

**FACTORS INFLUENCING THE ADOPTION OF LEARNING CARE
AND INTERNET AMONG LECTURERS IN UUM**

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By

HAFIZAH MOHAMAD HSBOLLAH

Mentor

PROF MADYA DR KAMIL MD IDRIS

**FACULTY OF ACCOUNTANCY
UNIVERSITI UTARA MALAYSIA
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Tandatangan

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by
Hafizah Mohamad Hsboolah

**Faculty of Accountancy
Universiti Utara Malaysia
06010 Sintok, Kedah**

Tel: 604-9283764

Fax: 604-9285762

E-mail: hs.hafizah@uum.edu.my

ABSTRACT

The growing impact of online technology and instructional delivery has kept the teaching style of lecturers on the research agenda. Although the E-Learning system is well known to academicians, its effective utilization and determinants of the use of such system are still remain questionable. Thus, this study is attempted to initiate discussion on the possible factors that may have influenced lecturers in Universiti Utara Malaysia (UUM) to adopt LearningCare and Internet as a teaching tool. Logistic regression analysis was employed to test the relationship between adoption decisions and the independent variables. Results of this study revealed that relative advantages, trialability and academic specialization have significant effects on the adoption decision. Thus, the findings have provided evidence of the importance of relative advantages and trialability in understanding adoption decision before introducing new online technology and instructional delivery in education.

Keywords: LearningCare, Internet, diffusion of innovation, teaching tool, Universiti Utara Malaysia.

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1.0 Introduction

Communication technology through the Internet is recognised as a recent and significant teaching tool in motivating students thus enhancing their learning process in classroom. The Internet enables access to limitless information and facilitates communication that promotes relationship between students and lecturers. It is expected that the use of the Internet in classroom among academicians can significantly increase value, quality and effectiveness of the learning and teaching process.

The importance of LearningCare implementation in UUM cannot be argued. As stated in the UUM strategic planning 2005, it is projected that 100 percent of courses at level 1000-2000 will fully utilize LearningCare in the teaching and learning process. However, the doubt is, do the lecturers fully utilize the LearningCare as proposed by the management? There is no empirical evidence that address how LearningCare is used and the factors that may have influenced UUM's lecturers to fully utilize the system. Therefore this study is attempted to determine the status of LearningCare usage and the determinants of LearningCare adoption. Consequently, this study would contribute to the body of knowledge in e-learning education, as well as the diffusion of teaching innovation itself.

1.1 Problem Statement

The adoption of the LearningCare system by UUM, among others is to enhance the teaching-learning activities among students and lecturers. However, the success of this learning tool depends largely on both the lecturers and the students as the users of the

LearningCare system. Lecturers have to embark on the LearningCare system, thus initiating students to use the system. Yet, there is no study that has shown the extent of usage of such system among lecturers. There is also no empirical evidence that explain the determinants of UUM lecturers adopting the LearningCare system in their teaching activities.

As the adoption of LearningCare is essential in the existing teaching environment in UUM, this study has attempted to reveal the determinants of LearningCare adoption.

1.2 Research Objectives

The gap describe in the problem statement section could be explained when the following objectives are achieved:

1. To determine the extent of usage of LearningCare system and Internet by the UUM lecturers; and
2. To investigate factors that influence the UUM lecturers to adopt LearningCare system and the Internet.

1.3 Significance of the study

This study attempted to reveal factors that influence the UUM lecturers to adopt LearningCare system and the Internet. Some variables were introduced and expected to explain the adoption factors in the diffusion process of teaching innovation. Another major contributor of this study is that factors that were normally used in testing the variability of LearningCare and Internet adoption will be tested in terms of their validity

as a measurement of latent variable. Therefore, this study will contribute to the body of IT knowledge. This study has also unveiled the factors that may have influenced the Internet adoption as a teaching tool among lecturers. The model proposed in this study and other information obtained would also be useful to university administrators, particularly UTLC to develop enhanced guidelines and promote the usage of the Internet among academicians nationwide. In effect, findings from this study may also help to improve academician's attitude toward the usage of LearningCare, thus enhancing the adoption of the Internet as a teaching tool.

2.0 Literature Review

2.1 Diffusion theory in education

Rogers (1995) defined diffusion as the process by which an innovation is adopted and gains acceptance by members of a certain community, whereby four major factors will interact to influence the diffusion of an innovation. The four major factors that influences the diffusion process are the innovation itself, how information about the innovation is communicated, time, and the nature of the social system into which the innovation is being introduced (Rogers, 1995). According to Surry (1997), the study on diffusion theory is potentially valuable to the field of instructional technology for three reasons. First, most instructional technologist do not understand why their products are, or are not, adopted. Therefore, a better understanding of the factors that influence adoption of innovations will make it possible for instructional technologist to explain, predict and account for the factors that impede or facilitate the diffusion of their products. Second, instructional technology is inherently an innovation-based discipline. The comprehension

of the innovation process and theories of innovation diffusion prepares educational technologist to work effectively with clients and potential adopters. Third, the study of diffusion theory could lead to the development of a systematic, prescriptive model of adoption and diffusion.

According to Rogers (1995), there are four widely used theory of diffusion, which are Innovation Decision Process theory, Individual Innovativeness Theory, Rate of Adoption theory and theory of Perceived Attributes.

2.1.1 Innovation Decision Process theory

The Innovation Decision Process theory is a process that occurs over time, which consists of five series of actions and decisions, which are Knowledge, Persuasion, Decision, Implementation and Confirmation. This theory has been widely cited in the instructional technology literature (Surry, 1997).as the Innovation Decision Process theory is depicted in Figure 1.

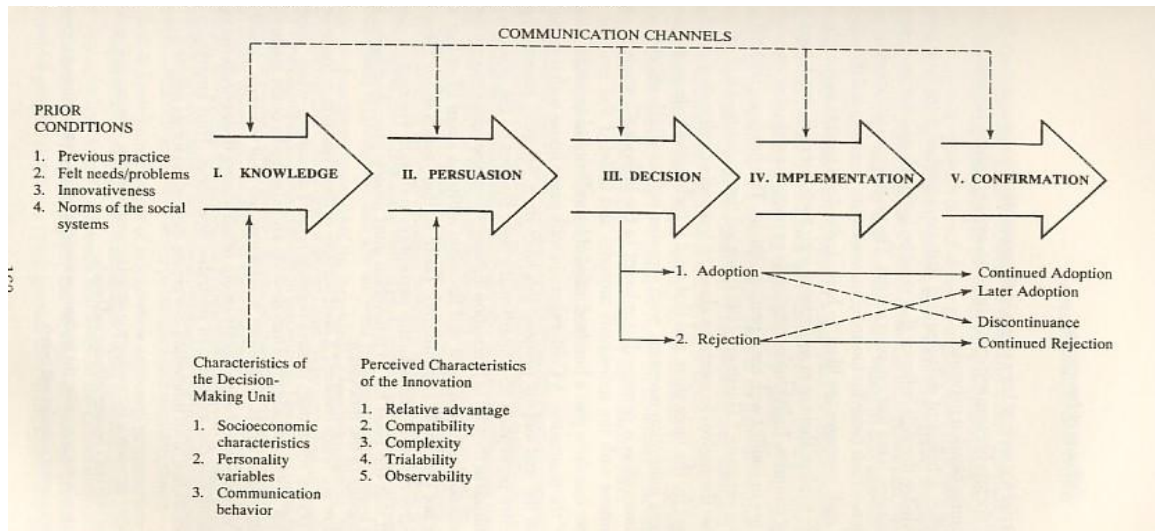


Figure 1: A Model of Stages in the Innovation-Decision Process

Source: Rogers (1995), pp 163

Table 1 presents the conceptualisation model of stages in the innovation–decision process.

Table 1: The Conceptualisation Model

| Stages | Description |
|-------------------|--|
| 1. Knowledge | Occurs when an individual (or other decision making-unit) is exposed to an innovation’s existence and gains some understanding of how it functions |
| 2. Persuasion | Occurs when an individual (or some other decision-making unit) forms a favourable or unfavourable attitude toward the innovation |
| 3. Decision | Occurs when an individual (or some other decision-making unit) engages in activities that lead to a choice to adopt or reject the innovation |
| 4. Implementation | Occurs when an individual (or some other decision-making unit) puts an innovation into use |
| 5. Confirmation | Occurs when an individual (or some other decision-making unit) seeks reinforcement of an innovation-decision already made, or reverses a previous decision to adopt or reject the innovation if exposed to conflicting messages about the innovation |

Source: Rogers, 1995

2.1.2 Individual Innovativeness theory

According to Rogers (1995), individuals who are risk takers or otherwise innovative will adopt an innovation earlier in the continuum of adoption/diffusion. The theory suggested five adopters' categories, which are innovators (venturesome), early adopters (respect), early majority (deliberate), late majority (skeptical), and laggards (traditional). In addition, adopters distributions tend to follow an S-shaped curve over time and to approach normality, as presented in Figure 2.

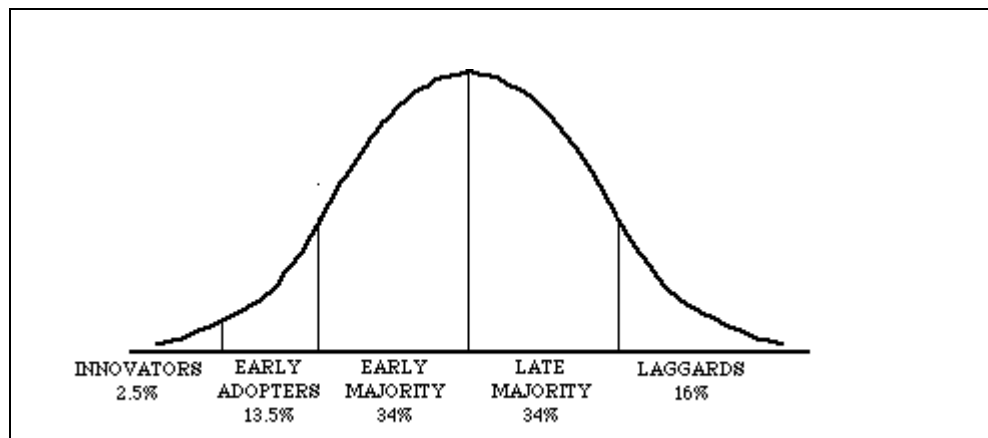


Figure 2: Adopters categorization on the basis of Innovativeness

Source : Rogers (1995), pp 262

2.1.3 Rate of Adoption theory

The theory of Rate of Adoption defined by Rogers (1995) as the relative speed with which an innovation is adopted by members of social system. The theory states that innovation goes through a period of slow, gradual growth and rapid growth. The variance in the rate of adoption is explained by five attributes: relative advantage, compatibility, complexity, trialability and observability, and also affected by type of innovation decision, communication channels, nature of the social system, and extent of

change agents promotion effort. The variables that determine the rate of adoption of innovations is presented in Figure 3.

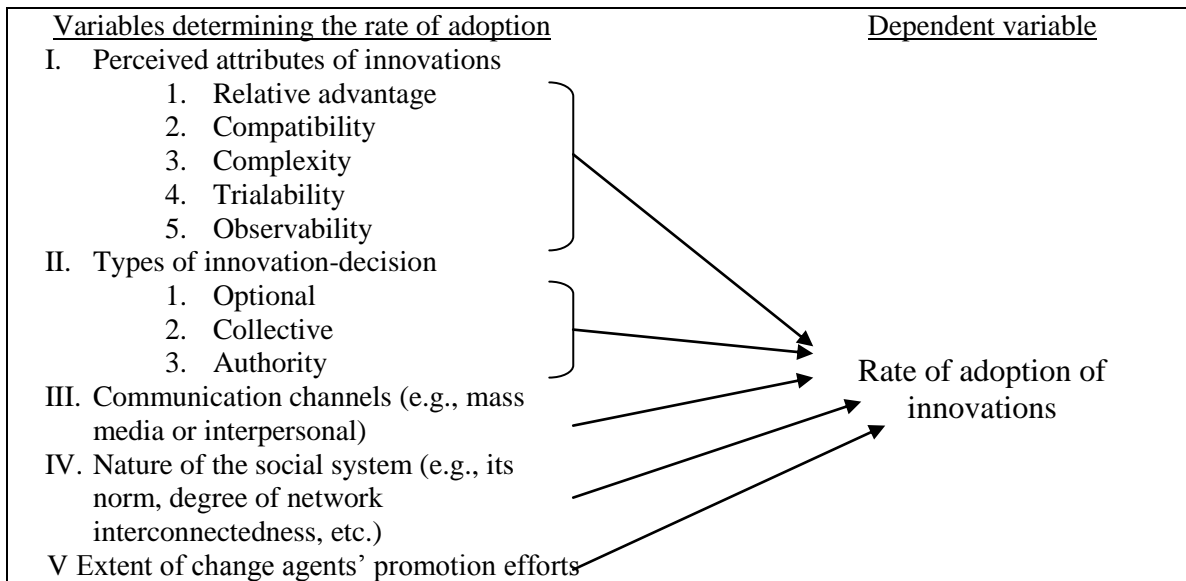


Figure 3: Variables Determining the Rate of Adoption of Innovations.

Source : Rogers (1995), pp 163

2.1.4 Perceived Attributes theory

The Theory of Perceived Attributes states that potential adopters judge an innovation based on their perception. There are five attributes that consistently influence adoption is presented as follows:

- i. Relative advantage, which is the degree to which an innovation is perceived as being better than the idea it supersedes. Potential adopters wants to know the degree to which a new idea is better than the existing practices, therefore, they are motivated to seek information to decrease uncertainty about the relative advantage of an innovation (Rogers, 1995);

- ii. Compatibility, which is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters (Rogers, 1995);
- iii. Complexity, which is the degree to which an innovation is perceived as relatively difficult to understand and use by its potential adopters (Rogers, 1995);
- iv. Trialability, which is the degree to which an innovation may be experimented with on a limited basis by its potential adopters (Rogers, 1995); and
- v. Observability, which is the degree to which the results of an innovation are visible to others and to potential adopters (Rogers, 1995).

The Theory of Perceived Attributes is widely used by researchers to study the diffusion of innovation in various aspects. For example Kendall, Thung et al., 2000; Pin, Jantan and Nasirin, et al., 2000; Premkumar and Robert, 1999; and Soh et al., 1997 have used the model to study the adoption of innovation of the Internet among firms. Martins et al. (2004) and Holcombe (2000) have also used Rogers Theory of Perceived Attributes as their theoretical framework to determine the factors influencing teachers to adopt the Internet as a teaching tool.

In another perspective, Tonartzky and Fleischer (1990) have addressed three elements from firm's context that influence adoption and implementation process of technological innovations. They are organisational context, technological context, and environmental context. Organisational context is defined in terms of firm size; the centralisation, formalisation and complexity of its managerial structure; the quality of its human

resources; and the amount of slack resources available internally. The technological context describes both the internal and external technologies relevant to the firm, while the external task environment (environmental context) refers to firms' business industry such as competitors, access to resources supplied by others, and dealing with the government.

3.0 Research Methodology

3.1 Theoretical Framework

As the focus of this study is LearningCare and Internet adoption, a list of variables proposed in the literature are therefore considered as important determinants of the adoption of the LearningCare and Internet. They are presented in Figure 4.

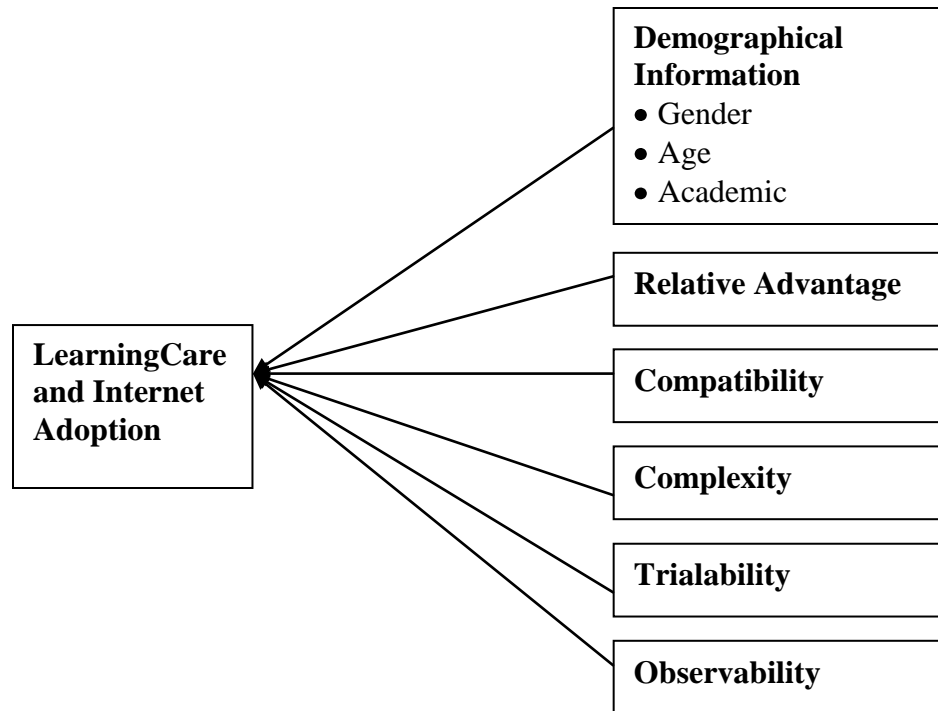


Figure 4: Determinants of LearningCare and Internet adoption

The dependent variable in this study is LearningCare and Internet adoption, which is attempted to be explained by six independent variables as shown in Figure 4 above. The selection of these variables is based on the literature supporting their relevancy to this study. Meanwhile, the theoretical framework is adopted and modified from Martins et al., (2004) who previously used the theory of Perceived Attributes (Rogers, 1995) in their study.

3.1.1 Operational Definitions

This study focuses on these three major terms, namely: LearningCare and the Internet, teaching tool and adoption.

3.1.1.1 LearningCare and the Internet

In UUM, E-Learning module comprises of three modules, which are Learning Management System (LMS), infrastructure and course content. LearningCare is an e-learning application used, which is also known as LMS. By using the Internet, LearningCare allows lecturers to link courses taught for students to access all related resources to the course. University Teaching and Learning Centre (UTLC) has played a very significant role in promoting and providing training towards the success of LearningCare implementation. E-Learning policy of UUM stated that:

“The function of LMS will complement the existing conventional/traditional system. The proportion of LMS to the conventional learning is proposed as 30:70... The academic staffs themselves are responsible for developing their own content with the technical help and assistance by UTLC”

Meanwhile, The Internet as a public and global communication network provides direct connection to anyone over a local area network (LAN) or Internet Service provider (ISP) (Turban, Lee, King, & Chung 2000). For the purpose of this study, LearningCare is defined as the usage of LearningCare (features available includes announcements; notes and documents; exercise and assessment), personal website (UUM based) and e-mail among lecturers in UUM. Therefore, lecturers are expected to be able to fully utilize LearningCare function, personal website and email in enhancing their teaching method.

In this study, the dependent variable; LearningCare and Internet adoption is determined by interval data which are related to their status of LearningCare and Internet usage as a teaching tool.

There are six major independent variables namely: demographic information, relative advantage, compatibility, complexity, trialability and observability, which are explained below.

- i. Relative advantage or the degree to which lecturers perceive a new technology as superior to existing substitute (Bennett & Bennett, 2003), and at the same time indicates the benefits and the costs resulting from adoption of a new technology (Rogers, 1995)
- ii. Compatibility or the degree to which lecturers feel that the new technology is consistent with their values and philosophy of teaching (Bennett & Bennett, 2003)

- iii. Complexity or the degree to which the technology is difficult to understand or use (Bennett & Bennett, 2003)
- iv. Trialability or the degree to which lecturers can test the technology before deciding whether to adopt it (Bennett & Bennett, 2003)
- v. Observability or the ease to which the technology can be observed, imagined, or described by the potential users (Bennett & Bennett, 2003).

3.1.1.2 Teaching Tool

Teaching tool in this study is defined as the use of the LearningCare and Internet to present resources that support learning and teaching.

3.1.1.3 Adoption

According to Rogers (1995), adoption refers to a decision to make full use of an innovation as the best action available. In this study, the term “adoption” will refer to a decision to make full use of the LearningCare and Internet as a teaching tool among lecturers in UUM.

3.2 Demographical Factors

This study is attempted to find relationships between gender, age, academic specialisation, position, and year joined UUM, which have been considered to have relationship with LearningCare and Internet adoption.

Thompson and Vivien (1996) examined gender differences in factors influencing personal computer usage. They found that there is a significant gender differences for factors related to image, ease of use, job fit, and voluntaries. However, their study failed to find any significant gender differences for factors related to usefulness, trialability, and complexity. In addition, based on a poll conducted by Logitech of Tremont, California, Kaplan (1994) revealed that gender gap exists in personal computer usage. In his study, women are more likely to think that computers are fun compared to men, and women are more likely to use computers for accounting, while men use computers for data management. His findings are supported by Thompson (2001), which indicated that there are differences between male and female in term of Internet usage activities.

As a result of focusing on a community of scholars rather than the total population, a study done by Oyelaran-Oyeyinka and Adeya (2003) showed that there is no association exist between gender and IT. Similarly, Ismail (2000) also found no significant difference of Internet usage between male and female accounting lecturers. Thus, this leads to the development of the first hypothesis, which is:

H₁ = There is a significant difference in adoption of LearningCare and Internet between male and female lecturers.

Thompson and Vivien (1996), as cited in Elder, Gardner and Ruth (1987) revealed that older workers are more likely to experience techno stress (physical and emotional burnout caused by inability to adopt new technology) in using personal computers

compared with younger workers. In another study, Oyelaran-Oyeyinka and Adeya (2003) noticed that younger persons are more likely to use the Internet. However, Ismail (2000) found no relationship between age and Internet usage among accounting lecturers of public universities in Malaysia. Therefore, to further clarify such relationship, the second hypothesis is developed as:

H₂ = There is a significant difference in adoption of LearningCare and Internet among lecturers of different age group.

In fact Oyelaran-Oyeyinka and Adeya (2003) also tested the relationship between academic specialisation with the usage of the Internet. Their study indicated that there is no significant relationship between academic specialisation with computers, e-mail and Internet usage. Meanwhile, Ismail (2000) found that place of employment has a significant influence with Internet usage. This study will use the term ‘academic specialisation’ to represent faculty. Thus, the third hypothesis is expressed as follows:

H₃ = There is a significant difference in adoption of LearningCare and Internet among lecturers of different academic specialisation group.

This study also includes the aspect of tenure ship, which later on will be referred as “number of years joining UUM”. Ismail (2000) used the term “tenure” to represent the number of years of a lecturer’s experience in his or her position. He found that tenure has no significant influence with Internet usage among accounting lecturers of public

universities in Malaysia. Assuming that the number of years joining UUM do have relationship with the adoption decision, the fourth hypothesis is expressed as follows:

H₄ = There is a significant difference in adoption of LearningCare and Internet among lecturers of different group of number of years joining UUM.

3.3 Perceived Attributes of Innovation

Previous studies indicated that relative advantages was the most important reason why firms adopted and continue to use computer (Cragg & King, 1993), the Internet (Poon & Swatman, 1999), EDI (Iacovou & Benbasat, 1995), and e-commerce (Kendall, Tung, Chua, Ng & Tan, 2001). As discovered by Iacovou and Benbasat (1995), a positive relationship exists between relative advantages and adoption, particularly EDI and was supported by other researchers (Mehrtens, Craggs & Mills, 2001; Kendall et al., 2001; Poon & Swatman, 1999; Premkumar & Robert, 1999; Poon & Swatman, 1997; Cragg & King, 1993). On another perspective, Martins, Steil and Todesco (2004) found that relative advantages has little influence towards the adoption of Internet as a teaching tool at foreign language school. Relative advantages are expected to emerge as the most essential factors that affect firms' willingness to adopt new technology; however the findings are contrary with Martins et al.'s findings. Therefore, this study is expected to find out a relationship between relative advantages and adoption of the Internet as a teaching tool among UUM's lecturer. Thus, the fifth hypothesis is expressed as follows:

H₅ = The more positive the relative advantages, the higher the level of adoption of LearningCare and Internet.

Premkumar and Robert (1999) and Martins et al. (2004) did not mention directly the relationship between compatibility and adoption decision. However, Kendall et al. (2001) found that compatibility is almost important in explaining small and medium size enterprises (SMEs) willingness to adopt e-commerce. Therefore, this study is expected to discover evidence that can support previous findings or otherwise. Thus, the sixth hypothesis is formulated as follows:

H₆ = The more positive the perceived compatibility, the higher the level of adoption of LearningCare and Internet.

Martins et al. (2004) revealed that complexity has a little influence towards the adoption of the Internet as a teaching tool at foreign language school. Meanwhile Kendall et al. (2001) found that complexity did not appear to be important attributes in SME's willingness to adopt e-commerce. Even though previous research indicated that complexity has a little implication towards adoption, but complexity issues still exist. It may be easy to adopt and use the Internet because of availability of various assistance. However, the Internet experiences a dynamic evolution, changing from time to time with new interfaces and databases. As firms or individual tries to keep up with technological changes, it will be more complicated resulting in issues of complexity. As they perceived something with innovative features as complex and difficult to adopt, the tendency to

adopt will certainly be reduced. Therefore, it is expected that negative relationship between complexity and adoption decision. Thus, the seventh hypothesis is expressed as follows:

H₇ = The more positive the perceived complexity, the higher the level of adoption of LearningCare and Internet.

Martin et al. (2004) discovered that trialability were the most significant variables towards influencing the adoption of the Internet as a teaching tool at foreign language school. Kendall et al. (2001) also revealed that trialability has affected SME's willingness to adopt e-commerce. Thus, the eighth hypothesis is expressed as follows:

H₈ = The more positive the trialability, the higher the level of adoption of LearningCare and Internet.

Observability also emerged as a significant determinant towards adopting the Internet as a teaching tool (Martins, et al. 2004). On the other hand, Kendall et al. (2001) noted that observability did not affect SME's willingness to adopt e-commerce. These two contradicting findings lead to the development of the ninth hypothesis, which is:

H₉ = The more positive the observability, the higher the level of adoption of LearningCare and Internet.

However all the hypotheses formulated above depend on the factor analysis that is discussed in the next section.

3.4 Data Collection

3.4.1 Population

The whole population of UUM lecturers is taken as the subjects under this study. Therefore, no sampling selection is conducted. The reason is that every lecturer is involved in teaching and has accessed to the Internet and LearningCare. Moreover, data were collected using an on-line survey questionnaire. This survey method is chosen because all lecturers are provided with IT applications and computer facilities that will enable them to answer the questionnaire on-line.

3.4.2 Instrumentation

The on-line survey method is also chosen because it can cover a wide geographical area and a large number of people. The respondents have enough time to reply conveniently. Nonetheless, it is also used because it involves minimal cost and the information gathered is easily coded. The instrument in this study was adopted from Martins et al. (2004). Martins et al. (2004) used instrument developed by Moore and Benbasat (1991), who developed a generic framework for diffusion questionnaire. The questionnaire, according to Moore and Benbasat (1991) is general enough to be used, with modification for the type of innovation being studied. Interestingly, Rogers (1995) admitted the work done by Moore and Benbasat (1991), and agreed that the items can be applied to any particular innovation.

Each questionnaire took about 10 minutes to complete and it is divided into three parts, which is comprised of:

- Part A - Respondent's information such as gender, academic specialization, age, and other related demographic information outlined by this study
- Part B - Information regarding the status of LearningCare usage as a teaching tool
- Part C - This section is measuring adoption factors that influenced the adoption of LearningCare as a teaching tool.

3.4.3 Procedures

As mentioned earlier, the on-line survey questionnaires were sent to 994 UUM lecturers. Personally administered questionnaires were also distributed to the non-responding respondents. Finally, 244 sets of survey questionnaires were received with a 26% of response rate.

3.5 Measurement

3.5.1 Dependent Variable

The dependent variable in this study is LearningCare adoption. A set of six items has been designed to conceptualise the construct. Each statement is in the form of Likert scale ranging from 1-point (not at all) to 5-point (very often). The construct were based on their participation in the LearningCare and Internet usage. The lowest score is 6 showing the lowest level of participation and the highest is 30, indicating the highest level of participation in LearningCare and Internet.

3.5.2 Independent Variables

3.5.2.1 Demographic variables

Demographic variables in this study refer to gender, age, academic specialization, and numbers of years joining UUM.

3.5.2.2 Relative Advantages

A set of five items was adopted from Martins et al. (2004) in the form of Likert scale, ranging from 1-point (strongly disagree) and 7-point (strongly agree). The lowest score is 5 indicating that the respondents have a low perception on perceived benefits gained from LearningCare and Internet adoption and the highest is 35. The highest score represents the respondents with high perception on perceived benefits in adoption decision.

3.5.2.3 Trialability

For trialability, a set of five items is adopted from Martins et al. (2004) and each item is measured with a seven-point Likert scale ranging from 1-point (strongly disagree) to 7-point. The highest score is 35, indicating that the respondents have a high perception on trialability on adoption decision, and the lowest score is 5, showing high perception on trialability as a factor in deciding to adopt.

3.5.2.4 Compatibility

The compatibility variable is measured using instrument that has been developed by Martins et al. (2004). The instrument is composed of four items of compatibility

statement. The lowest score is 4-point, indicating that the respondents do not agree that compatibility is one of the reason for adopting LearningCare. The highest score is 28-point; showing that the respondents agree that compatibility is one of the factors in adopting LearningCare and Internet.

3.5.2.5 Complexity

As for complexity, a set of four items by Martins et al. (2004), is used. The instrument is in the form of Likert scale, ranging from 1-point (strongly disagree) and 7-point (strongly agree). The lowest score is 4-point, indicating that the respondents do not agree that complexity is one of the reason for adopting LearningCare and Internet. The highest score is 28-point; showing that the respondents agree that compatibility is one of the factors in adopting LearningCare and Internet.

3.5.2.6 Observability

The observability variable is measured using the instrument developed by Martins et al. (2004). This variable is measured in the form of Likert scale, ranging from 1-point (strongly disagree) to 7-point (strongly agree). The lowest score is 3 and the highest is 21.

3.6 Data Analysis

For the purpose of data analysis; a multiple regression was employed. However, the dependent variable failed the normality test (Kolmogorov-Smirnov test). As the basic assumption of multiple regression could not be fulfil because the distribution skewed left,

which is negatively skewed, the data related to the dependent variables were collapsed. In the process of collapsing data, an arbitrary decision was made. Those who score below 18 will be given a score of “0”, while those who score 18 or below 30 will be given a score of “1”. Thus, the dependent variable is categorized as dichotomous variable, i.e. 1= adopted; 0 = not adopted. There is no specific or scientific approach that can be used to categorize the data. Thus, an arbitrary approach and professional judgement are exercised to categorize the data (dependent variable) into dichotomous variable. Subsequently, a logistic regression analysis is adopted.

Specifically, the logistic regression model for this study is expressed as follows:

$$\text{Logit (ADOPT)} = \beta_0 + \beta_1\text{GENDER} + \beta_2\text{AGE} + \beta_3\text{ACAS} + \beta_4\text{YEARJ} + \beta_5\text{RA} + \beta_6\text{COM} + \beta_7\text{PLEX} + \beta_8\text{TRIAL} + \beta_9\text{OBSERVE}$$

Where, Dependent Variables:

Logit (ADOPT) = $\log(\text{adopt} / 1 - \text{adopt}) = 1$, if lecturers adopt LearningCare and Internet in teaching; 0 otherwise

Hypotheses variables:

GENDER = Dummy variable, if 1 male, 0 otherwise;

AGE = Dummy variable having a value of 1 if respondents age in between 46-50, 0 otherwise;

ACAS = Academic specialisation, 1 if respondents were from Faculty of Tourism, Hospitality and Environment, 0 otherwise;

YEARJ = Year joining UUM, 1 if respondents joined UUM in between year 2000 – 2005;

RA = Relative advantage;

COM = Compatibility;

PLEX = Complexity;

TRIAL = Trialability;

OBSERVE = Observability; and

$\beta_0 - \beta_9$ coefficients measuring the strength of the relationship.

4.0 Results and Findings

4.1 Descriptive Information

Several demographic characteristics of the respondents, which are gender, age, academic specialization and numbers of year joining UUM are discussed and shown in Table 2. A total of 59 percent of the respondents who participated in this study are male, whilst the remaining is female. In terms of age, 55 percent are between 25-30 years, 25 percent are between 31-35 years, 10 percent are between 36-40 years old and 8 percent are between 41-45 years. Only a small percentage of them (3%) are within the range of 46-50 years old.

As for academic specialisation, 21 percent of the respondents are from the Faculty of Accountancy, 14 percent from the Faculty of Quantitative Sciences, and 10 percent from the Faculty of Information Technology. The rest of the respondents are from the Faculty of Cognitive Sciences and Education, Faculty of Communications and Modern Language, and Faculty of Human and Social Development, representing 7.0 percent, 7.4 percent and 7.8 percent respectively of the total respondents. A small percentage or slightly below

five percent are from the Faculty of Tourism, Hospitality and Environment, Faculty of International Studies and Faculty of Public Management and Law.

Table 2: Demographic Information

| | Frequencies | Percentage (%) |
|--|--------------------|-----------------------|
| <i>Gender</i> | | |
| Male | 144 | 59.0 |
| Female | 100 | 41.0 |
| | | 100 |
| <i>Age</i> | | |
| 25 – 30 years old | 133 | 54.5 |
| 31 – 35 years old | 61 | 25.0 |
| 36 – 40 years old | 24 | 9.8 |
| 41 – 45 years old | 19 | 7.8 |
| 46 – 50 years old | 7 | 2.9 |
| | | 100 |
| <i>Academic Specialization</i> | | |
| Accountancy | 50 | 20.5 |
| Business Management | 14 | 5.7 |
| Cognitive Sciences and Education | 17 | 7.0 |
| Communication and Modern Language | 18 | 7.4 |
| Economics | 13 | 5.3 |
| Finance and Banking | 13 | 5.3 |
| Human Social and Social Development | 19 | 7.8 |
| Information Technology | 24 | 9.8 |
| International Studies | 8 | 3.3 |
| Management of Technology | 15 | 6.1 |
| Public Management and Law | 12 | 4.9 |
| Quantitative Sciences | 34 | 13.9 |
| Tourism, Hospitality and Environment | 7 | 2.9 |
| | | 100 |
| <i>Number of Year Joining UUM</i> | | |
| Less than 5 years | 163 | 66.8 |
| 6 – 10 years | 49 | 20.1 |
| 11 – 15 years | 28 | 11.5 |
| More than 16 years | 4 | 1.6 |
| | | 100 |

4.2 Level of Participation in LearningCare and Internet Usage

Respondents are classified into three levels according to their intensity of participation in LearningCare, i.e. uploading notes, exercise, announcement and quizzes, and Internet, i.e. personal website (UUM-based) and e-mail as teaching tools. The levels are rated according to inactive, moderate and active participation. Active participation refers to respondents who are reported to have “very often” and “often” involvement in the Internet usage. Moderate participation refers to respondents who have “sometimes” and “seldom” involvement. Meanwhile, respondents who do not have any involvement in the Internet usage are categorised as inactive participation. Table 3 indicates the level of participation in the LearningCare and Internet usage for learning purposes among UUM lecturers.

Table 3: Level of participation in the LearningCare and Internet usage

| Items | Inactive | | Moderate | | Active | |
|---------------------------------|----------|------|----------|------|----------|------|
| | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % |
| 1. LearningCare | | | | | | |
| Notes | 44 | 18.0 | 55 | 22.6 | 145 | 59.4 |
| Exercise | 93 | 38.1 | 88 | 36.0 | 63 | 25.8 |
| Announcement | 50 | 20.5 | 94 | 38.5 | 100 | 41.0 |
| Quizzes | 152 | 62.3 | 67 | 27.5 | 25 | 10.3 |
| 2. Personal website (UUM Based) | 88 | 36.1 | 77 | 31.6 | 79 | 32.4 |
| 3. E-mail | 27 | 11.1 | 111 | 45.5 | 126 | 43.4 |

**Details for level of participation are presented in APPENDIX 1

4.3 Reliability of Instruments

Reliability analysis was conducted for all constructs showing Cronbach’s Alpha at 0.974 indicating that the data is reliable and good. An item with low alpha value was dropped from the study. The alpha values for every construct are presented in Table 4.

Table 4: Reliability analysis result

| Construct | Alpha Value | Number Of Items | |
|--------------------|--------------------|------------------------|--------------|
| | | Before | After |
| Relative advantage | 0.944 | 5 | 5 |
| Trialability | 0.857 | 5 | 5 |
| Compatibility | 0.952 | 4 | 4 |
| Complexity | 0.919 | 4 | 4 |
| Observability | 0.920 | 4 | 3 |

4.4 Validity of Instruments

Factor analysis was conducted to test the validity of each dimension in the instrument, i.e. the instrument taps the concept as theorised (Sekaran, 2000). In this study, principle component analysis with varimax rotation was applied to test the instrument. After examining the eigenvalues of factorial analysis of twenty one statements, two factors are extracted to determine factors influencing the adoption of LearningCare and Internet in UUM. The result is not similar to the research framework shown in Figure 4. The two factors are defined as; factor 1 is relative advantages; and factor 2 is trialability. It shows that in general, relative advantages and trialability still dominate lecturers' decision in adopting LearningCare and Internet. Table 5 below presents the factor analysis result for each constructs. The Barlett test of sphericity for both constructs are significant (sig=0.000) and the Kaiser-Meyer-Olkin (KMO Measure of Sampling Adequacy) for the constructs are adequate with values greater than 0.70 (Morgan & Griego, 1998) and the variance explained for the constructs were 67% and 74%. Factor loading of the two

items is within 0.6 and 0.9, which is above acceptable value of 0.3. Thus, both constructs have construct valid.

Table 5: Result of Validity Test

| Construct | No. of Items | Factor Loading | | | KMO |
|----------------------------|--------------|----------------|-------|------------------------|-------|
| | | Min | Max | Variance explained (%) | |
| Relative Advantages | 17 | 0.618 | 0.987 | 67% | 0.966 |
| Trialability | 4 | 0.601 | 0.851 | 74% | |

After conducting the factor analysis, only two factors are created, namely Relative advantage and Trialability. Therefore, these hypotheses have been dropped:

- H₅ = The more positive the relative advantages, the higher the level of adoption of LearningCare and Internet.
- H₆ = The more positive the perceived compatibility, the higher the level of adoption of LearningCare and Internet.
- H₇ = The more positive the perceived complexity, the higher the level of adoption of LearningCare and Internet.
- H₈ = The more positive the trialability, the higher the level of adoption of LearningCare and Internet.
- H₉ = The more positive the observability, the higher the level of adoption of LearningCare and Internet.

4.5 Multicollinearity Test

Before applying logistic regression analysis, a Pearson correlation product moment analysis was conducted to examine any multicollinearity problem. Table 6 shows the correlation matrix among the independent variables tested in the model.

Table 6: Pearson Correlation Matrix

| | RA | TRIAL | ACAS | YEARJ | GENDER | AGE |
|--------|----|-------|--------|---------|--------|----------|
| RA | 1 | 0 | -0.095 | -0.075 | -0.107 | -0.022 |
| TRIAL | | 1 | 0.072 | 0.023 | 0.003 | -0.090 |
| ACAS | | | 1 | 0.186** | -0.048 | -0.201** |
| YEARJ | | | | 1 | -0.066 | -0.494** |
| GENDER | | | | | 1 | -0.135* |
| AGE | | | | | | 1 |

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

** Correlation is significant at the 0.05 level (2-tailed)

The highest value of correlations is 0.19, which is significance at 0.01 level (2-tailed), i.e., between YEARJ (year joining UUM) and ACAS (academic specialisation). The lowest value of correlations is 0.20, which is significance at 0.01 level (2-tailed), i.e., between AGE (age) and ACAS (academic specialisation). Therefore, the multicollinearity problem is not serious.

4.6 Multivariate Analysis

A logistic regression analysis was performed with LearningCare and Internet adoption decision as the dependent variable and gender [GENDER], age [AGE], academic specialization [ACAS], number of years in UUM [YEARJ], relative advantage [RA], trialability [TRIAL] as predictor variables. A total of 244 cases were analyzed and their number is sufficient for the logistic regression analysis. As a rule of thumb, Roscoe (1975) suggested that the minimum sample size should be 10 times the number of

independent variables. In this study, the number of independent variables is 6. The minimum sample size should be 60 (6x10). Thus, the actual sample size is greater than the suggested sample size. Therefore, the sample size under logistic regression is more than sufficient.

The goodness of fit statistics was measured by using the Hosmer and Lemeshow test showing significance value of 0.71. Thus, the null hypothesis is fail to be rejected indicating that the model is good fit to the available data. In terms of measurement for the accuracy of prediction, the overall predictive accuracy in this model is 75 percent, as shown in Table 7.

Table 7: Classification Table

| Observed | Predicted | | | Percentage Correct |
|------------------------|------------------------|-----|------|--------------------|
| | Logistic Regress (0,1) | | | |
| | | .00 | 1.00 | |
| Logistic Regress (0,1) | .00 | 98 | 31 | 76.0 |
| | 1.00 | 30 | 85 | 73.9 |
| Overall Percentage | | | | 75.0 |

The relationships between the dependent variables and independent variables are moderate as recorded by Cox & Snell = 0.283 or Nagelkerke = 0.378. Table 8 presents the results of the logistic regression analysis.

Table 8: Result of the Logistic Regression Analysis

| Variable | B | S.E. | Wald | Sig | Exp(B) | Odd Log (1/Exp(B)) |
|------------|--------|-------|--------|---------|--------|--------------------|
| RA | 0.744 | 0.190 | 15.341 | 0.000* | 2.105 | 0.475 |
| TRIAL | 0.596 | 0.171 | 12.161 | 0.000* | 1.815 | 0.551 |
| ACAS | | | 30.001 | 0.0015* | | |
| ACAS (1) | 2.512 | 1.189 | 4.462 | 0.0175* | 12.327 | 0.081 |
| ACAS (2) | 0.813 | 1.314 | 0.383 | 0.268 | 2.254 | 0.444 |
| ACAS (3) | 2.278 | 1.287 | 3.133 | 0.0385* | 9.755 | 0.103 |
| ACAS (4) | 0.496 | 1.274 | 0.151 | 0.349 | 1.642 | 0.609 |
| ACAS (5) | 0.410 | 1.332 | 0.095 | 0.379 | 1.507 | 0.664 |
| ACAS (6) | 1.864 | 1.326 | 1.976 | 0.08** | 6.447 | 0.155 |
| ACAS (7) | -0.192 | 1.327 | 0.021 | 0.446 | 0.826 | 1.211 |
| ACAS (8) | 1.952 | 1.227 | 2.532 | 0.056** | 7.043 | 0.142 |
| ACAS (9) | 1.109 | 1.374 | 0.652 | 0.21 | 3.033 | 0.330 |
| ACAS (10) | 1.793 | 1.287 | 1.942 | 0.082** | 6.009 | 0.166 |
| ACAS (11) | 0.252 | 1.411 | 0.032 | 0.429 | 1.287 | 0.777 |
| ACAS (12) | 1.081 | 1.213 | 0.795 | 0.187 | 2.948 | 0.339 |
| GENDER (1) | -0.104 | 0.342 | 0.093 | 0.38 | 0.901 | 1.110 |
| YEARJ | | | 2.491 | 0.239 | | |
| YEARJ (1) | -1.299 | 1.032 | 1.586 | 0.104 | 0.273 | 3.663 |
| YEARJ (2) | -0.203 | 0.647 | 0.099 | 0.377 | 0.753 | 1.328 |
| YEARJ (3) | 0.206 | 0.376 | 0.301 | 0.292 | 0.583 | 1.715 |
| AGE | | | 1.363 | 0.426 | | |
| AGE (1) | 0.132 | 1.063 | 0.015 | 0.451 | 1.141 | 0.876 |
| AGE (2) | -0.175 | 1.024 | 0.029 | 0.432 | 0.864 | 1.157 |
| AGE (3) | 0.095 | 1.093 | 0.007 | 0.466 | 0.931 | 1.074 |
| AGE(4) | 0.648 | 1.135 | 0.326 | 0.284 | 1.912 | 0.523 |
| Constant | -1.636 | 1.447 | 1.278 | 0.129 | 0.195 | 5.128 |

*-2 Log likelihood=256.182, Cox & Snell R²=0.283, Nagelkerke R²=0.378, Goodness of Fit=5.425. * P < 0.05 ** P<0.1*

Table 8 shows that [RA] and [TRIAL] are the significant predictors for LearningCare and Internet adoption among UUM lecturers. The value of the coefficient reveals that an increase of one unit in [RA] is associated with an increase in the odds log of LearningCare and Internet adoption by 0.74. This indicates that the adoption of LearningCare and Internet is most likely increase by half ($1 / \text{Exp}(B) = 1 / 2.105 = 0.475$) when lecturers perceived relative advantages increase by one unit. Thus, the null

hypothesis is rejected. The present study has evidence to support H₅, which is the relative advantages is positively related to the adoption of LearningCare and Internet. Meanwhile an increase of one unit in [TRIAL] is associated with an increase in the odds log of LearningCare and Internet adoption by 0.6. This indicates that the adoption of LearningCare and Internet is most likely increase by 0.6 ($1 / \text{Exp}(B) = 1 / 1.815 = 0.551$) when lecturers perceived trialability increase by one unit. Thus, the null hypothesis is rejected and this study has evidence to support H₆, which is trialability is positively related to the adoption of LearningCare and Internet.

As for academic specialisation [ACAS], the overall effect takes Wald statistic value of 30.001. It indicates that the Faculty of Accountancy [ACAS1], Faculty of Cognitive Sciences and Education [ACAS3], Faculty of Finance and Banking [ACAS6], Faculty of Information Technology [ACAS8], and Faculty of Management of Technology [ACAS10] are significant, compared to those from the Faculty of Tourism, Hospitality and Environment as the reference group. Thus, H₃ is supported. This significant result suggests that a different category of academic specialization is significantly related to the adoption decision.

As for [GENDER], [YEARJ], and [AGE], the Wald statistic value shows that these groups are not significant. Therefore, hypotheses 1, 2 and 4 are not supported. The result revealed that gender; number of years in UUM and age are insignificantly related to the adoption decision. Thus, H₁, H₂, and H₄ are rejected.

Based on the result in Table 8, the model can now be expressed as follows:

$$\begin{aligned} \text{Logit (ADOPT)} = & -1.632 - 0.104 \text{ GENDER} + 0.132 \text{ AGE(1)} - 0.175 \text{ AGE(2)} + 0.095 \\ & \text{AGE(3)} + 0.648 \text{ AGE(4)} + 2.512 \text{ ACAS(1)} + 0.813 \text{ ACAS(2)} + 2.278 \\ & \text{ACAS(3)} + 0.496 \text{ ACAS(4)} + 0.410 \text{ ACAS(5)} + 1.864 \text{ ACAS(6)} - 0.192 \\ & \text{ACAS(7)} + 1.952 \text{ ACAS(8)} + 1.109 \text{ ACAS(9)} + 1.793 \text{ ACAS(10)} + \\ & 0.252 \text{ ACAS(11)} + 1.081 \text{ ACAS(12)} + 0.132 \text{ YEARJ(1)} - 0.175 \\ & \text{YEARJ(2)} + 0.095 \text{ YEARJ(3)} + 0.648 \text{ YEARJ(4)} + 0.744 \text{ RA} + 0.596 \\ & \text{TRIAL} \end{aligned}$$

5.0 Discussion, Recommendation and Conclusion

5.1 Discussion

The first objective of this study is to determine the extent of usage of LearningCare and Internet by the UUM lecturers. Overall, 244 respondents participated in this study, in which 59% of them are male and 41% are female. Most of the respondents (21%) were from Faculty of Accountancy, and the rest of the respondents are from Faculty of Quantitative Sciences (14%), Faculty of Information Technology (10%), Faculty of Cognitive Sciences and Education (7%), Faculty of Communications and Modern Language (7.4%), Faculty of Human and Social Development (7.8%), Faculty of Tourism, Hospitality and Environment (3%), Faculty of International Studies (3%) and Faculty of Public Management and Law(5%). Majority of the respondents (55%) are within 25-30 years old and the numbers of joining UUM is less than 5 years.

The terms “extent of usage” also further elaborate by determining respondents’s levels of participation in LearningCare and Internet. The levels are rated according to inactive, moderate and active participation.

With regards to the second objective, this study has provided an understanding of the influences on LearningCare and Internet adoption as a teaching tool among UUM lecturers. The findings from this study show that relative advantages, trialability and academic specialization have significant effect on the LearningCare and Internet adoption.

The relationship between relative advantages is positive and significant. This confirms the previous study by Martin et al. (2004) and Holcombe (2000). These findings also support the view that relative advantages are positively related to increase the rate of adoption. Thus, it can be concluded that relative advantages is a significant factor that encourage participation in the adoption of new technologies (Mehrtens et al., 2001; Kendall et al, 2001; Iacovou and Benbasat, 1995).

The study also reveals that variable trialability as one of the significant determinant in influencing the rate of adoption among lecturers. These is similar to what has been found by Martin et al. (2004) that trialability was the most significant variable towards influencing the Internet adoption as a teaching tool at foreign language school. Thus, the implication of these findings suggests that lecturers need to be given the opportunity to pre-testing the technology prior to implementation (Bennett & Bennett, 2003).

It is interesting to note that for academic specialization, lecturers from the Faculty of Accountancy, Faculty of Cognitive Sciences and Education, Faculty of Finance and Banking, Faculty of Information Technology, Faculty of Technology Management and Faculty of Quantitative Sciences have significant and positive relationship compared to those from the Faculty of Tourism, Hospitality and Environment that is used as the reference group. This is in line with previous study done by Ismail (2000), who found that place of employment, has a significant influence with Internet usage. A closer look at these findings reveal that faculty with high IT-related environment have more favourable attitudes towards the adoption of LearningCare and the Internet as teaching tool.

This study also fails to find significant relationships between gender, age and number of years in UUM. The insignificant result between age and adoption contradicts previous findings that indicated young and educated lecturers tend to use the Internet more (Oyelaran-Oyeyinka & Adeya, 2003). Nevertheless, this result concedes with Ismail (2000) who also found insignificant relationship between age and internet usage. On the other hand, the insignificant relationships between gender and number of years in UUM with adoption are consistent with Oyelaran-Oyeyinka and Adeya (2003) and Ismail (2000). In addition, Bullard (1998) has done a research on attitude towards educational technology also indicated that there was no difference between male and female university professors. One likely reason is that continuous training provided by UTLC demands lecturers to be updated and to be more flexible in using the Internet, particularly

LearningCare. Therefore, gender, age and number of years in UUM are not a factor that influences the LearningCare and Internet adoption in UUM.

5.1.1 Theoretical Implications

Earlier, the Theory of Perceived Attributes proposed by Rogers (1995) was adopted as a basis to examine the relationship of several factors related to the LearningCare and the Internet as a teaching tool among UUM lecturers. However, after conducting factor analysis, it is found that only two factors are considered in the research model that is; relative advantages and trialability. This implies that the theory proposed by Rogers (1995) is not conclusive. It is also evidenced from this study that the variables introduced by Rogers (for example observability, complexity and compatibility) are questionable in terms of their validity as latent variables. Although the process of measurement model was not conducted, this study contends that only relative advantages and trialability should be the dimension under perceived attributes of innovation.

5.1.2 Managerial Implications

The findings from this study revealed that relative advantages and trialability give an impact to adoption decision. It is recommended that UTLC and UUM Computer Centre should enhance the quality of LearningCare and at the same time consider these two factors when introducing new technologies. Nevertheless, Wild, Griggs and Downing (2002) argued that combining the characteristics of effective traditional learning with those of effective online learning will provide a rich and varied presentation environment that will satisfy individual need of users. Therefore, it is strongly recommended that

UUM lecturers fully exploit the Internet technology to make the teaching and learning process more interesting compared to the conventional method.

5.2 Limitations of the study

In this study, data were collected using on-line survey questionnaire. However, due to the low response rate, follow ups were made through personally administered email to all lecturers. It must be acknowledged that the perception on adoption decision towards LearningCare and Internet were gathered after the adoption process. Thus, the result might be influenced by post adoption experienced by the lecturers.

5.3 Recommendations for future research

This study is causal relationship studies, which is attempted to investigate the factors that may have influenced UUM lecturers to adopt LearningCare and the Internet as their teaching tool. Therefore future study may:

- i. conduct more extensive and qualitative studies to examine the extent to which the insignificant factors in this study really influence the adoption decision.
- ii. further elaborate the model where about 25 percent remained unexplained, suggesting that other factors should also be considered.
- iii. study on other Public Higher Learning Institutions that can be compared to UUM.

5.4 Conclusion

This study tested the relationship between LearningCare and Internet adoption decisions with demographic information, relative advantage, and trialability. Results showed that relative advantages, trialability and academic specialization have significant effect on LearningCare and Internet adoption, which is consistent with previous studies. This study will therefore enhance academicians' and practitioners' knowledge since there has been little research to examine factors influencing LearningCare and Internet usage as a teaching tool among lecturers.

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APPENDIX

Table A1: Level of Participation in LearningCare (Notes)

| Items | In-active | | Moderate | | Active | |
|--|-----------|------|----------|------|----------|------|
| | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % |
| <i>Gender</i> | | | | | | |
| Female | 30 | 20.8 | 30 | 20.8 | 84 | 58.4 |
| Male | 14 | 14.0 | 25 | 25.0 | 61 | 61.0 |
| <i>Age</i> | | | | | | |
| 25 - 30 years old | 19 | 14.3 | 31 | 23.3 | 83 | 62.4 |
| 31 - 35 years old | 12 | 19.7 | 14 | 22.9 | 35 | 57.4 |
| 36 - 40 years old | 6 | 25.0 | 4 | 16.7 | 14 | 58.4 |
| 41 - 45 years old | 5 | 26.3 | 4 | 21.1 | 10 | 52.7 |
| 46 - 50 years old | 2 | 28.6 | 2 | 28.6 | 3 | 42.9 |
| <i>Academic Specialization</i> | | | | | | |
| | 2 | 4.0 | 3 | 6.0 | 45 | 90.0 |
| Accountancy | 3 | 21.4 | 6 | 42.9 | 5 | 35.7 |
| Business Management | 2 | 11.8 | 6 | 35.3 | 9 | 52.9 |
| Cognitive Sciences and Education | 7 | 38.9 | 5 | 27.8 | 6 | 33.3 |
| Communication and Modern Language | 4 | 30.8 | 5 | 38.4 | 4 | 30.8 |
| Economics | 1 | 7.7 | 1 | 7.6 | 11 | 84.7 |
| Finance and Banking | 8 | 42.1 | 6 | 31.5 | 5 | 26.4 |
| Human Social and Social Development | 1 | 4.2 | 2 | 8.3 | 21 | 87.5 |
| Information Technology | 2 | 25.0 | 3 | 37.5 | 3 | 37.5 |
| International Studies | 3 | 20.0 | 1 | 6.7 | 11 | 73.3 |
| Management of Technology | 4 | 33.3 | 5 | 41.7 | 3 | 25.0 |
| Public Management and Law | 3 | 8.8 | 11 | 32.4 | 20 | 58.8 |
| Quantitative Sciences | 4 | 57.1 | 0 | 0 | 2 | 28.6 |
| Tourism, Hospitality and Environment | | | | | | |
| <i>Number of Year Joining UUM</i> | | | | | | |
| Less than 5 years | 25 | 15.3 | 40 | 24.6 | 98 | 60.2 |
| 6 – 10 years | 10 | 20.4 | 8 | 16.3 | 31 | 63.3 |
| 11 – 15 years | 7 | 25.0 | 7 | 25.0 | 14 | 50.0 |
| More than 16 years | 2 | 50.0 | 0 | 0.0 | 2 | 50.0 |

Table A-2: Level of Participation in LearningCare (Exercise)

| Items | In-active | | Moderate | | Active | |
|--|-----------|------|----------|------|----------|------|
| | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % |
| <i>Gender</i> | | | | | | |
| Female | 56 | 38.9 | 47 | 32.6 | 41 | 28.5 |
| Male | 37 | 37.0 | 41 | 41.0 | 22 | 22.0 |
| <i>Age</i> | | | | | | |
| 25 - 30 years old | 47 | 35.3 | 49 | 36.8 | 37 | 27.8 |
| 31 - 35 years old | 25 | 41.0 | 19 | 31.1 | 17 | 27.8 |
| 36 - 40 years old | 11 | 45.8 | 10 | 41.6 | 3 | 12.5 |
| 41 - 45 years old | 7 | 36.8 | 6 | 31.6 | 6 | 31.6 |
| 46 - 50 years old | 3 | 42.9 | 4 | 57.1 | 0 | 0.0 |
| <i>Academic Specialization</i> | | | | | | |
| Accountancy | 14 | 28.0 | 14 | 28.0 | 32 | 44.0 |
| Business Management | 8 | 57.1 | 4 | 28.6 | 2 | 14.3 |
| Cognitive Sciences and Education | 5 | 29.4 | 5 | 29.5 | 7 | 41.1 |
| Communication and Modern Language | 11 | 61.1 | 4 | 22.2 | 3 | 16.7 |
| Economics | 5 | 38.5 | 6 | 46.2 | 2 | 15.4 |
| Finance and Banking | 6 | 46.2 | 5 | 38.5 | 2 | 15.4 |
| Human Social and Social Development | 11 | 57.9 | 6 | 31.6 | 2 | 10.6 |
| Information Technology | 6 | 25.0 | 11 | 45.8 | 7 | 29.2 |
| International Studies | 2 | 25.0 | 5 | 62.5 | 1 | 12.5 |
| Management of Technology | 5 | 33.3 | 5 | 33.3 | 5 | 33.3 |
| Public Management and Law | 7 | 58.3 | 4 | 33.4 | 1 | 8.3 |
| Quantitative Sciences | 8 | 23.5 | 17 | 50.1 | 9 | 26.4 |
| Tourism, Hospitality and Environment | 5 | 71.4 | 2 | 28.6 | 0 | 0.0 |
| <i>Number of Year Joining UUM</i> | | | | | | |
| Less than 5 years | 61 | 37.4 | 61 | 37.5 | 41 | 25.2 |
| 6 – 10 years | 16 | 32.7 | 18 | 36.7 | 15 | 30.6 |
| 11 – 15 years | 14 | 50.0 | 9 | 32.1 | 5 | 17.8 |
| More than 16 years | 2 | 50.0 | 0 | 0.0 | 2 | 50.0 |

Table A-3: Level of Participation in LearningCare (Announcement)

| Items | In-active | | Moderate | | Active | |
|--|-----------|------|----------|------|----------|------|
| | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % |
| <i>Gender</i> | | | | | | |
| Female | 31 | 21.5 | 47 | 32.6 | 41 | 28.5 |
| Male | 19 | 17.4 | 41 | 41.0 | 22 | 22.0 |
| <i>Age</i> | | | | | | |
| 25 - 30 years old | 23 | 17.3 | 54 | 40.6 | 56 | 42.2 |
| 31 - 35 years old | 14 | 23.0 | 22 | 36.1 | 25 | 41.0 |
| 36 - 40 years old | 7 | 29.2 | 8 | 33.4 | 9 | 37.5 |
| 41 - 45 years old | 4 | 21.1 | 8 | 42.1 | 12 | 36.9 |
| 46 - 50 years old | 2 | 28.6 | 2 | 28.6 | 3 | 42.9 |
| <i>Academic Specialization</i> | | | | | | |
| Accountancy | 6 | 12.0 | 14 | 28.0 | 30 | 60.0 |
| Business Management | 4 | 28.6 | 7 | 50.0 | 3 | 21.4 |
| Cognitive Sciences and Education | 0 | 0.0 | 7 | 41.1 | 10 | 58.9 |
| Communication and Modern Language | 7 | 38.9 | 7 | 38.9 | 4 | 22.2 |
| Economics | 6 | 46.2 | 5 | 38.5 | 2 | 15.4 |
| Finance and Banking | 1 | 7.7 | 6 | 46.2 | 6 | 46.2 |
| Human Social and Social Development | 8 | 42.1 | 6 | 31.6 | 5 | 26.4 |
| Information Technology | 2 | 8.3 | 7 | 29.2 | 15 | 62.5 |
| International Studies | 1 | 12.5 | 2 | 25.0 | 5 | 62.5 |
| Management of Technology | 2 | 13.3 | 7 | 46.7 | 6 | 40.0 |
| Public Management and Law | 3 | 25.0 | 6 | 50.0 | 3 | 25.0 |
| Quantitative Sciences | 5 | 14.7 | 19 | 55.9 | 10 | 29.4 |
| Tourism, Hospitality and Environment | 5 | 71.4 | 1 | 14.3 | 1 | 14.3 |
| <i>Number of Year Joining UUM</i> | | | | | | |
| Less than 5 years | 30 | 18.4 | 65 | 39.8 | 68 | 41.7 |
| 6 – 10 years | 9 | 18.4 | 16 | 32.6 | 24 | 49.0 |
| 11 – 15 years | 9 | 32.1 | 11 | 39.3 | 8 | 28.6 |
| More than 16 years | 2 | 50.0 | 2 | 50.0 | 0 | 0 |

Table A-4: Level of Participation in LearningCare (Quizzes)

| Items | In-active | | Moderate | | Active | |
|--|-----------|-------|----------|------|----------|------|
| | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % |
| <i>Gender</i> | | | | | | |
| Female | 93 | 64.6 | 40 | 27.8 | 11 | 7.7 |
| Male | 59 | 59.0 | 27 | 27.0 | 14 | 14.0 |
| <i>Age</i> | | | | | | |
| 25 - 30 years old | 78 | 58.6 | 42 | 31.6 | 13 | 9.8 |
| 31 - 35 years old | 38 | 62.3 | 13 | 21.3 | 10 | 16.4 |
| 36 - 40 years old | 19 | 79.2 | 5 | 20.8 | 0 | 0.0 |
| 41 - 45 years old | 13 | 68.4 | 4 | 21.0 | 2 | 10.5 |
| 46 - 50 years old | 4 | 57.1 | 3 | 42.9 | 0 | 0.0 |
| <i>Academic Specialization</i> | | | | | | |
| Accountancy | 30 | 60.0 | 16 | 32.0 | 8 | 8.0 |
| Business Management | 10 | 71.4 | 43 | 21.4 | 1 | 7.1 |
| Cognitive Sciences and Education | 7 | 41.2 | 4 | 23.5 | 6 | 35.3 |
| Communication and Modern Language | 15 | 83.3 | 1 | 5.6 | 2 | 11.2 |
| Economics | 8 | 61.5 | 4 | 30.8 | 1 | 7.9 |
| Finance and Banking | 11 | 84.6 | 2 | 15.4 | 0 | 0.0 |
| Human Social and Social Development | 12 | 63.2 | 5 | 26.4 | 2 | 10.6 |
| Information Technology | 12 | 50.0 | 9 | 37.5 | 3 | 12.5 |
| International Studies | 4 | 50.0 | 3 | 37.5 | 1 | 12.5 |
| Management of Technology | 9 | 60.0 | 3 | 20.0 | 3 | 20.0 |
| Public Management and Law | 7 | 58.3 | 4 | 33.3 | 1 | 8.3 |
| Quantitative Sciences | 21 | 61.8 | 12 | 35.3 | 1 | 2.9 |
| Tourism, Hospitality and Environment | 6 | 85.7 | 1 | 14.3 | 0 | 0.0 |
| <i>Number of Year Joining UUM</i> | | | | | | |
| Less than 5 years | 104 | 63.8 | 46 | 28.3 | 13 | 7.9 |
| 6 – 10 years | 24 | 49.0 | 13 | 26.6 | 12 | 24.4 |
| 11 – 15 years | 20 | 71.4 | 8 | 28.6 | 0 | 0.0 |
| More than 16 years | 4 | 100.0 | 0 | 0.0 | 0 | 0.0 |

Table A-5: Level of Participation in Personal Website(UUM based)

| Items | In-active | | Moderate | | Active | |
|--|-----------|------|----------|------|----------|------|
| | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % |
| <i>Gender</i> | | | | | | |
| Female | 55 | 38.2 | 45 | 31.3 | 44 | 30.5 |
| Male | 33 | 33.0 | 32 | 32.0 | 35 | 35.0 |
| <i>Age</i> | | | | | | |
| 25 - 30 years old | 47 | 35.3 | 39 | 29.3 | 47 | 35.4 |
| 31 - 35 years old | 19 | 31.1 | 19 | 31.2 | 23 | 37.7 |
| 36 - 40 years old | 13 | 54.2 | 7 | 29.1 | 4 | 16.7 |
| 41 - 45 years old | 7 | 36.8 | 9 | 47.4 | 3 | 15.8 |
| 46 - 50 years old | 2 | 28.6 | 3 | 42.9 | 2 | 28.6 |
| <i>Academic Specialization</i> | | | | | | |
| Accountancy | 8 | 16.0 | 11 | 22.0 | 31 | 62.0 |
| Business Management | 6 | 42.9 | 6 | 42.8 | 2 | 14.3 |
| Cognitive Sciences and Education | 6 | 35.3 | 6 | 35.3 | 5 | 29.4 |
| Communication and Modern Language | 9 | 50.0 | 4 | 22.2 | 5 | 27.8 |
| Economics | 9 | 69.2 | 3 | 23.1 | 1 | 7.7 |
| Finance and Banking | 5 | 38.5 | 5 | 38.5 | 3 | 23.1 |
| Human Social and Social Development | 11 | 57.9 | 5 | 26.3 | 3 | 15.8 |
| Information Technology | 5 | 20.8 | 9 | 37.5 | 10 | 41.6 |
| International Studies | 4 | 50.0 | 3 | 37.5 | 1 | 12.5 |
| Management of Technology | 4 | 26.7 | 4 | 26.6 | 7 | 46.7 |
| Public Management and Law | 3 | 25.0 | 6 | 58.0 | 3 | 25.0 |
| Quantitative Sciences | 12 | 35.3 | 15 | 44.1 | 7 | 20.6 |
| Tourism, Hospitality and Environment | 6 | 85.7 | 0 | 0.0 | 1 | 4.3 |
| <i>Number of Year Joining UUM</i> | | | | | | |
| Less than 5 years | 57 | 35.0 | 53 | 32.5 | 53 | 32.5 |
| 6 – 10 years | 18 | 36.7 | 13 | 26.6 | 18 | 36.7 |
| 11 – 15 years | 11 | 39.3 | 9 | 32.1 | 8 | 28.6 |
| More than 16 years | 2 | 50.0 | 2 | 50.0 | 0 | 0.0 |

Table A-6: Level of Participation in E-mail

| Items | In-active | | Moderate | | Active | |
|--|-----------|------|----------|------|----------|-------|
| | <i>f</i> | % | <i>f</i> | % | <i>f</i> | % |
| <i>Gender</i> | | | | | | |
| Female | 17 | 11.8 | 70 | 48.6 | 57 | 39.6 |
| Male | 10 | 10.0 | 41 | 41.0 | 49 | 49.0 |
| <i>Age</i> | | | | | | |
| 25 - 30 years old | 16 | 12.0 | 60 | 45.1 | 57 | 42.8 |
| 31 - 35 years old | 5 | 8.2 | 30 | 49.2 | 28 | 45.9 |
| 36 - 40 years old | 4 | 16.7 | 10 | 41.6 | 8 | 33.3 |
| 41 - 45 years old | 2 | 10.5 | 9 | 47.3 | 10 | 52.6 |
| 46 - 50 years old | 0 | 0.0 | 2 | 28.6 | 6 | 85.7 |
| <i>Academic Specialization</i> | | | | | | |
| Accountancy | 3 | 6.0 | 28 | 56.0 | 19 | 38.0 |
| Business Management | 3 | 21.4 | 5 | 35.7 | 6 | 42.9 |
| Cognitive Sciences and Education | 1 | 5.9 | 8 | 47.0 | 8 | 47.1 |
| Communication and Modern Language | 1 | 5.6 | 7 | 38.9 | 10 | 55.5 |
| Economics | 2 | 15.4 | 8 | 60.8 | 3 | 23.1 |
| Finance and Banking | 3 | 23.1 | 5 | 38.5 | 5 | 38.5 |
| Human Social and Social Development | 2 | 10.5 | 8 | 42.2 | 9 | 47.25 |
| Information Technology | 1 | 4.2 | 10 | 41.7 | 13 | 54.2 |
| International Studies | 1 | 12.5 | 2 | 25.0 | 5 | 62.5 |
| Management of Technology | 3 | 20.0 | 3 | 20.0 | 9 | 60.0 |
| Public Management and Law | 2 | 16.7 | 4 | 33.0 | 6 | 50.0 |
| Quantitative Sciences | 4 | 11.8 | 19 | 55.9 | 11 | 32.3 |
| Tourism, Hospitality and Environment | 1 | 14.3 | 4 | 57.2 | 2 | 28.5 |
| <i>Number of Year Joining UUM</i> | | | | | | |
| Less than 5 years | 18 | 11.0 | 77 | 47.3 | 68 | 41.7 |
| 6 – 10 years | 5 | 10.2 | 20 | 40.8 | 24 | 49.0 |
| 11 – 15 years | 4 | 14.2 | 12 | 42.9 | 12 | 42.9 |
| More than 16 years | 0 | 0.0 | 2 | 50.0 | 2 | 50.0 |