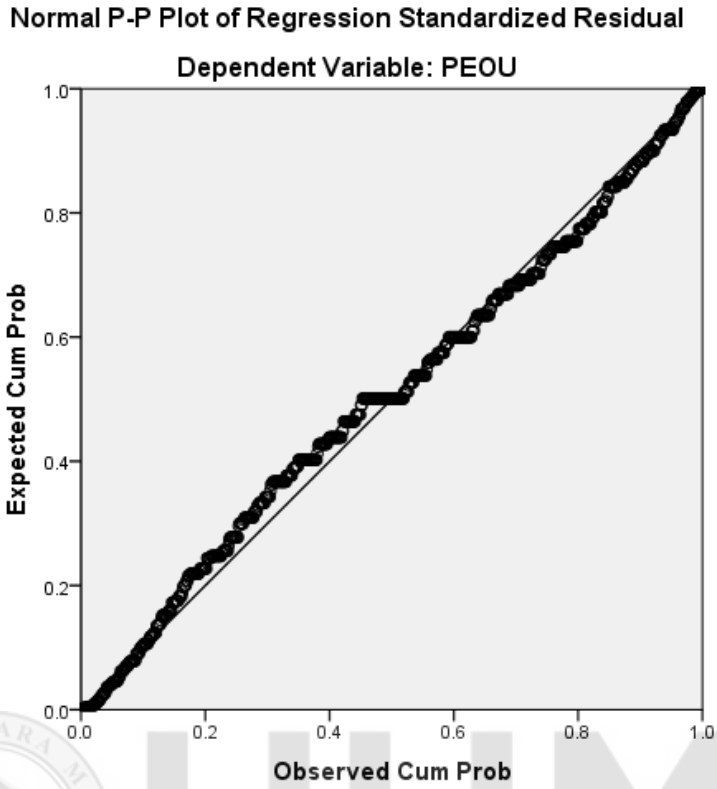
a. Dependent Variable: PEOU

Residuals Statistics[a]

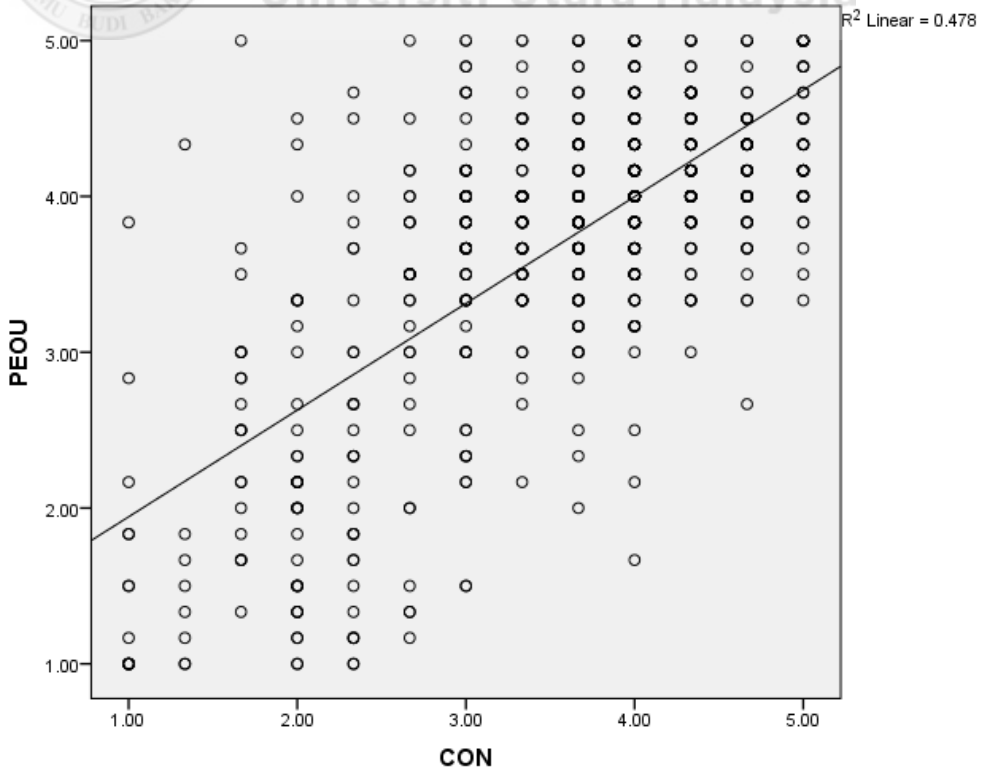
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.9439	4.6828	3.7171	.63723	727
Residual	-2.33142	2.59958	.00000	.66542	727
Std. Predicted Value	-2.783	1.515	.000	1.000	727
Std. Residual	-3.501	3.904	.000	.999	727

a. Dependent Variable: PEOU





Scatter plot



Appendix O

The Relationship between Perceived Enjoyment and Satisfaction

Descriptive Statistics

	Mean	Std. Deviation	N
SAT	3.6470	.97237	727
PE	3.2715	.47305	727

Correlations

		SAT	PE
Pearson Correlation	SAT	1.000	.754
	PE	.754	1.000
Sig. (1-tailed)	SAT	.	.000
	PE	.000	.
N	SAT	727	727
	PE	727	727

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PE[b]	.	Enter

a. Dependent Variable: SAT
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.754[a]	.569	.568	.63892	.569	956.506

Model Summary[b]

Model	Change Statistics			Durbin-Watson
	df1	df2	Sig. F Change	
1	1[a]	725	.000	1.950

a. Predictors: (Constant), PE
b. Dependent Variable: SAT

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	390.469	1	390.469	956.506	.000[b]
	Residual	295.962	725	.408		
	Total	686.431	726			

a. Dependent Variable: SAT
b. Predictors: (Constant), PE

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.425	.166		-8.599	.000
	PE	1.550	.050	.754	30.927	.000

Coefficients[a]

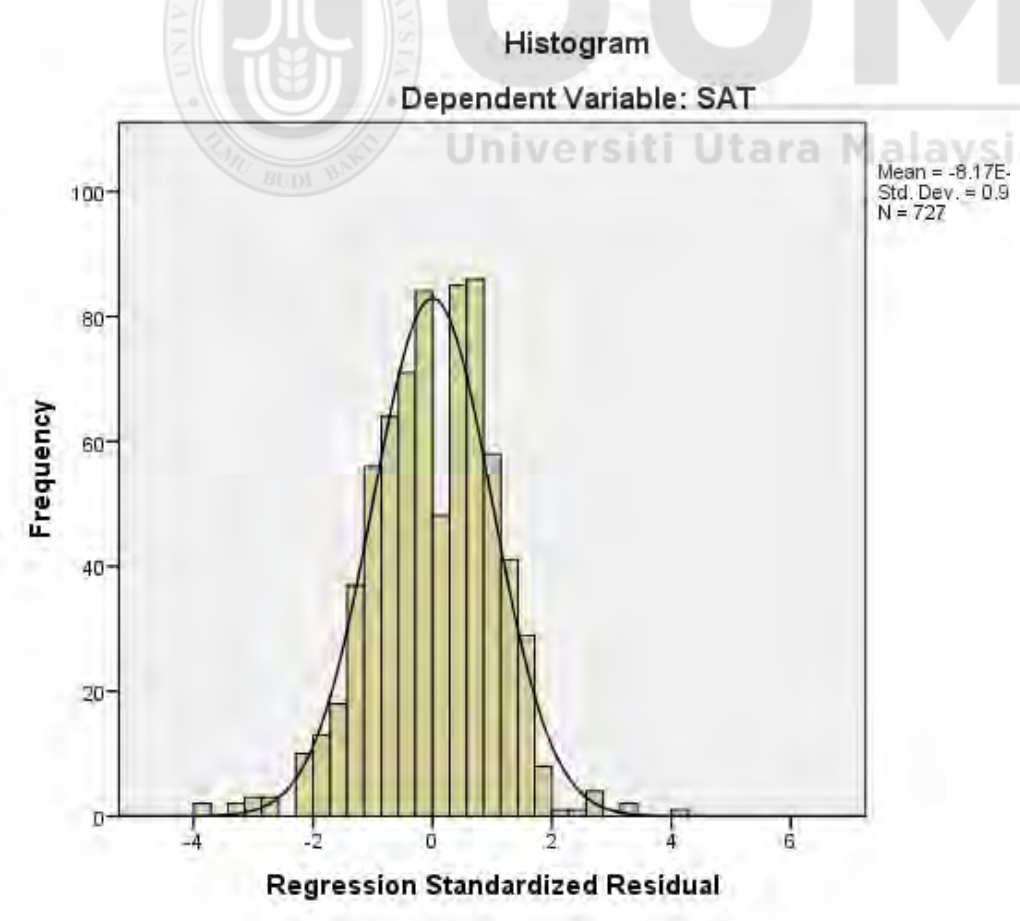
Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	-1.750	-1.099
	PE	1.452	1.649

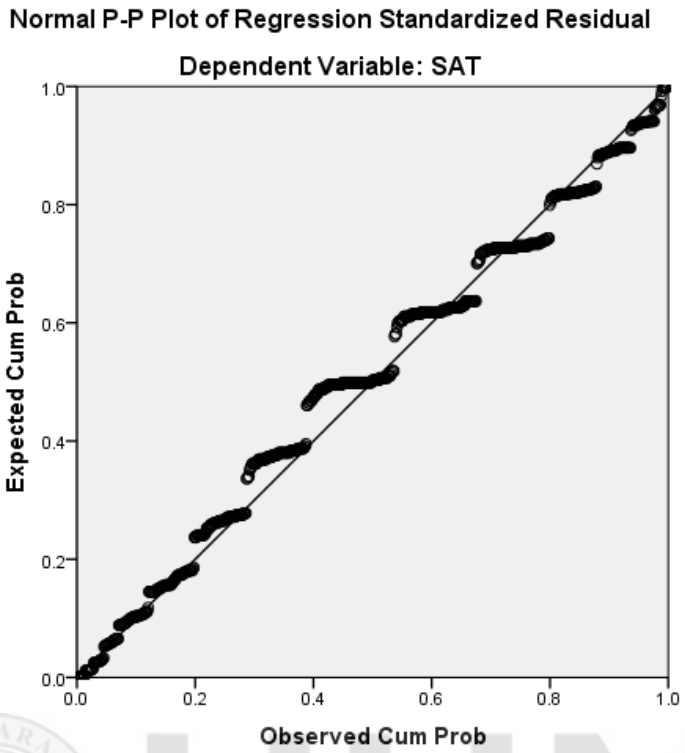
a. Dependent Variable: SAT

Residuals Statistics[a]

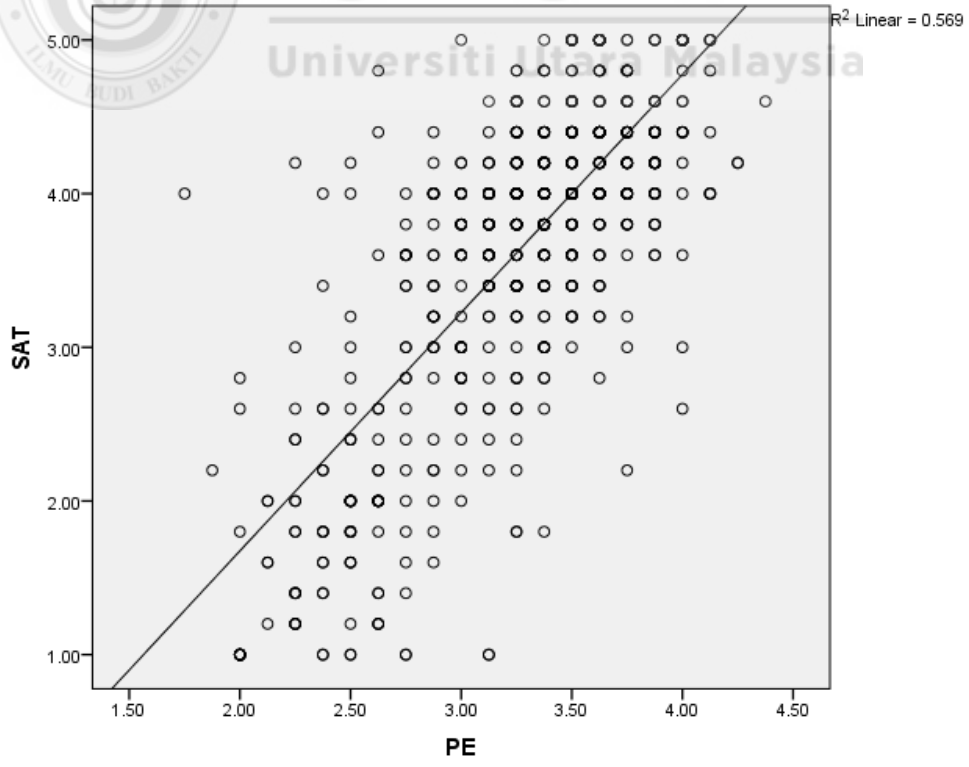
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.2883	5.3578	3.6470	.73337	727
Residual	-2.41993	2.71174	.00000	.63848	727
Std. Predicted Value	-3.216	2.333	.000	1.000	727
Std. Residual	-3.788	4.244	.000	.999	727

a. Dependent Variable: SAT





Scatter plot



Appendix P

The Relationship between Perceived Enjoyment and Continued LMS Usage Intention

Descriptive Statistics

	Mean	Std. Deviation	N
CI	3.7968	.91535	727
PE	3.2715	.47305	727

Correlations

		CI	PE
Pearson Correlation	CI	1.000	.719
	PE	.719	1.000
Sig. (1-tailed)	CI	.	.000
	PE	.000	.
N	CI	727	727
	PE	727	727

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PE[b]	.	Enter

a. Dependent Variable: CI
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.719[a]	.518	.517	.63625	.518	777.607

Model Summary[b]

Model	Change Statistics			Durbin-Watson
	df1	df2	Sig. F Change	
1	1[a]	725	.000	1.813

a. Predictors: (Constant), PE
b. Dependent Variable: CI

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	314.791	1	314.791	777.607	.000[b]
	Residual	293.494	725	.405		
	Total	608.285	726			

a. Dependent Variable: CI
b. Predictors: (Constant), PE

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.757	.165		-4.589	.000
	PE	1.392	.050	.719	27.886	.000

Coefficients[a]

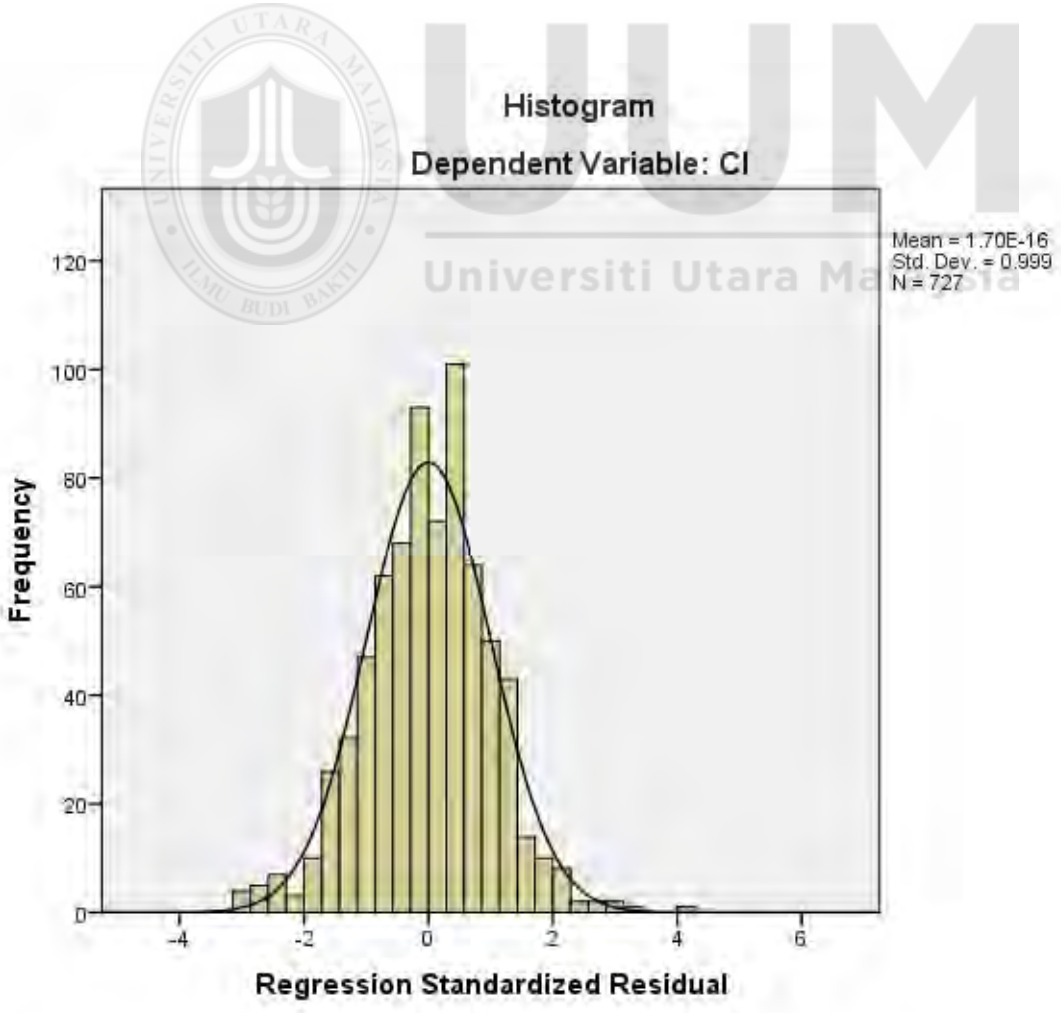
Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	-1.081	-.433
	PE	1.294	1.490

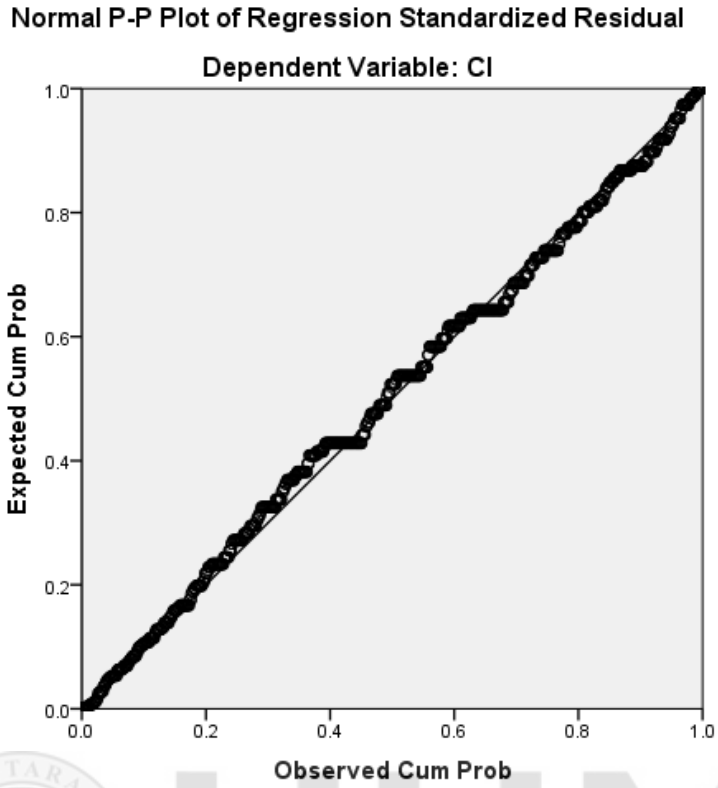
a. Dependent Variable: CI

Residuals Statistics[a]

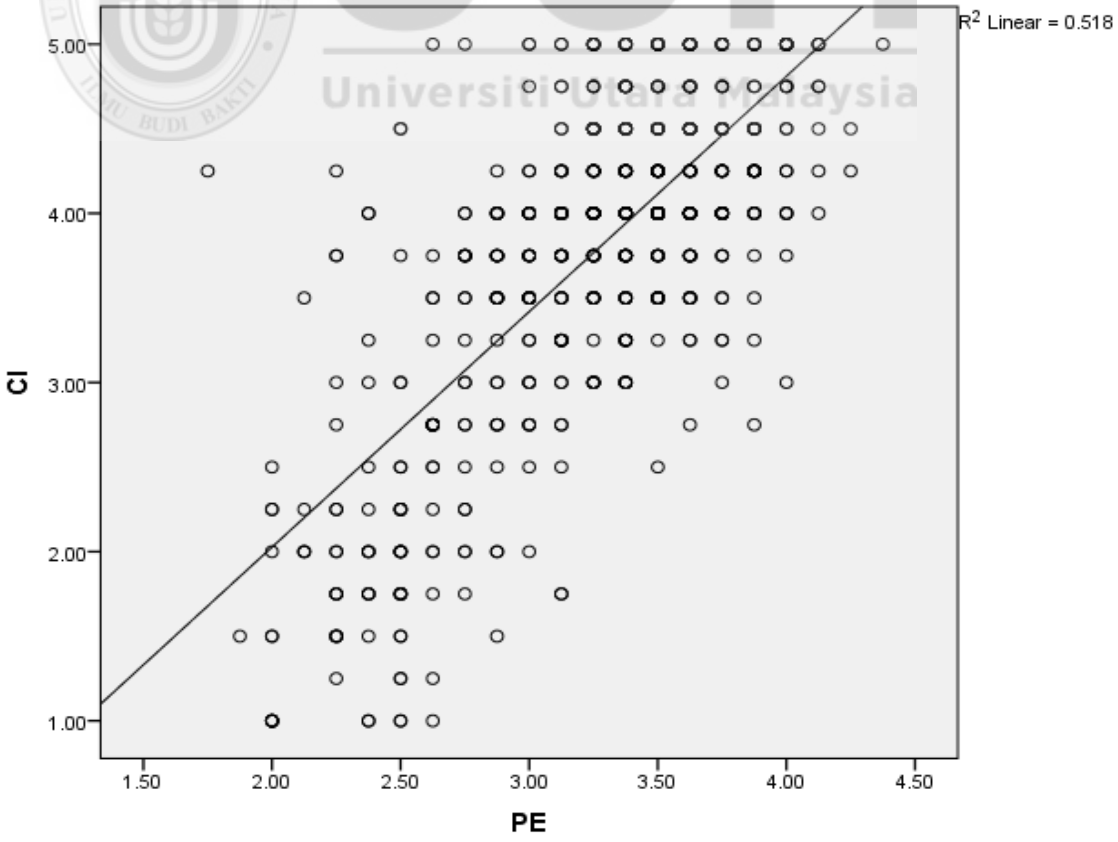
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.6789	5.3328	3.7968	.65848	727
Residual	-1.89686	2.57114	.00000	.63582	727
Std. Predicted Value	-3.216	2.333	.000	1.000	727
Std. Residual	-2.981	4.041	.000	.999	727

a. Dependent Variable: CI





Scatter plot



Appendix Q

The Relationship between Perceived Enjoyment and Perceived Ease of Use

Descriptive Statistics

	Mean	Std. Deviation	N
PEOU	3.7171	.92133	727
PE	3.2715	.47305	727

Correlations

		PEOU	PE
Pearson Correlation	PEOU	1.000	.712
	PE	.712	1.000
Sig. (1-tailed)	PEOU	.	.000
	PE	.000	.
N	PEOU	727	727
	PE	727	727

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	PE[b]	.	Enter

a. Dependent Variable: PEOU
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.712[a]	.507	.506	.64724	.507	746.084

Model Summary[b]

Model	Change Statistics			Durbin-Watson
	df1	df2	Sig. F Change	
1	1[a]	725	.000	1.735

a. Predictors: (Constant), PE
b. Dependent Variable: PEOU

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	312.547	1	312.547	746.084	.000[b]
	Residual	303.715	725	.419		
	Total	616.262	726			

a. Dependent Variable: PEOU
b. Predictors: (Constant), PE

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.821	.168		-4.888	.000
	PE	1.387	.051	.712	27.315	.000

Coefficients[a]

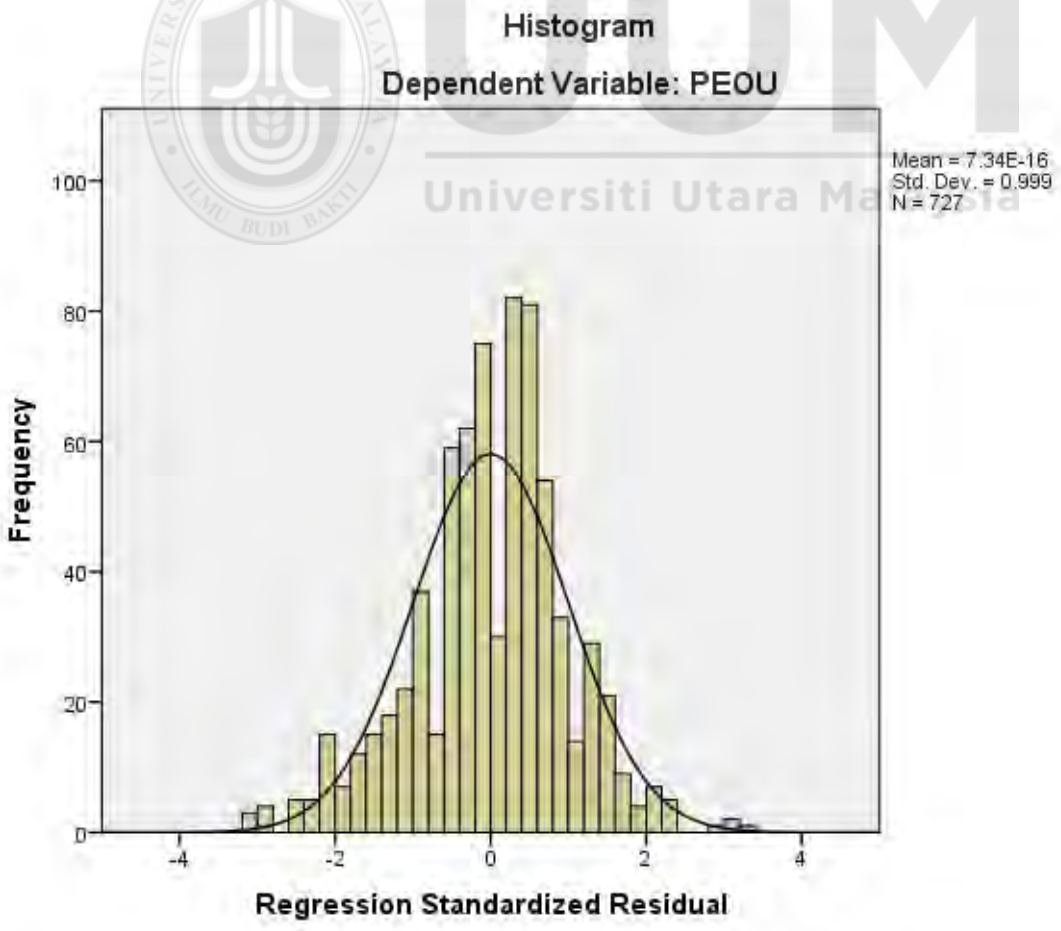
Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	-1.150	-.491
	PE	1.287	1.487

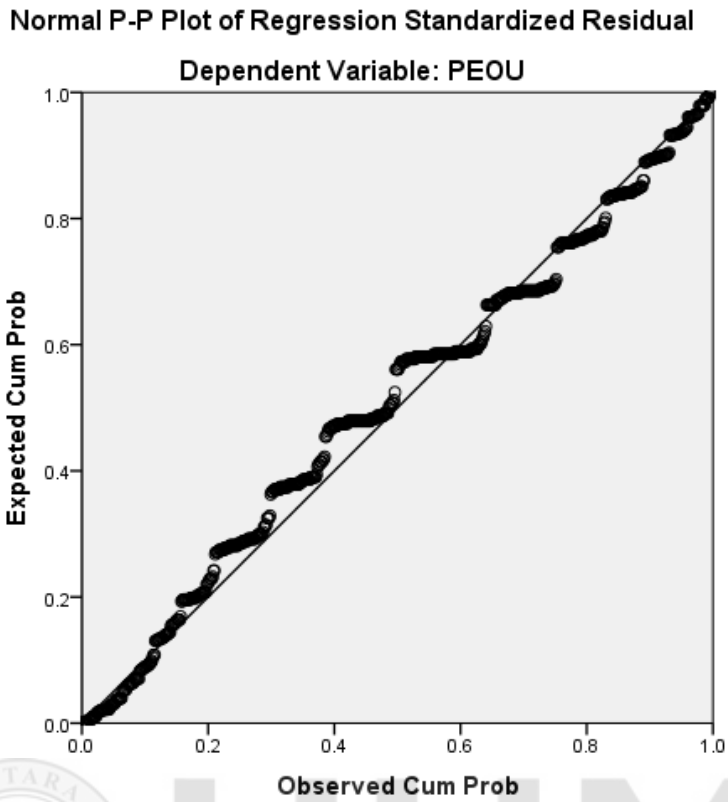
a. Dependent Variable: PEOU

Residuals Statistics[a]

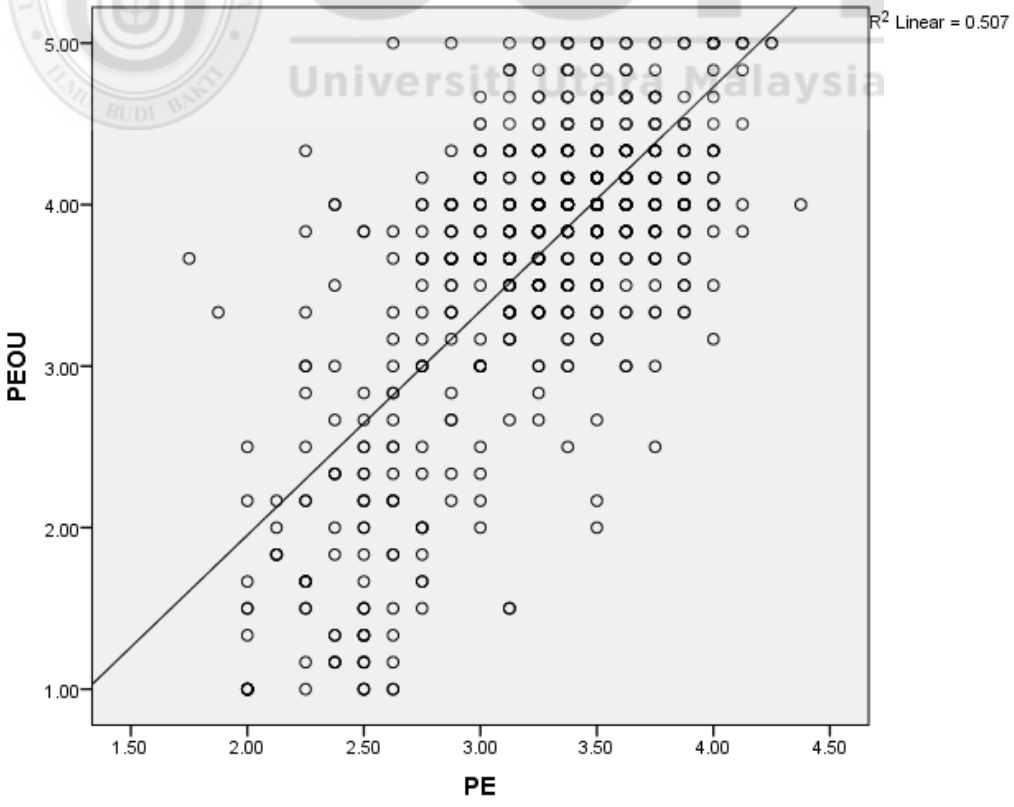
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.6068	5.2477	3.7171	.65613	727
Residual	-2.03405	2.17960	.00000	.64679	727
Std. Predicted Value	-3.216	2.333	.000	1.000	727
Std. Residual	-3.143	3.368	.000	.999	727

a. Dependent Variable: PEOU





Scatter plot



Appendix R

The Relationship between Confirmation and Perceived Enjoyment

Descriptive Statistics

	Mean	Std. Deviation	N
PE	3.2715	.47305	727
CON	3.5896	.93065	727

Correlations

		PE	CON
Pearson Correlation	PE	1.000	.716
	CON	.716	1.000
Sig. (1-tailed)	PE	.	.000
	CON	.000	.
N	PE	727	727
	CON	727	727

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	CON[b]	.	Enter

a. Dependent Variable: PE
b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.716[a]	.512	.512	.33062	.512	761.281

Model Summary[b]

Model	Change Statistics			Durbin-Watson
	df1	df2	Sig. F Change	
1	1[a]	725	.000	1.932

a. Predictors: (Constant), CON
b. Dependent Variable: PE

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	83.213	1	83.213	761.281	.000[b]
	Residual	79.248	725	.109		
	Total	162.461	726			

a. Dependent Variable: PE
b. Predictors: (Constant), CON

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.966	.049		40.205	.000
	CON	.364	.013	.716	27.591	.000

Coefficients[a]

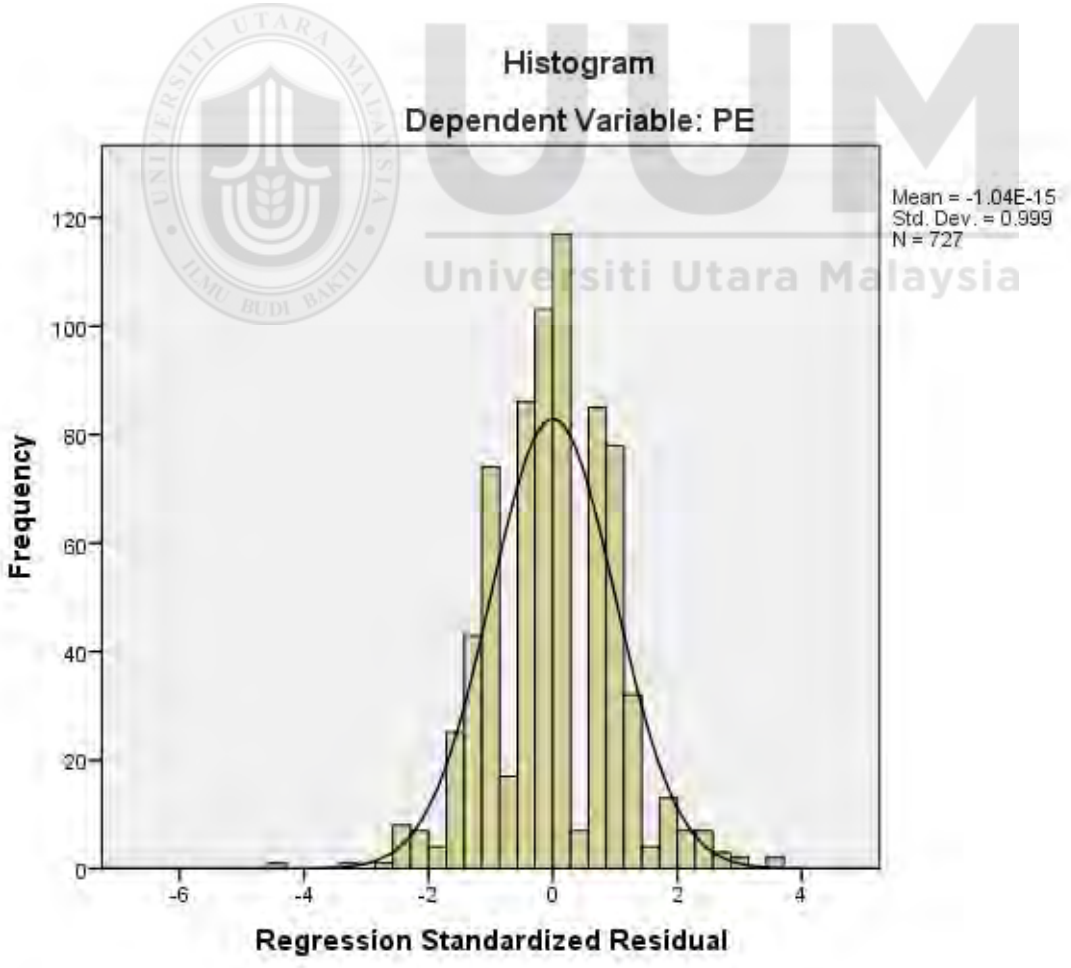
Model		95.0% Confidence Interval for B	
		Lower Bound	Upper Bound
1	(Constant)	1.870	2.062
	CON	.338	.390

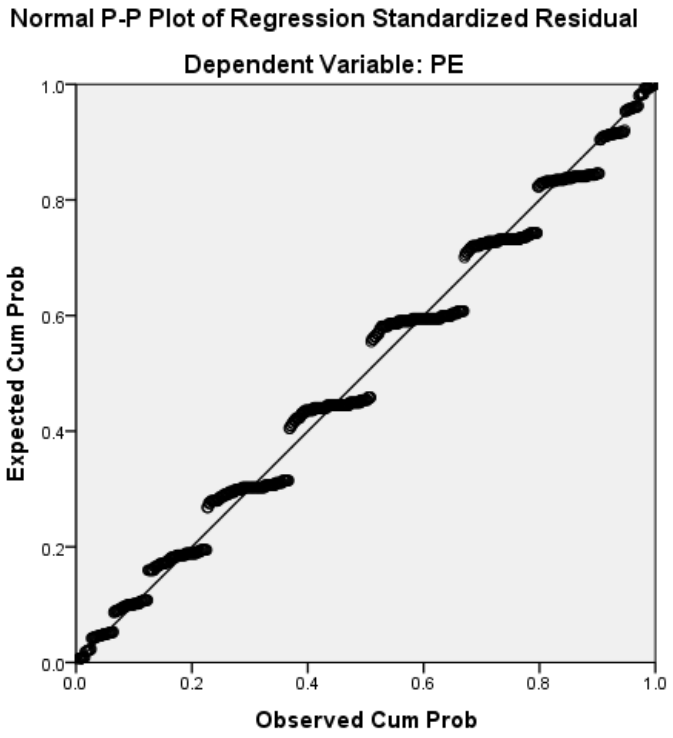
a. Dependent Variable: PE

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.3294	3.7846	3.2715	.33855	727
Residual	-1.42825	1.17805	.00000	.33039	727
Std. Predicted Value	-2.783	1.515	.000	1.000	727
Std. Residual	-4.320	3.563	.000	.999	727

a. Dependent Variable: PE





Scatter plot