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An Analysis of Students' Perceptions and Attitudes to Online Learning Use in Higher Education in Jamaica: An Extension of TAM

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[Research in progress]

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Abstract

The research presents preliminary work on the perception of students to the use of an e-learning system in a top Jamaican University. E-learning, defined as the act, process or experience of gaining knowledge or skill through the delivery of lessons and instructions via the Internet, has grown as key method in education management over the last couple of decades. Studies have shown that significant investments in this technology are made by Universities yet the full benefits expected have not been realized due to issues and challenges experienced by both learners and instructors in adopting and effectively using e-learning. Our investigation revealed that while this University has not officially launched its e-learning systems it has been available for over five years where instructors across faculties have implemented their classroom with varying results. The study extend the original TAM model to include several other constructs such as faculty encouragement, university climate and access to computers as basis to understand perceived usefulness and perceived ease of use of the university's current e-learning system. The study offers both research and practical significance as it is argued that within the developing contexts these variables are importance in understanding as institutions make the transitions to different modes of e-learning. Additionally, while there is growing literature on e-learning, little or no research is done within the context of the English-speaking Caribbean and it is imperative that technology adoption studies are specifically designed to fit the unique contextual settings, such as Jamaica.

Keywords: education, ICT4D, TAM, technology adoption, online e-learning, Jamaica, Caribbean

Introduction

The proliferation of access and use of information communication technologies (ICTs) have had a positive impact on education delivery strategies. Across the globe, schools and universities have extended their delivery modes to include fully online, and blended to support the traditional face-to-face approach. Studies have shown that e-learning has emerged as a new paradigm of modern education (Sun, et al., 2008; Martins & Kellermanns, 2004). This evolution has not only occurred in the education sector, many organizations have also adopted technology-based classroom instructions to enhance learning and knowledge development (Yoo, et al, 2012). This new approach to teaching and learning has taken root in developing economies despite the digital gaps. An analysis of the higher education landscape in Jamaica revealed that the top local universities have made significant investments in e-learning in an effort to harness its benefits. Some of the key benefits include improved flexibility in education delivery, improved focus on learner centeredness, greater access to knowledge, improved archival capability of knowledge and general improvements in knowledge management, and potential for increased global audience (Zhang, et al., 2004). As a result, there is a growing emphasis by these local universities to increase the number blended and fully online modules and courses.

Despite the benefits of e-learning, there are several barriers to the effective integration of e-learning in higher education. Our analysis underlined that key considerations and analysis of change management on business processes, stakeholders' impact (e.g. teachers, administrators, and students), clear and consistent business strategies are imperative to successful e-learning delivery and management. Studies have highlighted these challenges and failures, for example there is evidence of failures due to high cost of technology, insufficient supportive processes, competition and absence of clear business strategy (Ellouni, 2004); difficulties in acceptance and adoption of courses (Saadé, 2003). Low adoption and success rates may be attributable to increased instructors' involvement and time, increased preparation time for the instructor, low comfort levels for users, potentially more frustration, anxiety, and confusion for users (Zhang, et al., 2004). Closer analysis shows that these are predominant issues that impact technology-based projects delivery and management (Barclay, 2008), and can be broadly categorized into challenges from improper project and process management.

The context of the study involves the exploration of e-Learning at a Caribbean tertiary institution is well suited for while there has been e-Learning studies that focused on other regions (e.g. Al-Harbi, 2011; Yoo et al., 2012; Martins & Kellermanns, 2004; Williams & Willams, 2008), there is little or no published IS academic research that provides detailed theoretical and empirical analysis of e-Learning in local tertiary institutions of the English-speaking Caribbean. Therefore, there is the need for rigorous analysis, given e-

learning options may appear to be attractive to policy-makers and decision makers in resource constrained regions such as the small island states (SIS) of the English-speaking Caribbean.

Research problem

The challenges experienced in e-learning implementation and management underline the urgent need to find solutions that suit specific contexts. The significant investments in e-learning have made user acceptance an increasingly critical issue for technology implementation and management (Ong, et al., 2004). With the increased reliance on information systems in the classrooms, and to other sectors of the economy, identifying factors that impact successful adoption and use is important (Yi & Hwang, 2003). This becomes even more critical for developing economies that are faced with other challenges and constraints in resources that can hinder success. Little is known about user's online learning experience (Sun, et al., 2008) therefore opportunities to investigate and better understand users' online learning experience and their overall perceptions. Assessment of students' behavior in the developing contexts is needed yet limited studies have investigated the underexplored region of the English-speaking Caribbean. Developing countries are still challenged by digital gaps in households and in educational institution (Barclay & Osei-Bryson, 2012) and this will likely impact access to and effective use of e-learning systems.

Purpose of study

The purpose of this paper is to examine students' adoption and use of the e-learning system at a university based in Jamaica. The acceptance and use of new technologies has been studied extensively, particularly the seminal technology acceptance model (TAM) which has been shown to be robust in predicting and explaining user behavior, and has been used to explain and predict user behavior in multiplicity of technology contexts (Davis, et al, 1989; Venkatesh & Davis, 2000),. TAM originated by Davis, et al (1989) and is further developed and extended in several studies (Davis, et al, 2000; Venkatesh & Davis, 2000).

Our study applies TAM and extends to include additional considerations such as the university climate and access to computers as the basis to determine the influence on ease of use usefulness and behaviourial intention to use the e-learning system. The application of TAM to e-learning environment is relatively limited but growing (van Raiij & Schepers, 2008) and has been applied in different contexts. Some examples of e-learning studies include: an analysis of students in a Korean University (Park, 2009); acceptance and use in virtual learning environment (VLE) of Chinese managers in an executive MBA program (van Raiij & Schepers, 2008), undergraduates of management courses (Williams & Williams, 2008), the analysis of use of WebCT in management education in US-based university (Martins &

Kellermanns, 2004). These studies provide the opportunity to investigate e-learning use in our specific context and aid in richer meaning to findings. As a result, we also content that the university climate and access to computers may important factors that can explain and predict users' behavior in a developing economy context where there are inequities in access to computers (Barclay & Duggan, 2006; Qureshi et al., 2012) and cultural dimensions which has an impact on decision-making Hofstede (1980).

Research approach & implications

Empirical research will be conducted to obtain data students' demographics, and perceptions to using the e-learning system. The sample will consist of students of the university , and will target two groups of users that include new students registered for fully online IT module and third year IT project management students registered in a traditional face-to-face classroom sessions supported by online interactions. The study is currently in the distribution of survey phase. The study is also supplement with qualitative interviews done with key-decision makers to better understand the university's context. Collection of data, analysis of results, and conclusions and recommendations will be presented at the next stage of the research process.

The research provides implications for both research and practice particularly as e-learning applications and implementations increase at different levels of education. There is a clear need for strategic understanding and management of e-learning delivery processes based on some of the issues identified. E-learning stakeholders requires better and improved understanding of students' perception and reaction to e-learning, and as supported by Koohang & Durante (2003) aid in how to effectively apply e-learning strategies to enhance learning experience. Our study and its findings contributes to the extension of the knowledge base relating to the multiplicity of factors that may influence the adoption of technology, e-learning and its role in ICT education, particularly in developing economies. The study considers the university climate, access to computers as additional factors that can impact adoption of e-learning systems in higher education. The intent is to provide sound empirical data to support universities' decision making as they continue to investment in e-learning so that they can improve their e-learning implementation process, strategies and enhance users' satisfaction.

Review of Literature & Theoretical Framework

Dimensions and development of E-learning

Learning can be defined as the act, process, or experience of gaining knowledge or skill (Free Online Dictionary) or the act or experience one learns, knowledge or skill gained through schooling and study, modification of behavioural tendency by experience or conditioning (M-W Dictionary). Learning theory

emphasizes that there are a multiplicity of enabling factors that promote or enhance learning. Learning is promoted or enhanced when students are actively involved in the learning process, when activities and assignments reflect real-life contexts and experiences, that are relatable and when critical thinking is promoted and applied through reflective activities (Bransford, et al., 2000; Driscoll 2002). Modern teaching has evolved to reflect this and support it through appropriate instructional methods that suits students' way of life and context.

Over the last decade, in particular the dimensions of teaching have evolved and become evident as the classroom is no longer a particular physical space. Researchers have argued that with the advances in the study of learning, teaching has undergone significant changes (Dervan, et al. 2006) and teaching has become transformative with the advances in technology and the in transformative (Franzoni & Assar, 2007, Greenhow, et al., 2009). There are different modes of e-learning included blended approach and full online e-learning. Blended learning is a hybrid instructional approach that combines elements of e-learning with the traditional classroom environment (Rubenstein, 2003; Ward & LaBranche, 2003).

As a consequence we have seen rapid development in e-learning. E-learning is defined as instructions that are delivered electronically via the Internet, Intranet or multi-medium platforms such as DVD, CD-ROM, interactive TV (Hall, 2003). Similarly, e-learning can be seen as technology-based learning in which learning materials are delivered electronically to remote learners via a computer network (Zhang, et al., 2004). Also, based on the concepts of learning, definition of e-learning would encompass the act, process or experience of gaining knowledge or skill through the delivery of lessons and instructions via the Internet. The term is often used synonymously with *online learning, virtual learning or web-based learning*.

E-Learning, issues, challenges and opportunities

E-learning provides multiple opportunities and benefits to the stakeholders however these have to be balanced with the issues and challenges experienced in various contexts in its implementation and management (e.g. Al-Harbi, 2011; Qureshi et al. (2012)). E-learning systems are rapidly becoming an integral part of the teaching and learning process in many schools (Pituch & Lee, 2006). Convenience and flexibility tend to be the distinguishing and most valuable features of developing e-learning content (Arbaugh & Duray, 2001). To most learners, online instruction offers the flexibility and convenience to complete learning units when and where a learner desires (Yoo, et al, 2012; Zhang, et al., 2004) as the issues of location and time are no longer a limitation to study. In other words, it enables improvements in

communication efficiency, both between student and teacher, as well as among students (Martins & Kellermanns, 2004). According to McEwen (1997), online instruction can potentially enhance learning compared to what can be accomplished using a classroom only approach. Additionally, online education can result in cost reduction and improvements in efficiency through a standardized way to deliver content (McDonald, 1999-2000). Similar studies have also identified similar benefits and opportunities. For example, Zhang, et al., 2004, noted that e-learning provides institutions with the opportunity to have learner-centered and self-paced courses, flexibility in time and location, and cost-effective options for learners. They present strategic opportunities for these schools to extend their offerings and reach across geographical borders and regions (Zhang, et al., 2004). Additionally, unlimited access to knowledge and improved archival capability for knowledge reuse and sharing can be harnessed.

Despite the potential benefits to the learners and the institutions, these stakeholders are still faced with challenges. For example, several studies have found that students have difficulties in adopting e-learning approach. Students may experience several challenges as they may struggle to overcome any psychological barrier from shift in learning mode, which may become more apparent in fully online modes. For example students may experience a sense of learner isolation (Brown, 1996), lack of immediate feedback in asynchronous e-learning (Zhang, et al., 2004) which may result in higher attrition rates (Frankola, 2001; Laine, 2003), learner frustration, anxiety, and confusion (Zhang, et al., 2004). These experiences underscore the need for greater discipline, and self-motivation, and a strong sense of commitment to online learning (Golladay, et al., 2000; Serwatka, 2003). As a consequence, some students may prefer the face-to-face environment and believe they learn best in that environment (Hiltz & Turoff, 2005). Further, many students may lack the capacity and inclination for the demands of independent learning that an online environment facilitates thereby resulting in low engagement (Mason & Weller, 2000).

The instructors have also encountered challenges in the implementation of e-learning. The design and management of online content throughout the semester can be significant work pressures, resulting in increased preparation time for the instructor (Zhang, et al., 2004). This may be especially evident when it is accompanied by additional face-to-face interactions.

Critical factors to e-learning

Any change in organizations such as implementation of technology requires due diligence, effective management and considerations for the key stakeholders to help assure success. This in turn impacts user

acceptance and satisfaction. A factor critical to successful implementation of e-learning systems is student acceptance of the system (Martins & Kellermanns, 2004), and other users.

Yoo (et al, 2012) categorized the critical factors for success in implementing e-learning into three areas. The *human factors* encompass user attitude, learning styles, and instructor's attitude and teaching styles are included in this factor in evaluating the effectiveness of e-learning to an individual or a large group of people (Liaw, et al., 2007; Selim, 2007*)*. *Content and learning factors* encompass the content format, structure, and authoring tools (Wang, et al., 2010). *The institutional factors* encompass organizational policy, climate, or culture (Klein, et al., 2001). Other studies have provided additional viewpoints. For example, McPherson and Nunes (2006) categorized the organizational critical success factors of e-learning largely into leadership and cultural issues, design issues, technological issues and delivery issues. Joo, et al., (2011) identified success factors as organization's leadership, support and willingness to provide funding as well as to recognize and reward. These studies highlight that there are multiplicity of factors that are critical to success, therefore in the analysis of users' acceptance of e-learning technology, careful examination of the additional contextual factors is important. Such an approach will provide a richer understanding on the basis of adoption of the e-learning technology.

Adoption of technology

Adoption of technology studies form an important part of information systems landscape. A seminal approach is the technology acceptance model (TAM), (Davis, 1986; Davis et al 1989). TAM (fig. 1) is considered an influential extension of theory of reasoned action (TRA), according to Ajzen and Fishbein (1980) as it sought to explain why a user accepts or rejects information technology. The model suggests that one's actual use of a technology system is influenced directly or indirectly by the user's behavioral intentions, attitude, perceived usefulness of the system, and perceived ease of the system. The original model has been extended in several different models: TAM 2 (Venkatesh & Davis, 2000) to explain perceived usefulness and usage intentions including social influence (subjective norm, voluntariness, and image), cognitive instrumental processes (job relevance, output quality, and result demonstrability) and experience; and TAM 3 (Venkatesh & Bala, 2008); and influenced the development of Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, et al., 2003).

Even with these developments the original TAM has still proven to still be a sound theoretical model in helping to explain and predict user behavior of technology (sources). Over the years, strong empirical support has been established in favor of TAM (Davis et al., 1989;; Venkatesh & Davis, 2000), making it a robust theory since it holds across persons, settings, and times (van Raaij, & Schepers, 2008).

Additionally, studies that have examined the acceptance of e-learning systems has confirmed that factors, such as perceived ease of use and perceived usefulness are indeed significant predictors of student acceptance of such systems (Martins & Kellermanns, 2004; Yoo, et al., 2012).

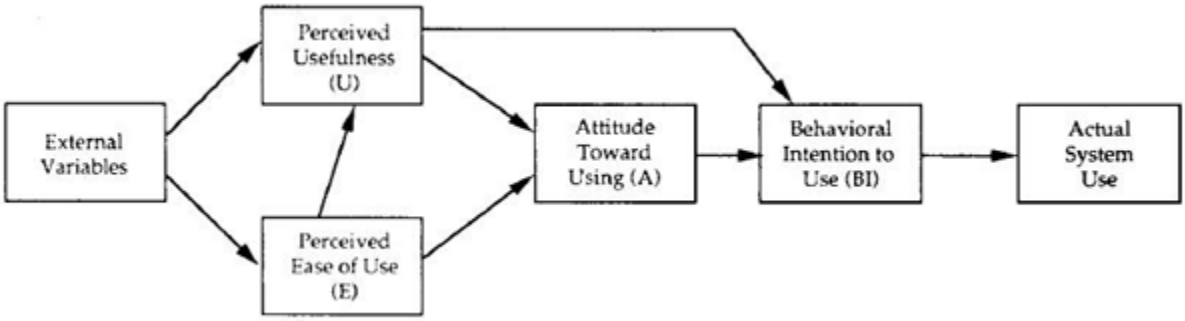

Figure 1: Original TAM (Davis, et al., 1989)

Adoption of e-learning technology

The literature on the examination of adoption of e-learning technology is growing. Analysis of the literature shows that studies have been done in the education, business and organizational contexts. These studies are predominately based in regions of North America, Europe and Asia (Lee, et al., 2005; Martins & Kellermanns, 2004; Williams & Williams, 2009; Qureshi, et al., 2012; van Raaij & Schepers, 2008). The findings revealed that there are multiple factors that influence users' behaviours, and can be categorized into *institutional characteristics, e-learning system's characteristics, learners' characteristics and instructors' characteristics*.

Table 1: Summary of findings in literature

Characteristics by Categories	**Findings: Factors that influence behaviours**
Institutional	• Role of technical support (Martins & Kellermanns, 2004; Williams & Williams, 2009) • Electricity failure (Qureshi, et al., 2012).
e-learning systems	• characteristics of system quality (Pituch & Lee, 2006)
Learners	• Encouragement by others (Martins & Kellermanns, 2004; Williams & Williams, 2009). • Computer efficacy and experience (Martins & Kellermanns, 2004; Ong et al., 2004). • Learner's attitude (Selim, 2003). • Perceived enjoyment (Lee, et al., 2005). • English proficiency (Qureshi, et al., 2012).

Characteristics by Categories	Findings: Factors that influence behaviours
	• Peer encouragement (Martins & Kellermanns, 2004; Williams & Williams, 2009). • Students' participation and involvement (Saadé, et al., 2007)
Instructors	• Instructor characteristics (Lee, et al, 2009). • Teaching materials (Lee, et al, 2009). • faculty encouragement (Martins & Kellermanns, 2004; Williams & Williams, 2009)

Research Methodology

A quantitative methodology is adopted to collect and analyze the data on the students' perceptions and attitudes to the e-learning system being piloted by the university based in Jamaica. This is supported by qualitative approach to obtain deeper appreciation of the context of the study (Yin, 2001).

Sample and Data Collection Method

The data will be collected in the next phase of the study. The sample will consist of students of the university. It will target two distinct groups of users: (1) new students pursuing the information technology module that is facilitated as a fully online course. There are approximately 200 students across several faculties registered for this option; and (2) third year students in IT project management module. The module is facilitated by the face-to-face approach, and is supported by web-based component where students are able to engage both the instructor and other students, perform online exercises and upload their assignments for marking. Approximately 140 students are currently a part of this blended approach to learning.

The survey is web-based (link here) and is proposed to become a part of the students' class activity later in the semester. The survey is designed to reflect the research model (fig. 2) and hypotheses (Table 2), which are grounded in literature. Data analysis will be performed, and findings reported on completion of exercise. In addition, interviews are being conducted with key decision-makers to obtain information on the development of e-learning system, challenges and opportunities. This is further supported by review of relevant departmental documents.

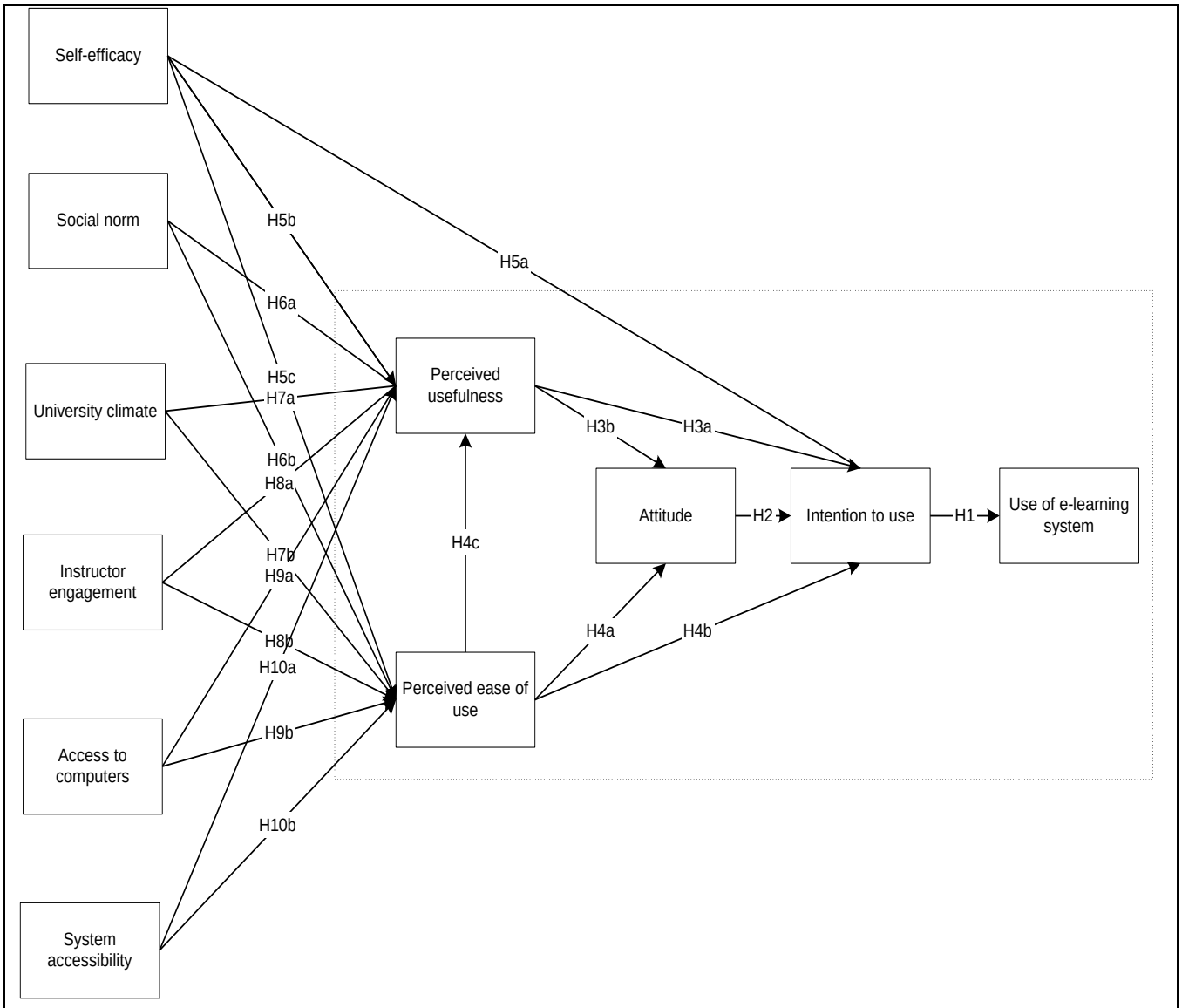

Figure 2: Research Model: Students' e-learning perceptions

Table 1: Summary of Hypotheses

Hypothesis	**Expected Influence**
H1: Intention to use → Attitude	+
H2: Attitude → Intention to use	+
H3a: Perceived usefulness → Intention to use	+
H3b: Perceived usefulness → Attitude	+
H4a: Perceived ease of use → Attitude	+
H4b: Perceived ease of use → Intention to use	+
H4c: Perceived ease of use → Perceived usefulness	+
H5a: Self-efficacy → Intention to use	+
H5b: Self-efficacy → Perceived usefulness	+

Hypothesis	Expected Influence
H5c: Self-efficacy → Perceived ease of use	+
H6a: Social norm → Perceived usefulness	+
H6b: Social norm → Perceived ease of use	+
H7a: University climate → Perceived usefulness	+
H7b: University climate → Perceived ease of use	+
H8a: Instructor engagement → Perceived usefulness	+
H8b: Instructor engagement → Perceived ease of use	+
H9a: Access to computers → Perceived usefulness	+
H9b: Access to computers → Perceived ease of use	+
H10a: System availability → Perceived usefulness	+
H10b: System availability → Perceived ease of use	+

Preliminary Discussion

University Context

The university under study is one of the top universities in Jamaica and the English-speaking Caribbean. It offers both undergraduate and graduate courses to approximately 12, 000 students. It began implementation of their e-learning system in 2006 as a pilot. As a consequence, there is generally low adoption from instructors, and inconsistency in levels of use as use is not yet mandated. However, despite its relatively low adoption by instructors, there are multiple courses across multiple faculties available on the e-learning systems, and being used by students. The available courses utilize a range of approaches from distribution of course materials to the utilization online interactions to complement face-to-face sessions.

The officials have stated that planned official launch will be in 2013/14. During the six (6) years of operations, an analysis of the system shows an exponential growth of modules being available online. The university in its guidelines proposed that they are five (5) levels of adaptation of online learning:

(1) *Web-assisted course* – uses the e-learning system primarily to distribute content and to supplement face –to-face sessions, and does not recognize online components in its assessments.
(2) *Web-enhanced course* – promotes the use of online tools and online interaction with the instructor, explore the use of the e-learning system and may include online components as part of its formal assessments.
(3) *Blended Online course* – integrates the use of the e-learning system with face-to-face sessions, promotes interaction online and selects assessment modalities to reflect the balance between online and face-to-face sessions.

(4) *Hybrid Online course* – extensively uses the e-learning system, supported by face-to-face sessions, and which integrates online assessments with face-to-face sessions.

(5) *Intensively or exclusively online course* – relies entirely or almost entirely on the use of the e-learning system for delivery of teaching-learning interactions and assessment with very few or no face-to-face sessions.

Concluding Remarks

E-learning implementation and adoption offers numerous opportunities for organizations and educational institutions. Studies have noted that e-learning systems are rapidly becoming a significant part of the education delivery process in many schools (Pituch & Lee, 2006). Some of the common benefits include flexibility and convenience to instructors and learners (Arbaugh & Duray, 2001; Zhang, et al., 2004), opportunities for the educational institution to extend its course offerings and move beyond geographical borders. A factor critical to successful implementation of e-learning systems is student acceptance of the system (Martins & Kellermanns, 2004). We contend that while students will intuitively be the key user considered, the instructors' acceptance is also critical. Therefore, analysis of challenges faced by these stakeholders is imperative to better understand and achieve successful implementation and use of e-learning systems.

This study is its preliminary stages. Its purpose is to carefully examine students' perceptions and attitudes to using an e-learning system at a top university based in Jamaica. We contend that while there are other studies that have assess e-learning use among students, the results are more meaningful when designed to fit specific context such as a single university. Our study is well positioned at it is the first known scientific study of this nature in the English-speaking Caribbean. The university is at the pilot stage of implementation and has admitted to some challenges such as constraints in support personnel and bandwidth. The study extend the TAM model to include additional considerations such as university climate, instructor encouragement, access to computer and systems availability as a basis to understand the students perceptions to using the e-learning system.

The study is may be considered to be because its empirical component involves surveying a single institution. It should be noted that several empirical studies that appear in reputable top journals such involves only a single institution. Further, it should be noted currently there are only four (4) local 4-year universities in Jamaica, and that the target university is in the top 2 with its students and faculty being very representative of what occurs at the other 2 largest universities. Further, until only little over a decade ago, there was only one (1) local university in Jamaica; similar situations apply to other small

island states. Thus, the apparent limitation may not be as severe as it would be in countries with many more universities. Nevertheless, in future work we intend to extend the analysis to local other institutions in the country and across the region, include additional variables to analyze their impact, and examine instructors' perceptions and attitude.

The study has significance in both the research and practitioner communities. Technology adoption is a key issue in IS discipline, and as e-learning grows it is important to understand these areas within the developing economy context. Additionally, studies of this nature are underexplored in the region under study. It is hoped that decision-makers will use the findings to help support their strategic management of the implementation of e-learning systems and carefully addresses key points of concerns for the stakeholders such as instructors and learners.

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