

# **An Integration of Expectation-Confirmation and Commitment Model for Mobile Learning Systems**

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## **Abstract**

With the proliferation and popularity of mobile phones, mobile learning has become an integral part of higher education. However, intention to continue using mobile technology in educational context has not been extensively researched. In this paper, we integrate commitment into the expectation confirmation model and use it to examine students' intention to continue using an interactive mobile learning system in learning. The findings indicate that confirmation, perceived usefulness and satisfaction are important factors to motivate students continuously adopting mobile learning system.

## **Keywords**

Mobile Learning, Expectation-Confirmation and Commitment Model, Teaching and Learning, Higher Education, Continue Intention to Use.

## **Introduction**

The increasing penetration of mobile learning in higher education has made student learning activities more lively, interactive and collaborative and thus students' academic performance is improved. In order to achieve the long-term educational benefits of mobile learning, it is important to investigate students' intention to continue using mobile technology in the teaching and learning activities. The intention to adopt mobile learning does not only depend on the perceived benefits of the system (e.g. perceived usefulness, perceived ease of use), but also rely on the students' voluntary decision making process. When an individual performs a behavior, commitment is an essential element in building a long-term relationship with the product or service (Morgan & Hunt, 1994). It is believed that the positive long-term impact of mobile learning is resulted from high level of students' commitment. However, studies about the role of commitment in affecting continuance intention to use mobile learning are rare. To justify the claims that we have made in this regard, we synthesize continuance theory and commitment-trust theory to integrate commitment to predict students' continuance intention to use mobile learning in university teaching and learning activities. This study aims to answer two research questions: (1) what is the influence of commitment to predict students' intention to continue using mobile learning in education? (2) what are the relationships among the constructs in the expectation-confirmation and commitment model?

## **Theory and Hypotheses**

### ***Behavioral Intention of Mobile Learning Adoption***

There is a growing body of studies focused on the development of conceptual models to explain students' behavioral intention to use mobile learning to achieve educational learning outcomes. Among the

variables studied in the previous literature, a majority of studies have applied technology acceptance model (TAM) and unified theory of acceptance and usage technology (UTAUT) to investigate the main factors leading to the intention of mobile learning adoption (Karimi, 2016). Despite of the research effort over the past years, discussions on student engagement in mobile learning to achieve long-lasting educational impact are limited. We argue that student commitment to learn in using mobile technology contributes to the success of effective mobile learning initiatives.

### ***Expectation-Confirmation Theory***

Expectation-confirmation theory (ECT) is a theoretical base for expectation-confirmation model (ECM) which is widely used to elucidate user continuance behavior in using information system (IS) at post-acceptance stage (Bhattacharjee, 2001b). Within the context of IS technology adoption in mobile learning, continuance intention refers to students' behavioral intention to continue using mobile learning after the first time use. Students form an initial expectation about the use of IS, then they form perceptions about its performance after a period of initial consumption. The perceived performance of the mobile learning system is assessed by students' level of satisfaction. Satisfaction is a fundamental prerequisite to influence continuance intention of the system (Oliver, 1993). The level of satisfaction is determined by both confirmation and post-adoption expectations (perceived usefulness) regarding the experience of use. Satisfaction is the evaluation of the direct experience in using mobile learning system. If the students are satisfied with the use of mobile learning, they are more likely to continue using the system to achieve learning outcomes. Therefore, we propose that:

Hypothesis 1: Satisfaction has a positive influence on continuance intention of mobile learning

As originated from technology acceptance model (TAM), the perceived usefulness of mobile learning is defined as the degree to which the students believe that using mobile learning would improve his or her task performance (Davis, Bagozzi, & Warshaw, 1989). Perceived usefulness often creates a significant impact on user's satisfaction and continued intention to use IS (Sun & Mouakket, 2015). In general, post-adoption studies find perceived ease of use not to be a significant driver of IS continuance (Bhattacharjee, 2001b). It is arguable that this factor loses its importance over time, when users become familiar with the system. Therefore, perceived ease of use is omitted in this study. An effective mobile learning system does not only create an interactive platform to enrich students' learning experience, but also enhance the knowledge that they have learnt from the classes. Thus, it stands to a reason that higher level of perceived usefulness provides adequate expectation in affecting students' satisfaction and continuance intention of mobile learning. Based on these, the following hypotheses are proposed:

Hypothesis 2: Perceived usefulness has a positive influence on satisfaction with mobile learning

Hypothesis 3: Perceived usefulness has a positive influence on continuance intention of mobile learning

Confirmation is defined as the user's realization of the expected benefits of using the system (Bhattacharjee, 2001b). The confirmation of expectations indicates the discrepancies (confirmation level) between pre-adoption expectations and actual performance of the system. Students obtain the expected benefits (positive confirmation), contributing to the positive influence on satisfaction level with the use of mobile learning. Apart from this, expectation serves as a reference level for students to judge the experience in using mobile learning system. A high confirmation of expectations is more likely to increase students' level of satisfaction. Taking confirmation level as a reference point, the perceived usefulness of mobile learning would positively affect students' level of satisfaction with the use of mobile learning. Following this logic, we propose that:

Hypothesis 4: Confirmation has a positive influence on satisfaction with mobile learning

Hypothesis 5: Confirmation of expectations has a positive influence on perceived usefulness of mobile learning

### ***Commitment-Trust Theory***

In marketing literature, commitment-trust theory states that commitment is an important element in building and maintain a valued long-term relationship between two parties in a relational exchange (Morgan & Hunt, 1994). The nature of the long-term relationship is similar to students' continuance intention to use mobile learning. Student's level of satisfaction in a long run affects the formation of commitment between the students and the mobile learning system. This mirrors the concepts discussed in

the organizational behavior studies where commitment is viewed as a binding force that frames an employee’s mind-set to perform a behavioral action (i.e. continue to work for a company) (Meyer & Herscovitch, 2001). Support is given to employ organizational commitment to enrich the understanding of customer commitment in building relationship (Fullerton, 2005). Researchers stated that commitment is a complex construct contains at least two distinct dimensions - an affective commitment and a continuance commitment (Allen & Meyer, 1990). Commitment affects students’ intention to use mobile learning because they want to (affective commitment) and need to (continuance commitment). The affective part corresponds to the emotion of an individual whereas the continuance part concerns more with the economic benefit (Evanschitzky, Iyer, Plassmann, Niessing, & Meffert, 2006). In order to label the constructs clearly, following the suggestions made in marketing studies, we refer calculative commitment as continuance commitment in examining behavioral intention of students (Li, Browne, & Chau, 2006).

Within the educational context, commitment reveals the psychological attachment between students and the mobile learning system that make them continue to use the system in voluntary context. Affective commitment enables students to develop favorable attitude and engagement in using mobile learning in a long run. In terms of calculative commitment, students recognize the perceived cost of stop using mobile learning and perceive that the alternatives are poor. Therefore, it increases students’ continuance intention to use mobile learning to achieve learning outcomes in order to minimize the potential loss. Previous studies has put forward that customers’ level of satisfaction affects the formation of commitment in marketing perspective (Hashim & Tan, 2015). Both affective commitment and calculative commitment are important factors leading to satisfied with the use of mobile learning, it is more likely to develop emotional attachment towards mobile learning to support education. We argue that students with commitment to use mobile learning would result in higher level of continuance intention. In other words, students utilize the benefits of mobile learning in a long-run. Therefore, the following commitment-related hypotheses are proposed:

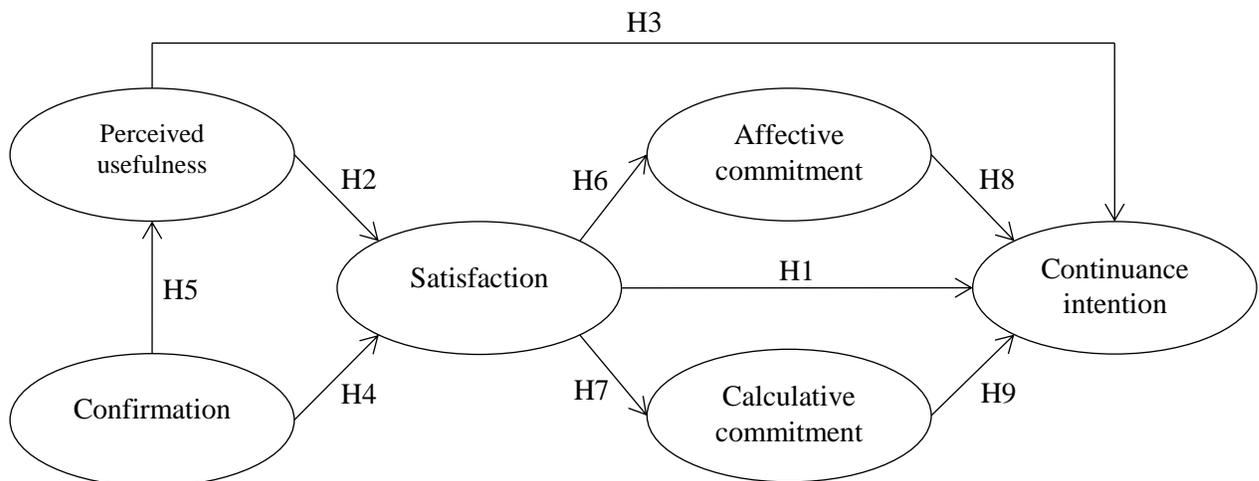
Hypothesis 6: Satisfaction has a positive influence on affective commitment in mobile learning

Hypothesis 7: Satisfaction has a positive influence on calculative commitment in mobile learning

Hypothesis 8: Affective commitment has a positive influence on continuance intention of mobile learning

Hypothesis 9: Calculative commitment has a positive influence on continuance intention of mobile learning

Figure 1 presents the theoretical model of the present study.



**Figure 1. Proposed Conceptual Model**

## Data Collection and Data Analysis

In this study, a questionnaire was developed to measure the research variables affecting the behavior intention to use mobile learning. All the scales were adapted from extant literature with some modifications to meet the research purpose. Perceived usefulness was taken from the 4-item scale in Bhattacharjee (2001b) and Davis (1989). Both affective commitment and calculative commitment were assessed by the relevant constructs with the highest factor loadings initially in Allen and Meyer (1990). Previous studies supported that commitment-related items were reliable and valid (Li, Browne, & Chau, 2006). The scales of confirmation, satisfaction and continuance intention were based on the scale in Bhattacharjee (2001a) and Bhattacharjee (2001b).

Data were collected from students who adopted the mobile learning system within a semester period at a university in Hong Kong. The mobile learning system referred in this research is developed by the first author and is different from various student response systems available in the market. This system features a two-way response function, that is, by using the mobile devices, students provide an online response to the teacher and then the teacher provides feedback to students based on the analyzed results. Among the 357 returned questionnaires, 330 responses were usable. The sample consists of 64% of female students and 36% male students. The respondents are undergraduate students majoring in Marketing, Management and Logistics. Half of the respondents (50%) are aged between 21 and 30. For the open-ended questions, most students indicated that they found the learning device useful, interactive, efficient and convenient. They agreed that the mobile learning system can enhance the concentration of students in the class.

In analyzing the data, the proposed measurement model was initially assessed by confirmatory factor analysis (CFA) and common method variance with the six latent constructs. We then used structural equation modelling (SEM) to test the hypothesized relationship paths.

## Results

Based on the hypothesis testing results (Table 1), all the hypotheses are supported except hypothesis 9. The squared multiple correlation coefficient ( $R^2$ ) for continuance intention is 0.78, which indicates that 78% of the total variance in continuance intention can be explained by perceived usefulness, confirmation, satisfaction, affective commitment and calculative commitment.

Hypothesized path				Estimate	SE	CR	P	
H1	Satisfaction	→	Continuance intention	0.569	0.078	6.730	***	Supported
H2	Perceived usefulness	→	Satisfaction	0.272	0.049	4.630	***	Supported
H3	Perceived usefulness	→	Continuance intention	0.145	0.050	2.248	*	Supported
H4	Confirmation	→	Satisfaction	0.673	0.060	10.543	***	Supported
H5	Confirmation	→	Perceived usefulness	0.785	0.055	16.340	***	Supported
H6	Satisfaction	→	Affective commitment	0.709	0.059	13.078	***	Supported
H7	Satisfaction	→	Calculative commitment	0.276	0.078	4.653	***	Supported
H8	Affective commitment	→	Continuance intention	0.249	0.047	4.477	***	Supported
H9	Calculative commitment	→	Continuance intention	0.001	0.025	.030	ns	Rejected

Note: SE=standard error; CR=critical ratio; P=p value, \* p<0.05; \*\* p<0.005; \*\*\*p<0.001; ns=not significant

**Table 1. Results of Hypothesis Testing**

## Conclusions

To maximize the benefits of mobile learning in education, it is crucial to make students engaged in mobile learning continuously. Grounded on the expectation-confirmation theory and commitment-trust theory, the findings of the present study reveal that confirmation, perceived usefulness and satisfaction are significant important factors affecting students' intention to continue using mobile learning to enhance learning experience and improve academic performance. The results are consistent with previous studies (Bhattacharjee, 2001b). Commitment is significantly affected by level of satisfaction in using mobile learning. Affective commitment is found to have a strong impact on students' continuance intention of mobile learning adoption. On the contrary, the conceptual model indicates that taking student commitment into account, the influence of perceived usefulness becomes less important in affecting students to continue using mobile learning to support their learning. In today's digital age, mobile learning has transformed the educational landscapes. Perceived usefulness and satisfaction are no longer enough to explain students' behavioral intention to adopt mobile learning to achieve educational outcomes. Thus, it is suggested that researchers should pay more attention to students' intrinsic factors influencing their continuance intention to adopt mobile learning in long-term perspective.

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