05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

UNIVERSITI TEKNOLOGI MARA

EVALUATING THE USABILITY OF FTMSK ONLINE TEST SYSTEM USING SHACKEL'S MODEL

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

NUR SAADAH BINTI FATHIL

Thesis submitted in fulfilment of the requirements for the degree of Master of Science (Information Technology)

Faculty of Information Technology and Quantitative Sciences

November 2005

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

ABSTRACT

One of the most important characteristic of an online learning system is its ability to access the ease of use of the system. Nowadays, many types of application for e-learning have been developed. However, most of the software developers only focus on developing the system but not concern about the usability of the system. In reality, the usability of the system is an important aspect of system development. Poor usability will effects the utility of the system and will wasted the user's time, causes worry and frustration and discourages further to use the system. Therefore, usability testing has been considered as a potential method to evaluate a system. Based on Shackle's Model of usability, the questionnaire is designed to evaluate the FTMSK Online Test System. The questionnaire is based on the four usability factors such as effectiveness, learnability, flexibility and attitude to determine students' and lecturers' view on the online test system. The usability testing also has been conducted with the lecturers as a test subject. The result of this study showed that the overall level of the usability for four construct (effectiveness, learnability, flexibility and attitude) in student's point of view are in the acceptable level (mean=3.9279). While, from the lecturer's point of view, the overall level of the usability are also in the acceptable level (mean=3.8331). From the research, we also found that both students and lecturers acceptance toward the online test system is most highly in positive level. The gender and online test experience do not influence lecturers' and students' acceptance. This is because most of them are exposed to the information and communication technology. In conclusion, the usability testing method has an ability to determine the level of user's acceptance on using the online test system.

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

Candidate's Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree of qualification.

In the event that my thesis be found to violate the conditions mentioned above, I voluntarily waive the right of conferment of my degree and be subjected to the disciplinary rules and Universiti Teknologi MARA.

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

Candidate's Name ..... NUR SAADAH BINTI FATHIL

Candidate Signature .....

Date ..... 25 NOVEMBER 2005

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

ACKNOWLEDGEMENT

Alhamdulillah, praise to Allah for his Almighty and Graciousness. With His utmost blessings, I was able to finish this written report within the time duration given.

My success will not be easily achieved if it was not for the thoughtfulness of several individuals. I would like to express my heartfelt thanks to my supervisor, Encik Faisal Bin Ibrahim. It is very hard to find a dedicated supervisor like him. His guidance through the development of this research paper had portrayed his patience in enriching me with the research skills that can be use in the near future. I highly appreciate in his concern in the detail and content of the report. Thank you for patiently responding to my enquiries and reinforcing my views. Thank you so much Sir. I also would like to express my thanks to Ass. Prof. Dr. Norlaila Mohd. Noor for her guidance, recommendations and suggestions who had helped me complete of this thesis.

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

A special thanks to Puan Noor Azean Binti Atan, lecturer from Universiti Teknologi Mara for his statistical advice and moral support. Thank you for spent a lot of time in teaching me using the SPSS software.

I would like to thank all of my family members, especially my parents; Abah and Mak, my brothers; Abang Abid, Angah and Aizat and my sisters in law; Kak Elly and Kak Zue for the encouragement and moral support. Thanks you for being the best family. Without their support, this study could not have been finished.

Finally, I would like to give a special thanks to all my friends; Nuraziati, Nor Diana, Fatimah, Suhaimi, Suziayana, Huda, Kak Rohada, Kak Rosena and Kak Zaiha for the contribution, moral support and opinions.

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

TABLES OF CONTENTS

ABSTRACT		ii
ACKNOWLEDGEMENT		iii
TABLES OF CONTENTS		iv
LIST OF TABLES		ix
LIST OF FIGURE		xi
CHAPTER 1		1
INTRODUCTION		1
1.1	Background of Research	1
	1.1.1 FTMSK Online Test System	2
1.2	Statement of Problem	4
1.3	Research Question	5
1.4	Research Objectives	6
1.5	Significance of the Research	6
1.6	Scope and Limitations of the Research	7
1.7	Structure of the Thesis	7
CHAPTER 2		9
LITERATURE REVIEW		9
2.1	Introduction	9
2.2	Definition of Terms	9
2.3	The Concept of Usability	10
	2.3.1 Usability in General	11
	2.3.2 Shackel's Approach	11
	2.3.3 Neilsen's Approach	12
	2.3.4 ISO 9241-11	13
	2.3.5 ISO 9126	14
2.4	Shackel's Model	16
2.5	Agree Key Performance	18
2.6	Theory of Reasoned Action	19

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

2.7 Usability Evaluation Method and Technique 21

2.8 Usability Testing 22

2.8.1 The Importance of Usability Testing 24

2.8.2 Testing Models 25

- Testing with a Lab 25
- Testing without a Lab 26
- Field Testing 27

2.8.3 Phases in Usability Testing 28

2.9 Usability in E-learning 30

2.10 Related Work 32

2.11 Summary 36

CHAPTER 3 37

RESEARCH METHODOLOGY 37

3.1 Introduction 37

3.2 Research Methodology 37

3.3 Usability Objective Formulation 39

3.4 Test Plan Preparation 39

3.4.1 Ethical Consideration 39

3.4.2 Population and Sampling Design 40

3.4.3 Variables Identification 40

3.4.4 Instruments and Data Collection 41

- Tasks 42
- Questionnaire 43

3.4.5 Test Environment Set Up 45

- System 47

3.4.6 Participant Selection 47

3.5 Usability Testing 49

3.6 Usability Measurement 50

3.6.1 Scale Score and Benchmarking 51

3.7 Documentation 53

3.8 Instrument Validation and Pilot Study 53

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

3.9 Summary 55

CHAPTER 4 56
RESULTS AND ANALYSIS OF DATA 56
4.1 Introduction 56
4.2 Instrument Reliability 56
4.3 Analysis for the Usability of the Online Test System (Student) 57
4.3.1 Descriptive Analysis on Student's Demographic Details 57
4.3.2 Descriptive Analysis on Effectiveness of the Online Test System (Student) 58
4.3.3 Descriptive Analysis on Learnability of the Online Test System (Student) 59
4.3.4 Descriptive Analysis on Flexibility of the Online Test System (Student) 61
4.3.5 Descriptive Analysis on Student's Attitude 62
4.3.6 The Mean Score Scale for Usability of the Online Test System (Student) 63
4.4 Descriptive Analysis on Usability of the Online Test System (Student) 64
4.4.1 Bar Graph on Comparing between the Usability and Gender (Student) 65
4.4.2 Bar Graph on Comparing between the Usability and Online Test Experience (Student) 67
4.4.3 Bar Graph on Comparing between the Usability and Student Group 70
4.4.4 Bar Graph on the Level of Usability (Student) 73
4.5 Analysis for Usability of the Online Test System (Lecturer) 75
4.5.1 Descriptive Analysis on Lecturer's Demographic Details 75
4.5.2 Descriptive Analysis on Effectiveness of the Online Test System (Lecturer) 76
4.5.3 Descriptive Analysis on Learnability of the Online Test System (Lecturer) 78
4.5.4 Descriptive Analysis on Flexibility of the

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

	Online Test System (Lecturer)	80
4.5.5	Descriptive Analysis on Lecturer's Attitude	81
4.5.6	The Mean Score Scale for Usability of the Online Test System (Lecturer)	83
4.6	Descriptive Analysis on Usability of the Online Test System	84
4.6.1	Bar Graph on Comparing between the Usability and Gender (Lecturer)	84
4.6.2	Bar Graph on Comparing between the Usability and Online Test Experience (Lecturer)	87
4.6.3	Bar Graph on the Level of Usability (Lecturer)	90
4.7	Usability Testing Result	91
4.8	Summary	106
CHAPTER 5		107
DISCUSSION OF FINDINGS		107
5.1	Introduction	107
5.2	Discussion on the Effectiveness of the Online Test System	107
5.3	Discussion on the Learnability of the Online Test System	108
5.4	Discussion on the Flexibility of the Online Test System	109
5.5	Discussion on Student's and Lecture's Attitude on using the Online Test System	109
5.6	Summary	110
CHAPTER 6		111
CONCLUSION AND RECOMMENDATION		111
6.1	Conclusion	111
6.2	Recommendations for Future Work	112
REFERENCESS AND BIBLIOGRAPY		114
APPENDIX 1		121
APPENDIX 2		126
APPENDIX 3		131

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

APPENDIX 4 136
APPENDIX 5 141
APPENDIX 6 142

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

LIST OF TABLE

Table 2.1:	Overview of usability definition	15
Table 2.2:	Summary of the related work	34
Table 3.1:	List of independent and dependent variables	40
Table 3.2:	Instruments of usability evaluation	41
Table 3.3:	The set of tasks	42
Table 3.4:	Illustrated the criteria of the usability factors	44
Table 3.5:	User group characteristics	48
Table 3.6:	Error classification	50
Table 3.7:	Usability acceptance indicator	53
Table 3.8:	Correction on the sentences	54
Table 4.1:	Cronbach's alpha coefficient reliability test	56
Table 4.2:	Summary of student's demographic details	57
Table 4.3:	The effectiveness of the online test system construct (student)	58
Table 4.4:	The learnability of the online test system construct (student)	60
Table 4.5:	The flexibility of the online test system construct (student)	61
Table 4.6:	Student's attitude towards using the online test system construct	62
Table 4.7:	Mean for usability of the online test system (student)	63
Table 4.8:	Summary of lecturer's demographic details	76
Table 4.9:	The effectiveness of the online test system construct (lecturer)	77
Table 4.10:	The learnability of the online test system construct (lecturer)	79
Table 4.11:	The flexibility of the online test system construct (lecturer)	80
Table 4.12:	Lecturer's attitude towards using the online test system construct	82

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

Table 4.13:	Mean for usability of the online test system (lecturer)	83
Table 4.14:	Timing Results from FTMSK Online Test System	92
Table 4.15:	Usability acceptance indictor	93
Table 4.16:	Task completion data for novice or first time users	93
Table 4.17:	Task completion data for knowledge intermittent users	94
Table 4.18:	Task completion data for expert users	94
Table 4.19:	Summary on Number of Errors from the Test Subject when using the FTMSK Online Test System	96
Table 4.20:	Qualitative findings from the post task	101

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

LIST OF FIGURE

Figure 2.1:	Shackel's definition of usability	12
Figure 2.2:	Neilsen's definition of usability	13
Figure 2.3:	ISO 9241-11 definition of usability	14
Figure 2.4:	The Shackel's Model of usability	17
Figure 2.5:	Research Theoretical Framework	18
Figure 2.6:	Theory Reasoned Action (TRA)	21
Figure 2.7:	Usability testing setup without a lab	27
Figure 2.8:	Phases in usability testing	28
Figure 3.1:	The research approach	38
Figure 3.2:	Physical layout of the lecturer's office	46
Figure 4.1:	Students' level of usability toward using online test system as a learning tool	64
Figure 4.2:	Effectiveness of the online test system according to gender (student)	65
Figure 4.3:	Learnability of the online test system according to gender (student)	65
Figure 4.4:	Flexibility of the online test system according to gender (student)	66
Figure 4.5:	Student's attitude on using the online test system according to gender	67
Figure 4.6:	Effectiveness of the online test system according online test experience (student)	68
Figure 4.7:	Learnability of the online test system according online test experience (student)	68
Figure 4.8:	Flexibility of the online test system according online test experience (student)	69
Figure 4.9:	Student's attitude on using the online test system according online test experience	70
Figure 4.10:	Effectiveness of the online test system according	

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

	student group	71
Figure 4.11:	Learnability of the online test system according student group	71
Figure 4.12:	Flexibility of the online test system according student group	72
Figure 4.13:	Student's attitude on using the online test system	72
Figure 4.14:	Level of usability on the online test system according gender (student)	73
Figure 4.15:	Level of usability on the online test system according online test experience (student)	74
Figure 4.16:	Level of usability on the online test system according student group	75
Figure 4.17:	Lecturers' level of usability toward using the online test system as a teaching tool.	84
Figure 4.18:	Effectiveness of the online test system according gender (lecturer)	85
Figure 4.19:	Learnability of the online test system according gender (lecturer)	85
Figure 4.20:	Flexibility of the online test system according gender (lecturer)	86
Figure 4.21:	Lecturer's attitude on using the online test system according gender	86
Figure 4.22:	Effectiveness of the online test system according online test experience (lecturer)	87
Figure 4.23:	Learnability of the online test system according online test experience (lecturer)	88
Figure 4.24:	Flexibility of the online test system according online test experience (lecturer)	89
Figure 4.25:	Lecturer's attitude on using the online test system according online test experience	89
Figure 4.26:	Level of usability on the online test system according gender (lecturer)	90

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

Figure 4.27: Level of usability on the online test system according online test experience (lecturer) 91

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

CHAPTER 1

INTRODUCTION

1.1 Background of the Research

The Internet and World Wide Web have grown rapidly in the past decade and have come to play a major role in the education system. The use of the internet for teaching and learning purposes has received increasing attention from educators over the recent years. They used the electronic learning (e-learning) as a method for delivering courses. In Malaysia, the wave of e-learning is blowing across the entire education system from public and private institutions (Ndubisi, 2004). According to Iahad, Kalaitzakis et al. (2004), e-learning refers to the process of learning or training online, meaning acquiring knowledge via Internet and the Web. There are three main factors that encourage the higher education institutions to get involved with e-learning such as the increasing number of students, the need for life-long learning and the need to prepare students with knowledge and skills for succeeding in the knowledge economy (Irvine, 1998; Harasim, 2000) as cited in Iahad, Kalaitzakis et al. (2004).

Nowadays in the market there are many educational software specifically designed for (e-learning) such as WebCT, Blackboard and Prometheues (Burgess, 2003). Each of these software offers similar components such as course note posting, assignment submissions, quizzes and communication features. It is because they believed the advances in electronic technologies such as Internet and World Wide Web have opened new avenues for student to learn in a collaborative ways.

According to Relan and Gillani (as cited in Lewis, 2002) the online learning environment is broadly interpreted as an instructional delivery method in which the

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

Internet is the medium of the delivery. There are two ways to delivery online learning such as:

- Synchronous: communication in which interaction between learner-instructor and learner-learner is simultaneous.
- Asynchronous: communication in which interaction between learner-instructor and learner-learner does not take place simultaneously (anytime, anyplace).

By using the delivery method of online learning, higher education can use the online learning platform to create an online assessment. Student assessment is one of the most important elements in an education system. Appropriate assessment strategies can have comprehensive implications for faculty development and student learning. The purpose of assessment is to provide a measurement of student performance and give constructive feedback to individual students. According to Barbosa and Garcia (2005), the importance of online assessment is that educators could ensure time saving benefit since the system could have the characteristic to automate the marking. It also can minimize the academic dishonesty. To avoid this, a widely used method is to have an online database of assessment as a part of a test bank that allows generating random tests from randomized items (Barbosa & Garcia, 2005). In addition, online assessment also allows in improving the assessment process, quick feedback to students, creates consistent and standardized assessment, student progress can be monitored and the assessment activity can be documented.

1.1.1 FTMSK Online Test System

Two main purpose of an online test are to evaluate student's progress and to help students to learn (Mornar, Bozic & Zokovic, 2003). Furthermore, lecturer can use tests to indicate how well students have achieved the goals and objectives of the learning event. Testing students online is challenging because as a lecturer, he or she must strike the right balance between the complexity of the question and the feasibility of answering the question in a limited amount of time (Kumar, 1999).

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

According to Driscol (as cited in Mornar et al., 2003) online quizzes and test are among the most commonly used types of asynchronous interaction. Asynchronous interaction will allow students and lecturers to communicate in anytime at anyplace. When students completed a test, their answers are automatically recorded and graded.

One of the existing assessment systems that currently being used at the Faculty of Information Technology and Quantitative Sciences (FTMSK) is Cisco's Online Test. According to Nurul (2005) the Cisco Academy Program is a comprehensive e-learning program that provides instructionally supportive-assessment with immediate and ongoing feedback to lecturers and students. However, assessment capabilities are delivered by CLI Virtuoso, an authoring and content delivery system which is conducted by Cisco. CLI Virtuoso stores assessment questions and results for students according to mastery of the certain subject (Cisco Networking Academy Program, 2002). The test questions are also limited and depend on Cisco's test bank question only.

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

The faculty has developed other online test system which be can integrated with the Network Based Project Learning (NBPL) system called FTMSK Online Test System. The design of the FTMSK Online Test System is based on cognitive domain of Bloom's Taxonomy. The questions are categorized based on the cognitive levels in term of knowledge, comprehension, application and analysis (Nurul, 2005). This system can help the lecturers to assess their student's performance through online and assessment process can be done easily and quickly. The online test system has three main menus for lecturers to evaluate their student's performance such as menu addition, menu view and menu report.

With the intention of that, the purpose of this research is to evaluate the usability of the Online Test System Prototype that currently being developed by the faculty. The usability evaluation of the system is important to ensure that the system is not only functions as expected by the users but is also usable and can be accepted by lecturers and students.

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

1.2 Statement of the Problem

Recently, the number of systems, software and web sites from the educational software industry has significantly increased. The reason for the increase is closely related to the use of the Internet for teaching and learning in online environment. But, why most of the systems, software and web sites in use today is unnecessarily difficult to understand, hard to learn and complicated to use (Bevan and Macleod, 1994). This happened because many of the organizations and developers ignored the importance of the usability during the development phases and procuring the product. According to Olsson (2002) because of the web development is continues grow as if out of control, the usability aspects more or less have been left out. This phenomenon cause may be the fact that web designers are working as quickly as possible. They build as many web sites as possible because of the overheated demand and therefore do not have time or simply do not need to usability test their designs. Olsson (2002) also state that people leave web sites all the time because of usability aspects, as they get stucked and they may never come back.

When the software is design for educational use, additional principles become important such as the design of learning activities and the learner's ability to control sequence, pacing, presentation medium and level of difficulty (Hannafin, 1989). But, in other hand, Storey, Philips et al. (2002) reported that even though several formal and informal case studies have been conducted, none of them have paid attention on both usability of the learning tools and the impact on the potential users such as students, instructors and course administrators. As a result, Miller (2005) found that so many e-learning applications fail because of the decision makers have a poor understanding of usability, unaware of the importance or not consider it worthy of time and effort. Koohang (2004) believed that little research has been done regarding the usability of e-learning courseware and its significance in the e-learning instructional design process. As a consequence, difficulties to use software will waste the user's time, causes worry and frustration and discourages further use of the software (Bevan and Macleod, 1994).

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

Miller (2005) also said even though many organizations have made great strides in their ability to develop and deliver e-learning programs to their employees, customers and suppliers, the usability of these e-learning applications is often lacking or entirely overlooked. There are a large number of reasons for the lack of usability adoption such as quality of courses, relevancy of content, comfort level with the technology, availability of technical support and ability to interact with peer learners. But the major contributor often left off this list is poor usability, which is characteristic of many e-learning applications.

Long, Barnard et al. point out (as cited in Goodwin, 1987) that poor usability may put in risk the utility of a system if it causes some users to give up on it. This problems will cause the current data in the system may be at risk when a computer system is difficult to use.

1.3 Research Question

This research is aimed to discover and understand the usability factors such as effectiveness, learnability, flexibility and attitude of using the Online Test System as an instrument for student assessment. In addition, this research also wants to determine whether the system can be accepted by the lecturers and students. This research examined the following research questions:

1. Do the factor of effectiveness, learnability, flexibility and attitude will affect the students' and lecturers' acceptance in using the online test system?
2. Is gender and online test system influence usability factor?
3. What is the level of lecturers' acceptance toward using the online test system as a teaching and learning tool?

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

1.4 Research Objectives

The objectives of this research are:

1. To determine the factors of effectiveness, learnability, flexibility and attitude that will positively or negatively affects the lecturers' and students' acceptance in using the online test system.
2. To determine whether gender and online test experience influence usability factor.
3. To determine the level of lecturers' acceptance toward using the online test system as teaching and learning tool.

1.5 Significance of the Research

The research explores the lack of system or software usability especially in educational software to support e-learning. Usability features should not only allow people to efficiently manipulate the interactive software, but should also be appropriate for the intended learning task (Costabile, De Marsico, Lanzilotti, Plantamura & Roselli, 2005). Educators and researchers agree that the computer industry tends to employ usability terms very loosely (Mandel, 1997).

The usability testing of computer system is an important aspect of system development and acquisition which is of interest to students, educators, information system professional, strategic managers and developers. In addition, the research will help to identify a number of problems that can illustrate the importance of usability testing as a standard practice when evaluating the use of technology in education.

The research can also be a guideline for the educators before they want to implement any education system in their organizations. It is because usability is a part of evaluation to improve the quality and effectiveness of system features. For the developers, they can use the research as a guideline before they develop any product, software or system.

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

1.6 Scope and Limitations of the Research

In this research we will only consider usability factors such as effectiveness, learnability, flexibility and attitude in evaluating the human factors issues based on Shackle's Model. The usability testing is based on the functional aspects of the online test system and will ignore the user interface of the system. In usability testing was only record the task completion time and number of errors made by users. The participants in this study are students from two master programmes (Master of Science in Information Technology and Master of Computer Science) and selected lecturers from FTMSK.

1.7 Structure of the Thesis

Chapter 1: Introduction

This first chapter highlights the background of the research, statement of the problem and subsequently outlines the research questions and objectives of the study. It also discusses the significance of the study, scope and limitations of the study.

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

Chapter 2: Literature Review

In the second chapter, it will discuss the usability model that can be used to evaluate product, usability benchmark, usability evaluation method and technique, usability testing and reviews of study on usability in e-learning.

Chapter 3: Research Methodology

The third chapter will outline the methodology of the study. It involved the activities in usability testing such as establish test objectives, prepare test plan, conduct the usability, analysis the data and document the result.

Chapter 4: Result and Analysis of Data

The fourth chapter presents the result of findings. The descriptive analysis will be discussed at the beginning of the chapter and followed by statistical analysis on each part of the survey.

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

Chapter 5: Discussion of Findings

The fifth chapter will formulate and conclude the analysis discussed in the fourth chapter.

Chapter 6: Recommendation and Conclusion

Finally, the last chapter will conclude the outcomes of the study and recommendations for future research.

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi

05-4506832 pustaka.upsi.edu.my Perpustakaan Tuanku Bainun Kampus Sultan Abdul Jalil Shah PustakaTBainun ptbupsi