

# An Investigation of Factors Affecting Instructors' Usage of E-Learning Systems at the University of the West Indies

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**Abstract-** This study seeks to explore the factors that determine the level of instructors' acceptance of the e-learning platform at the University of the West Indies (UWI), St. Augustine Campus. The Unified Theory of Acceptance and Use of Technology (UTAUT) model was used to evaluate responses from over 600 instructors. Four important factors, i.e. subjective norms, facilitating conditions, perceived usefulness and perceived ease of use were core to the UTAUT model. After using exploratory factor analysis and structural equation modelling three of the four factors emerged as significant; facilitating conditions, perceived ease of use and perceived usefulness.

## I. INTRODUCTION

The University of the West Indies (UWI) was founded in Jamaica in 1948 as a division of The University of London. Over the last six decades UWI has grown to three physical campuses in Jamaica (Mona), Barbados (Cave Hill) and Trinidad (St. Augustine) as well as a virtual Open Campus. Together these four campuses serve the English speaking Caribbean with an enrolment of 47,000 as of the 2011/2012 academic year [1].

Over the last decade, UWI St. Augustine has adopted information and communication technologies to support various blended eLearning initiatives. The first system was based on Web CT and this was upgraded in 2005/2006 [2] to myeLearning based on the Moodle content management system. As of January 1<sup>st</sup>, 2014, Campus IT Services, listed 662 active myeLearning courses [2], up from 393 in 2005 [3]. Despite this growth, the number of active myeLearning courses accounts for a relatively small proportion of the over 2,000 courses offered by the campus each year.

This paper examines the instructors' acceptance of the myeLearning system and is, as far as we know, one of the few studies focusing on technology acceptance amongst instructors in the region.

The objectives of this study are:

- a) To clearly identify critical factors affecting UWI instructors' acceptance to e-learning in context of higher education.
- b) To examine the viability the Unified Theory of Acceptance and Use of Technology model (UTAUT) to measure instructors' technology acceptance at the UWI, St Augustine Campus.
- c) To identify gaps that may inhibit the full utilization of the present e-learning system at the UWI and to propose possible recommendations that may help diminish these gaps.

The sections that follow include the literature review, methodology, findings and recommendations.

## II. LITERATURE REVIEW

E-learning refers to “the use of internet technologies to deliver a broad array of solutions that enhances knowledge and performance” [4]. It relies on ICT based tools (e.g. internet, computers, telephones, radio, video, and others) and content created with technology (e.g. animations) to support teaching and learning activities [5].

One of most popular types of e-learning is blended learning. Blended learning is defined as “face-to-face oral communication and online written communication optimally integrated such that the strengths of each are blended into a unique learning experience congruent with the context and intended educational purpose” [6].

According to [7] over 90% of universities and colleges in United States and about “95% of the same institutions in United Kingdom have adopted E-learning systems for students and faculties” [8].

Despite the rapid uptake, many instructors lack the knowledge and ability to integrate the technologies into their teaching practices [9] [10]. According [11] many universities’ problem lie with instructors, who over the years have become accustomed to the teacher-centered approach of face to face tutorials, lectures and mentoring. As a result, “Classroom users of potentially powerful information technologies are seen too often to take the reduced form of mindless activities that do little to alter the expectations, assumptions, and practices of higher education teaching” [12].

This has often led to a learning transfer misalignment which creates a gap in the outcome of e-learning systems at many universities because “ICT implementation often takes place without a theory and many institutions do not spread any resources on trying to understand what kind of changes ICT and computers bring to their systems; they just follow the new trend, casting doubts on the success and effectiveness of such initiatives” [13].

## III. THE PROPOSED MODEL AND ASSOCIATED HYPOTHESES

In order to study instructors’ use of the myE-learning system at the St. Augustine campus we used a model based on a combination of e-learning acceptance model (ELAM) [5], the Unified Theory of Acceptance and Use of Technology [14] and the venerable Technology Acceptance Model [15].

The proposed model contains four (4) core constructs which are performance expectancy (PE), effort expectancy (EE), subjective influence (SI) and facilitating conditions (FC).

PE is defined as the “degree to which an individual believes that using a system will help him or her to attain gains in job performance” [14]. Under PE, Perceived Usefulness (PU) is defined as “the extent to which a user believes that utilizing a certain system would influence his/her job performance and productivity positively” [15]. As such we propose that;

*H<sub>1</sub>: Perceived usefulness affects instructors’ attitude towards using e-learning systems at the UWI.*

EE is the “degree of ease associated with the use of the system” [14]. Under EE, Perceived Ease of Use (PEOU) is defined as “the extent to which people believe that using certain systems would be effortless” [15]. It is assumed that if the instructors’ perceptions about using a system are perceived to be relatively unproblematic to operate then there is a great likelihood that the instructor will use the system. Consequently;

*H<sub>2</sub>: Perceived ease of use affects instructors’ attitude towards using e-learning systems at the UWI*

In TAM [15], PEOU is often observed as directly influencing PU. Thus

*H<sub>3</sub>: Perceived ease of use affects perceived usefulness of e-learning systems at the UWI.*

SI and is defined as “the degree to which an individual perceives that important others believe he/she should use the new system”. Under SI, Subjective Norms (SN) are defined as “a person’s perspective that most people who are important to him think he should or should not perform the behaviour in question” [15]

H<sub>4</sub>. *The influence of Subjective Norms affects instructors’ attitude towards using e-learning systems at the UWI.*

Attitude (ATT) is centered on the belief that a person will only perform a behaviour if it is believed to have a positive outcome. Therefore;

H<sub>5</sub>. *Attitude will positively affect instructors’ intention to use e-learning systems at the UWI.*

Behavioural intention is users’ decision, willingness or expectation to perform certain actions. ITU\_BI is “an indication of how hard people are willing to try and of how much an effort they are planning to exert, in order to perform the behaviour” [16]. It is assumed that PE, EE and SI will have a significant effect on instructors’ behavioural intentions to use e-learning systems.

H<sub>6</sub>. *Behavioural intention to use will affect instructors’ actual use of an e-learning system at UWI.*

Facilitating conditions are conditions that an individual cannot influence or change immediately and it is defines as “the degree to which an individual believes that an organization and technical support/ infrastructure exist to support use of the system” [14]. FC consists of ICT infrastructure, institutional policies, training and support, and leadership [5]

H<sub>7</sub>. *Facilitating conditions will affect instructors’ actual use of e-learning systems at UWI*

The actual usage is the end result that follows behavioural intention to use and can only occur when the individual’s intention is enforced and internalized, resulting in the performance of a desired action.

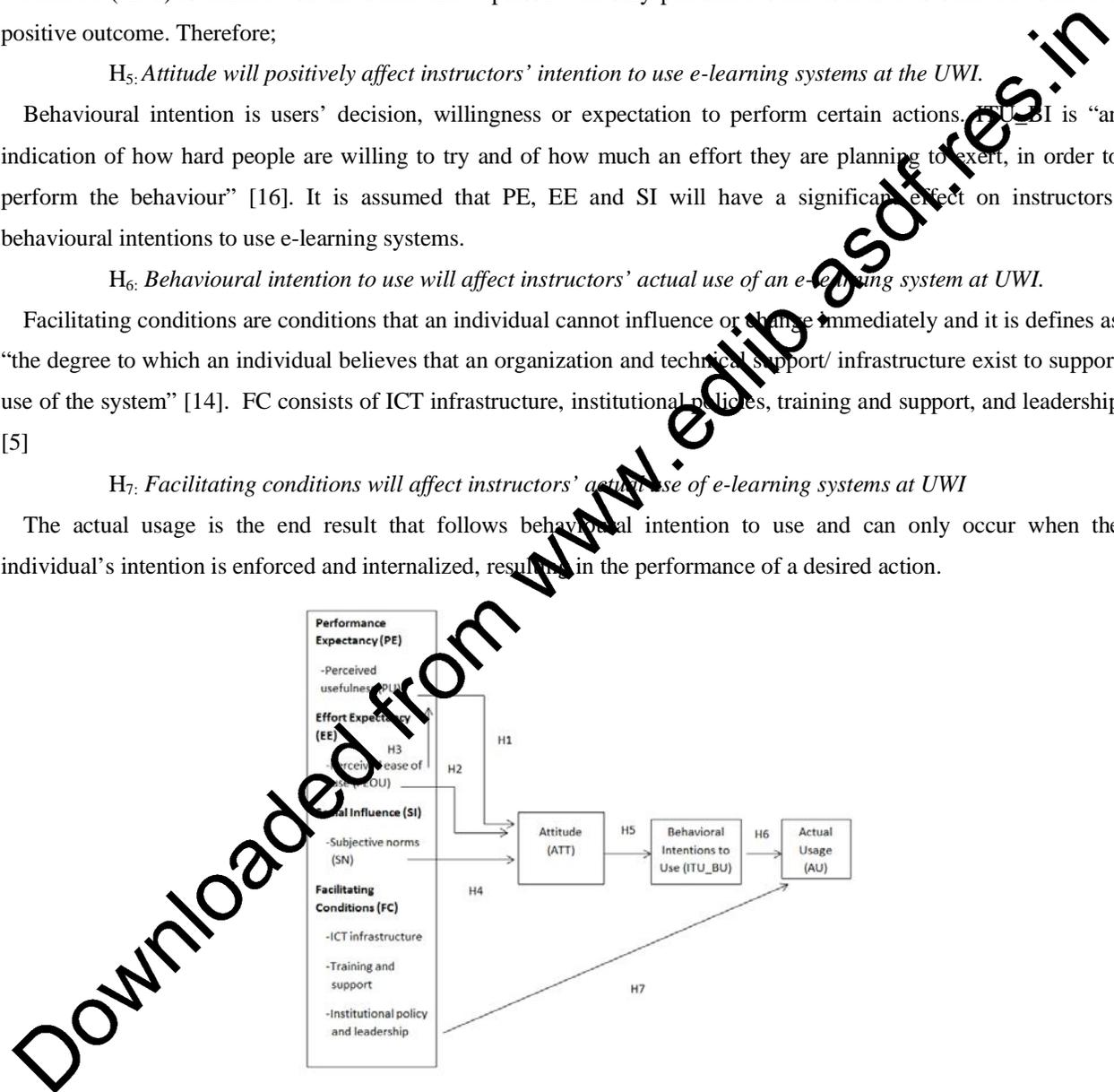


Figure 1: Proposed Model

#### IV. METHODOLOGY

The sample elements in this study targeted 635 full time and part time senior lecturers, lecturers, assistant lecturers and professors across all five faculties of the St. Augustine campus. Invitations were emailed to all instructors in the above categories. Each email contained a unique hyperlink to an online questionnaire hosted at Survey Monkey.

The instrument consisted of 36 Likert questions and one open ended question soliciting general feedback and perceptions. This method of data collection was cost effective given the instructors' geographic dispersion across the campus and diverse teaching schedules. Of the 635 instructors contacted, 126 completed the questionnaire giving a response rate of 20%.

## V. DATA ANALYSIS

The data collected was imported into SPSS version 15 and factors that contained at least 5 to 8 factor loadings per construct were subsequently reduced, through the use of Exploratory Factor Analysis to 4 of the highest factor loadings per construct. Structural Equation Modelling (SEM) was then used to assess the path diagram and convert it into a graphical and structural path diagram.

## VI. RESULTS

Normality testing was conducted to ensure that the variables contained in the data set were fairly normally distributed. In all cases, the mean in the data set ranged between 3 and 5 with majority of responses favouring the mid-section while the standard deviation was 1 and lower in most cases indicating that there is a low deviation from the norm and consistent with a normal distribution

The cronbach alpha for the data set was computed at .931 well above the 0.7 threshold and suggests there is very high internal consistency [17].

TABLE 1  
RELIABILITY STATISTICS

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.931	.936	35

The measurement model was examined using exploratory factor analysis followed by an assessment of scale reliability and convergent validity using SPSS.

Table 2 shows the summarized table of questions and total variance for each variable. All variables are tested with the use of questions that are designed to collect specific information about the tested variable.

TABLE 2  
QUESTIONS DROPPED AFTER FACTOR ANALYSIS

Item	Item name	Total Variance Explained
<b>Perceived usefulness</b>		69.58%
PU1	Kept	
PU2	Kept	
PU3	Kept	
PU4	Kept	
PU5	Kept	
PU6	Kept	
PU7	Kept	
PU8	Dropped	

TABLE 2  
QUESTIONS DROPPED AFTER FACTOR ANALYSIS (CONTINUED)

Perceived Ease of Use		
PEOU1	Kept	68.86%
PEOU2	Kept	
PEOU3	Kept	
PEOU4	Kept	
PEOU5	Dropped	
PEOU6	Kept	
Attitude		
ATT1	Kept	65.14%
ATT2	Kept	
ATT3	Kept	
Subjective Norm		
SN1	Kept	65.86%
SN2	Dropped	
SN3	Kept	
SN4	Dropped	
SN5	Kept	
Intention to Use		
ITU1	Kept	88.94%
ITU2	Kept	
ITU3	Kept	
Facilitating Condition		
FC1	Kept	60.68%
FC2	Dropped	
FC3	Dropped	
FC4	Kept	
FC5	Kept	
FC6	Kept	
FC7	Dropped	
FC8	Dropped	
Actual Use		
AU1	Kept	96.33%
AU2	Kept	
AU3	Kept	

Structural equation modelling was used to refine the proposed model and test the model fit. After several iterations the following model yielded the best fit.

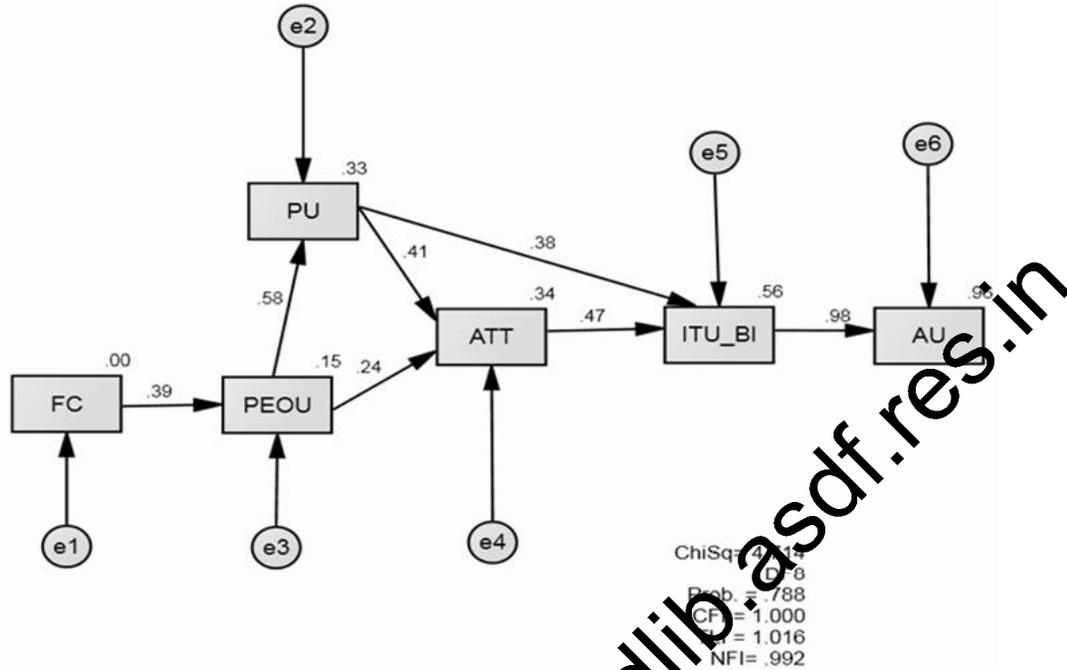


Figure 2. Revised Model

The revised model showed relationship patterns similar to the Technology Acceptance Model [15]. This technology acceptance model has been a mainstream model for many years after being thoroughly examined and continually validated through numerous studies, the converse is said to be true for the novel UTAUT model.

Generally, the revised model fulfilled all the criteria when examined and all fit indices (CFI 1.000, TLI 1.016, and NFI .992) were at the acceptable level of 0.90 or above. All factors except SN were statistically relevant and retained for the revised model. The probability was approximately 0.8, significantly above the acceptable level of 0.5 or above.

Table 3 depicts the hypothesis change for both the a priori expectation of the proposed model and the a posteriori results of the revised model.

TABLE 3  
REVISED HYPOTHESES

A Priori Expectations: The Proposed Model		A Posterior Results: The Revised Model	
Proposed Hypotheses	Status	Revised Hypotheses	Status
<i>H1: Perceived usefulness</i> positively affects instructors' <b>attitude</b> towards using e-learning systems at the UWI	Transferred: path relationship merged into the revised model	<i>H1: Facilitating conditions</i> positively affect <b>Perceived ease of use</b> of e-learning systems at UWI	New path relationship found: supported: good fit
<i>H2: Perceived ease of use</i> positively affects instructors' <b>attitude</b> towards using e-learning systems at the UWI	Transferred: path relationship merged into the revised model	<i>H2: Perceived ease of use</i> positively affects <b>perceived usefulness</b> of e-learning systems at UWI	Accepted from old proposed model: supported (H2)
<i>H3: Perceived ease of use</i> positively affects <b>perceived usefulness</b> of e-learning systems at the UWI	Transferred: path relationship merged into the revised model	<i>H3: Perceived ease of use</i> positively affects instructors' <b>attitude</b> towards the use of e-learning systems at the UWI	Accepted from old proposed model: supported (H2)
<i>H4: The influence of Subjective Norms</i> positively affects instructors' <b>attitude</b> towards using e-learning systems at the UWI.	Rejected- no path relationship found, dropped from the proposed model	<i>H4: Perceived usefulness</i> positively affects instructors' <b>attitude</b> towards the use of e-learning systems at the UWI	Accepted from old proposed model: supported (H1)
<i>H5: Attitude</i> will positively affect instructors' <b>behavioural intention to use</b> e-learning systems at the UWI.	Transferred: path relationship merged into the revised model	<i>H5: Perceived usefulness</i> positively affects instructors' <b>behavioural intention to use</b> an e-learning system	New path relationship found: supported: good fit
<i>H6: Behavioural intention to use</i> will positively affect instructors' <b>actual use</b> of an e-learning system at UWI.	Transferred: path relationship merged into the revised model	<i>H6: Attitude</i> will positively affect instructors' <b>behavioural intention to use</b> e-learning systems at the UWI.	Accepted from old proposed model: supported (H5)
<i>H7: Facilitating conditions</i> will positively affect instructors' <b>actual use</b> of eLearning systems at UWI	Rejected- no path relationship found, dropped from the proposed model	<i>H7: Behavioural intentions to use</i> will positively affect instructors' <b>actual use</b> of e-learning systems	Accepted from old proposed model: supported(H6)
		<b>* Subjective Norms</b>	Dropped

## VII. RECOMMENDATIONS

While the model exhibits a reasonably good fit and most of the hypotheses are supported, many lecturers still do not use myeLearning, and many that do, use it only for posting course outlines and class schedules. In the open ended question, many complained about a poor user interface, lack of support, slow networks and the difficulty of integrating multimedia.

In order to make the best use of the technology and to increase usage and effectiveness, UWI St. Augustine should consider adopting the following recommendations.

1. Consider implementing a dedicated e-learning department in each faculty to can help instructors integrate all the components of e-learning.
2. Create incentive schemes that encourage instructors to incorporate eLearning technologies where appropriate as well as to reward innovations and best practices.
3. Encourage early adopters and experienced to share their experiences as well as to mentor new or reluctant staff members.
4. Introduce a system of continuous monitoring and benchmarking vis-à-vis acknowledged leaders so as to benefit from advances in best practice and to avoid unnecessary mistakes.

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