# A MODEL OF E-LEARNING UPTAKE AND CONTINUED USE IN HIGHER EDUCATION INSTITUTIONS

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**ABSTRACT**

This research investigates the factors that affect a students' take-up and continued use of E-learning. A mathematical model was constructed by applying three grounded theories; Unified Theory of Acceptance and Use of Technology, Keller's ARCS model, and Expectancy Disconfirm Theory. The learning preference factor was included in the model. National culture influences the learning preference, hence national culture will also be considered in this research.

**KEYWORDS**

E-learning uptake, Continued use of E-learning, Higher Education, National Culture-Influenced Learning Preference

## 1. INTRODUCTION

Despite the high level of investment on E-learning system in many universities around the world, researchers have found a low uptake of this technology amongst students and those who do start to use the system opted out later (Liao & Lu, 2008). In order to understand how to increase the number of new E-learning users and how to sustain them to continue using the system, this research has constructed a model for the effective uptake and continued use of E-learning in Higher Education Institutions.

## 2. FACTORS INFLUENCING THE UPTAKE OF E-LEARNING

In E-learning uptake research area, most researchers ground their research in the Technology Acceptance Model (TAM) or the Unified Theory of Acceptance and Use of Technology (UTAUT). TAM highlights the importance of a user's attitude towards the system, but does not address adequately the social and resource factors. Therefore, we have adopted UTAUT as the grounded theory for this investigation.

### 2.1 Unified Theory of Acceptance and Use of Technology (UTAUT) and the Application in this Investigation

The UTAUT model asserts that an individual's uptake of new technology is driven by their intention (motivation) to take up that technology (Venkatesh, Morris, Davis, & Davis, 2003). By applying the UTAUT model, behaviour intention factor will be adopted in our proposed model, called as 'Motivation to use E-learning' factor, to capture a student's motivational level for predicting E-learning uptake. Additionally, the proposed model will have the four UTAUT factors that influence student's motivation to take up E-learning: [1] Performance expectancy (PE) is defined as the degree to which an individual student believes in the ability of an E-learning system to support them in learning activities to achieve their intended learning outcome; [2] Effort expectancy (EE) is the degree to which an individual believes that the use of that system does not require an increase in effort; [3] Social influence (SI) is the degree to which an individual expects that the use of E-learning should be encouraged by their important persons; [4] Facilitating conditions (FC) is the degree to which an individual student believes that an IT resource exists to support use of E-learning.

The factors from UTAUT model focus on technical point of view. "E-learning" has two aspects to its definition, 'learning' (referring to learning environment) and 'E' (referred to technology); the former is overlooked by researchers in the field, thus any existing model could not fully explain the uptake of E-learning (Chen, 2011). This research adds "learning motivation" to the proposed model. To identify learning motivation factors, the ARCS model has been applied.

## 2.2 Keller's ARCS Model and the Application in this Investigation

The ARCS model asserts that four major factors influence a student's learning motivation, it includes 'attention' (A), 'relevance' (R), 'confidence' (C) and 'satisfaction' (S) (Keller, 1987). Two ARCS factors will be not included in the model as E-learning uptake factor. According to Keller, attention can be promoted by arousing the learner's curiosity in what is being taught. However, this research aims to increase E-learning uptake in general; thus their attention and curiosity about a particular course is not relevant. Therefore, attention will not be integrated in our uptake model. Similarly, learning satisfaction is not included as an uptake factor. Learning satisfaction occurs when a learner takes a part in learning environment ($t_1$) and achieves their desired outcome from a course (Keller, 1987). At the initial stage ($t_0$), before a student takes up E-learning, their satisfaction with the provided course in E-learning has not manifested. The use of the remaining two ARCS factors (learning relevance and confidence) in this investigation is called 'learning preference' factor, and be defined as the degree to which an individual believes that an instructional environment in E-learning (which includes content and learning activities) is relevant to their goals, learning styles and has confidence in their past experiences about what is being learned.

# 3. FACTORS INFLUENCING THE CONTINUED USE OF E-LEARNING

A problem of high opt-out rate with E-learning was also found in much of the literature on the subject (Lee, 2010). In order to tackle this problem, Expectancy Disconfirms Theory (EDT) was utilised as a grounded theory. EDT asserts that repurchase motivation is primary influenced by a customer's satisfaction with prior use of the product (Oliver, 1980). The principle seems to be consistent with many researches in the field, which found that satisfaction with the E-learning system is a key influential factor that leads the E-learner to continue using the system (Roca, Chiu & Martínez, 2006). So satisfaction will be used as a key factor that influences a student's motivation to continue using E-learning in this investigation. In addition, Oliver claims customer satisfaction with the product is directly influenced by confirmation of their level of expectancy; discrepancy between perceived product performance and the initial expectation. This principle is supported by many researchers in this field; they assert that E-Learners will be satisfied with the E-learning system if the actual outcome is better than their initial expectation (Lee, 2010).

# 4. A PROPOSED MODEL

By applying the theories introduced earlier, a model for E-learning uptake and continued use is proposed (see Figure 1). Before a student takes up E-learning (at the time represented by $t_0$), an initial expectation is created (Oliver, 1980). From UTAUT and ARCS model, a learner has five potential expectations (belief) toward E-learning; performance expectancy ($b_1$), effort expectancy ($b_2$), social influence ($b_3$), facilitating condition ($b_4$) and learning preference ($b_5$). Thus, the 'expectation of E-learning' construct ($\sum b_i$) is added into the model to aggregate levels of belief for each expectation (uptake) factor and can be expressed as:

$$\text{Expectation of E-learning} = \sum b_i = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \\ b_5 \end{bmatrix} = \begin{bmatrix} \text{performance expectancy} \\ \text{effort expectancy} \\ \text{social influence} \\ \text{facilitating condition} \\ \text{learning preference} \end{bmatrix} \quad (1)$$

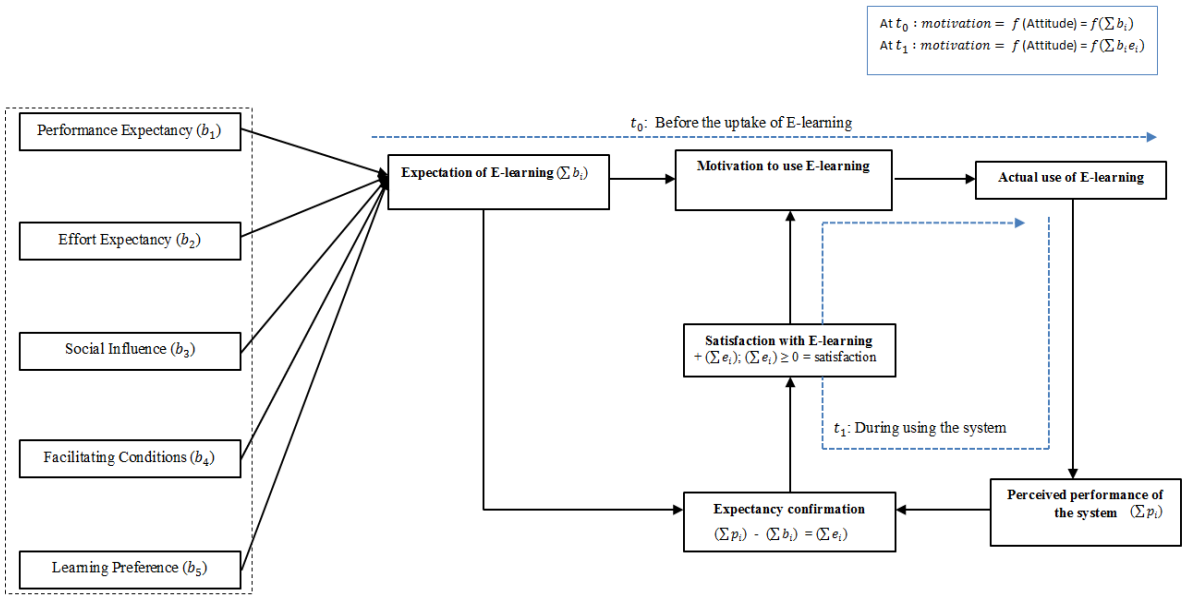


Figure 1. A model of E-learning uptake and continued use in Higher Education Institution

The learner's motivation to take up E-learning is directly influenced by their expectation towards the system and the E-learner will decide to take it up if their expectation is high; sum of beliefs is positive ($+\ \sum b_i$) (Oliver, 1980).

During the consumption period ($t_1$), perceptions of the system performance will be formed, measured by the 'perceived performance of system' factor (the expression $\sum p_i$ ). Oliver (1981) asserted that initial expectation is formed for creating a reference level that the customer uses to make a comparison with perceived product performance to determine their level of confirmation. Thus, in perceived performance of system factor, there are five factors based on each expectation, expressed as:

$$\text{Expectation of E-learning} = \sum p_i = \begin{bmatrix} p_1 \\ p_2 \\ p_3 \\ p_4 \\ p_5 \end{bmatrix} = \begin{bmatrix} \text{Perceived performance of } b_1 \\ \text{Perceived performance of } b_2 \\ \text{Perceived performance of } b_3 \\ \text{Perceived performance of } b_4 \\ \text{Perceived performance of } b_5 \end{bmatrix} \quad (2)$$

Then, the learner compares their perceived performance with their initial expectation to determine their level of expectancy confirmation. Therefore, the 'expectancy confirmation' factor ($\sum e_i$ ) was added in the model, and expressed as follows:

$$\text{Expectancy confirmation} = \sum e_i = \begin{bmatrix} e_1 \\ e_2 \\ e_3 \\ e_4 \\ e_5 \end{bmatrix} = \begin{bmatrix} p_1 \\ p_2 \\ p_3 \\ p_4 \\ p_5 \end{bmatrix} - \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ b_4 \\ b_5 \end{bmatrix} \quad (3)$$

A learner's satisfaction with E-learning is a function of their expectancy confirmation; learners are satisfied with the system if each actual performance is better than each anticipated performance. This is expressed as:

$$\text{Satisfaction with E-learning} \equiv \text{positive expectancy confirmation} \equiv +\sum e_i \quad (4)$$

Fishbein and Ajzen (1975) assert that the most immediate precursor of motivation towards specific behaviour is attitude, which is the function of personal belief (represented by expectation of E-learning factor in our model) and evaluation of outcome (represented by expectancy confirmation factor in our model). Therefore, the general equation is expressed:

$$\text{Motivation to use} = f\ (\text{Attitude}) = f(\sum b_i e_i) \quad (5)$$

By putting equations (4) into (5) and assuming that a student who takes up E-learning will have a positive belief toward E-learning, thus the motivation towards continued use can be expressed as

$$\text{Intention to use } t_1 = f\,(\text{+Attitude}) = f(\sum(+\sum b_i)(+\sum e_i)) = e_1b_1 + e_2b_2 + e_3b_3 + e_4b_4 + e_5b_5 \quad (6)$$

As can be seen from equation (6), satisfaction $(+\sum e_i)$ is a key factor for supporting E-learner to continue using the system; if E-learner does not satisfy with the system $(-\sum e_i)$ they will have nagative attitude towards system which lead them to dropt out from the system.

# 5. AN APPLICATION OF THE PROPOSED MODEL INTO HIGHER EDUCATION INSTITUTIONS IN EACH COUNTRY

The factors discussed so far have been widely validated in both eastern and western countries, and have been accepted by many researchers as influencing towards uptake and continued use of E-learning; it is likely that these factors would also be applicable to solve problems of E-learning uptake and continued use in each different country (Chen, 2011; Maldonado, Khan, Moon, & Rho, 2011). However, one factor that may differ between each other country is learning preference, which includes learner's goal and style (Tetiwat & Huff, 2003). Additionally, literature suggests that the main cause for difference in learner's learning goal and style between each country is culture (Oxford & Anderson, 1995). Therefore, in order to truly understand students' learning goal and style in each country, the National Culture-Influenced Learning Preference (NCILP) dimension was constructed in this research by reviewing the literature (see Figure 2).

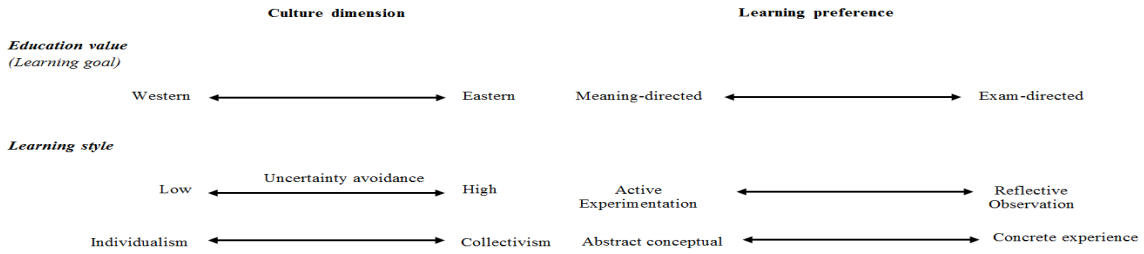


Figure 2. National culture influenced learning preference dimension

The first dimension is relationship between culture and educational value. In cross-culture educational value field, the researchers agrees that eastern and western students have different educational values; the former view education as a way to climb the social ladder (social approval) and to get a higher salary job, the latter is driven to learn by their personal interest in that subject (Biggs, 1991). In order to be approved by the people society (e.g. parent, peers) and obtain a good job, Eastern students are highly motivated to obtain high grades and a university degree. Therefore, students in these countries are exam-directed learners. In contrast, as can be seen from the figure, in Western countries, students are meaning-directed learners, and study is more a result of personal interest (Eaves, 2009).

The second and third dimensions explain the relationship between culture and learning styles. It was constructed by using Hofstede's four cultural dimensions and Kolb Learning Style. Upon the review of literature on differences between the cross-culture of learning styles, the results of all research in this area confirm that if an individual has a reflective observation style, this strongly indicates that they are from a culture that has high uncertainty avoidance, while people who scored high in active experimentation have low uncertainty avoidance (Joy & Kolb, 2009; Yamazaki, 2005). In a culture that has high uncertainty avoidance, people fear failure and prefer tasks with a definite outcome and clear guidelines, thus students in this society are more comfortable in a lecture that is a structured learning situation, more than a scientific method with trial and error process (active experimentation) (Joy & Kolb, 2009). The 'concrete experience' style of learning has also been confirmed by Yamazaki (2005) and Joy & Kolb (2009) to be higher in a collectivist culture. People in collectivist cultures are interdependent, and students will rely on others to help them learn (social learning) rather than by a self-contained 'abstract conceptualisation' style of learning.

NCILP dimension help universities in each country to understand their student's learning motivation, which can be used for constructing learning environment in E-learning to be responsive to their student's learning motivation need. However, only focusing on learning motivation is not enough. As E-learning is a piece of technology; students will not take up this technology if they do not accept it. Thus, the technology motivation is also needs to be considered by the university. The literature review found four factors; 1) PE: E-learning in the university has to support students to learn better (fast and higher performance) than other possible way of learning; 2) EE: the system design suits the student's level of IT skills; 3) SI: the student will take up the system if their significant others (e.g. parents, teachers and peers) encourage them to use; and 4) FC: necessary IT resources (ex. computer and internet) need to be provided. As can be seen from the proposed model, by achieving these mentioned conditions, not only will university students take up E-learning, they will continue to use the system. This is because the Expectancy Disconfirm Theory (EDT) asserts that people will continue using the service if their expectations are met (Oliver, 1980).

## 6. CONCLUSION

The main purpose of this research was to construct a model of effective uptake and continued use of E-learning in Higher Education. The model from this research will fill in the gap left by other researchers by adding "learning motivation" to the model. Moreover, the emphasis on cross-national application of the model; differences between cultural aspects will be addressed to ascertain their influence on particular students' learning styles and goals. In order to complete the answer to these research questions, future work will focus on validation using triangulation; including investigator and methodological triangulation.

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