The Usage of E-Learning Instructional Technologies in Higher Education Institutions in the United Arab Emirates (UAE)

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ABSTRACT

Higher education institutions in the UAE are increasingly incorporating e-learning programs into their curriculum. The large investment spent on these learning systems does not match the slow rate of adoption of e-learning among the faculty of these higher education institutions in the UAE. This autoethnographic study aimed to investigate and identify the factors that affect the adoption of e-learning systems among the faculty in higher education institutions in the UAE. The diffusion of innovation theory was used as a theoretical model and as a lens to guide this autoethnographic study. The purpose of this study was to identify the factors that positively affect the rate of adoption of Blackboard Learn among the faculty of the Computer Information Sciences and how the faculty measured that success. A qualitative autoethnographic research methodology was used and data was collected from personal reflections presented in my personal experiences and from my own recall of discussions with colleague. The findings revealed that the Computer Information Sciences faculty use the four variables of the diffusion of innovation theory to determine the rate of adoption of new e-learning initiatives and to measure their success. This study confirmed the importance of relative advantages, communication channels, time and social system in the diffusion of e-learning. It also revealed the need to increase the level of some attributes of these variables to increase the adoption rate of Blackboard Learn.

INTRODUCTION

Over the last decades, the investments of organizations in Information Technology (IT) have witnessed a continued steady increase (Purnama & Subroto, 2016). Organizations have realized that the key to success in the new digital age is to leverage the benefits from information technology. Similar to other business organizations, higher education institutions realized the importance of information technology on their institutional performance (Dlamini, 2015). The rapid infusion of information technology in higher education institutions resulted in an unprecedented change in the way these institutions conduct their businesses. Reich and Nelson (2003) stated that information technology had direct impact on the way higher education institutions conduct their marketing, admission, instructional delivery, finance, procurement, research services, students' records, and sharing information. Overall, it was argued, information technology changed everything in higher education institutions (Ashrafzadeh & Sayadian, 2015; Hardaker, 2014; Kopcha, Rieber, & Walker, 2016).

The largest impact of information technology was seen on the instructional components of the higher education institutions and particularity on the e-learning systems (Gunn, 2010). E-learning instructional technologies are widely understood as the use of information technology in learning and teaching (Czerniewicz & Brown, 2009; Salmon, 2005). The success of adopting e-learning instructional technologies in higher education institutions has been the subject of studies of many researchers (Abdullah & Ward, 2016; Kassim, Jailani, Hairuddin, & Zamzuri, 2012; Tarhini, Hone, Liu, & Tarhini, 2017; Wang, Wang, & Shee, 2007). However, few studies have focused particularly on the factors that affect the success of adopting e-learning instructional technologies among the faculty in higher education institutions in United Arab Emirates (UAE) (Mirza & Al-Abdulkareem, 2011). Rogers (2003) developed and presented the diffusion of innovation theory as a theoretical framework to study the factors that affect the adoption of new technologies. Diffusion of innovation theory seeks to describe how, why and at what rate new technologies spread out (Rogers, 2003). In this paper, I attempt to study the factors that affect the adoption of e-learning instructional technologies among the faculty of my Computer Information Sciences (CIS) department at the Abu Dhabi Women's College campus of the Higher Colleges of Technology (HCT) as part of the UAE higher education institutions using an autoethnographic research methodology.

The problem of diffusion of e-learning
Higher education institutions have followed the global trends in adopting new technologies and in particular they have spent millions of dollars on acquiring e-learning instructional technologies (Dlamini, 2015). However, the rate of diffusion of e-learning solutions among faculty in higher education institutions in the UAE is still slow (*E-learning Barriers in the United Arab Emirates*, n.d.). With the introduction of Blackboard Learn as the main learning management system in my CIS department, the rate of adoption among the faculty of my department is very slow when compared to the slow usage of the capabilities provided.

Purpose of this study
Considering the extensive investment in e-learning instructional technologies in my CIS department, the purpose of this qualitative research is to investigate and identify the factors that positively impact the diffusion of Blackboard Learn as a new e-learning instructional technology in my CIS department. To achieve this objective, an autoethnographic research methodology is used to research my current personal stance, opinions of two of my colleagues and the current literature. The Higher Colleges of Technology is the largest federal higher education institution in UAE with more than 23,000 full time students in 16 campuses serving all emirates of the UAE ("About HCT," n.d.; "Enrollments," n.d.). The HCT was among the first higher education institution to implement e-learning systems. My CIS department in Abu Dhabi Women's College is the largest IT department in the HCT system with 20 full time faculty.

Research Questions
Traditional information technology success measurement theoretical models as investigated by (D. A. Adams, Nelson, & Todd, 1992) cannot produce accurate investigation of the factors that affect the diffusion of e-learning instructional technologies among the faculty of my CIS department. In addition, other organizational theoretical models as investigated by researchers in organizational theories such as Melville, Kraemer, and Gurbaxani (2004) and Nilakant and Rao (1994) are not adequate to be used to investigate the diffusion factors. In general, many researchers have focused their studies on the information technology success factors. On the other hand, what has not yet been established are the factors that affect the adoption of e-learning instructional technologies among faculty in higher education institutions in the UAE. Therefore, the overarching research question of this study is to investigate the factors that affect the diffusion of a new e-learning instructional technology from the perspective of the CIS faculty and how they measure its success? The particular research questions that will be addressed in this study are:

RQ1. What do the faculty of the CIS department believe are the factors that affect the diffusion of a new e-learning instructional technology?
RQ2. How do the faculty of the CIS department measure the success of the diffusion of a new instructional technology?

LITERATURE REVIEW
Frustration is the emotion that can summarize my personal experience with the adaptation of use of Blackboard Learn in our department. My frustration started last semester when I noticed that some instructors were not using Blackboard Learn as planned. In our regular instructors meetings, no concerns were raised which added another layer to the existing mystery of why some of the information technology instructors were not using blackboard Learn. Frustrated with this situation, I started to research the literature to seek answers on why instructors who are experts in technology decide not to use a new instructional technology and revert to their own delivery methods.

This literature review aims to provide a complete overview of the factors that affect the adoption of e-learning systems in higher education institutions. The literature review is organized as follows: the evolution of e-learning systems is examined first. The factors that affect the adoption of e-learning in higher education institutions are examined after that. This is followed by a review of the diffusion of innovation theory framework. Next is a discussion about the factors that affect the adoption of learning systems among the faculty of higher education institution using the diffusion of innovation theory as a lens. Finally, the literature review concludes by identifying the literature gaps on the factors that positively affect the diffusion of e-learning systems.

I have used a combination of the following key keywords: e-learning, instructional technology, adoption of innovation, and diffusion theory to search for articles in peer-reviewed journals such as Journal of Educational Technology Systems, Canadian Journal of Learning and Technology, Educational Technology and Society. Overall, 37 peer reviewed articles and 5 books were used and were published between 1989 and 2017.

The Evolution of e-learning

Czerniewicz and Brown (2009) defined e-learning as the use of information and communication technology (ICT) in learning and teaching. E-learning includes any intentional use of electronic instruments like computers, iPads, televisions, or delivery of content via internet, social media, and so on for learning (Ozkan & Koseler, 2009; Shee & Wang, 2008). McGill, Klobas, and Renzi (2014) observed two types of e-learning systems in higher education institutions. The first type is at the institutional level and the second type is at the local level. At the institutional level, e-learning systems are instructional technology systems that are used to manage the delivery of course material to enrolled students. Learning management systems (LMS) are an example of e-learning systems at the institutional level. At the local level, e-learning systems are observed at the level of the single course or even at the class level, lesson or the learning activity. McGill et al. (2014) argued that with such a broad scope of e-learning covering both institutional and local levels, the success of e-learning should be considered by merging the two levels.

Learning management systems play a fundamental role in strengthening the e-learning systems in higher education institutions. They provide faculty with a software platform to blend in class face to face teaching with online teaching. There are two main types of LMS that higher education institutions can select from. The first one is the open source code LMS like MOODLE ("Moodle - Open-source learning platform | Moodle.org," n.d.) and ATutor ("ATutor Learning Management System: Information:," n.d.). The second one is the commercial LMS like Blackboard Learn ("Blackboard | Education Technology & Services," n.d.) or TalentLMS ("TalentLMS - Cloud LMS Solutions. Online Learning Management System," n.d.). All LMS provide a set of tools to support faculty in their course curriculum. Examples of the tools provided by LMS are listed in the table below (Findik & Özkan, 2013):

Table (1) *Learning Management Systems*

Example of Learning Management Systems	Example of Tools
MOODLE ATutor Blackboard Learn TalentLMS	Discussion Boards
	Forum
	Chat Rooms
	Online Grading
	Online Exams
	File Sharing
	Assignment Management
	Cataloguing of Syllabus
	Schedules
	Announcements
	Course Planning

Note: This table lists four examples of LMS and the tools they provide.

Ross and Gage (2006) stated that the adoption of e-learning systems is witnessing a constant increase in higher education institutions around the world. Norberg, Dziuban, and Moskal (2011) added that e-learning had become the new traditional model for course delivery in higher education institutions. Aparicio, Bacao, and Oliveira (2016) went further by considering e-learning systems among the enablers of the 21st century.

We can conclude that e-learning has played a major role in changing learning and teaching in higher education institutions around the world. There is agreement between scholars that higher education institutions are constantly increasing their investment in e-learning systems. However, scholars agree also on the limitation of the available data that accurately measure the degree of adoption of e-learning instructional technologies in higher education institutions (Graham, Woodfield, & Harrison, 2013; Norberg et al., 2011; Oliver & Trigwell, 2005; Porter & Graham, 2016; Ross & Gage, 2006; Sharpe, Benfield, Roberts, & Francis, 2006).

Factors that affect the adoption of e-learning systems

(McGill et al., 2014) studied 64 empirical papers published in peer reviewed literature related journals that examined the conditions associated with the continuation of the e-learning initiatives in higher education institutions. Out of these 64 e-learning initiatives, 20 had not continued. (McGill et al., 2014) stated that the continued and the non-continued 64 initiatives did not offer any financial advantage to their higher education institutions. The authors concluded that the characteristics of the technology itself and the financial support of the initiative by the institution are the only two factors that have distinguished between the continued initiatives and non-continued ones. All the continued initiatives needed to attract others to become involved in adoption and development to secure their sustainability.

Graham et al. (2013) studied six cases of institutional adoption of e-learning. The cases were selected from institutions that are at different phases of their e-learning adoptions. Three phases were identified: (1) awareness and exploration, (2) adoption and early implementation, and (3) mature implementation and growth. In all three phases, the authors concluded that three factors have significant impact on the adoption of e-learning systems. The first factor was the institutional strategy related to issues of the overall design of the e-learning initiative. The second factor is the structure related to issues on the technology, pedagogy, and administrative framework. The third factor is the support related to issues of maintenance, technical support, pedagogical support and faculty incentives.

Cigdem and Topcu (2015) studied the factors that affect the adoption of e-learning systems in a Turkish vocational college. The authors stated that the prediction of faculty intention to use e-learning systems is an important factor in determining the level of adoption. Cigdem and Topcu (2015) used a behavioural conceptual framework proposed by Findik and Ozkan (2013) to determine the factors that affect faculty's intention to adopt e-learning systems. The proposed framework was based on the technology acceptance model as proposed by Davis (1989) and it included the following factors: perceived ease of use, perceived usefulness, behavioural intention, application self-efficacy, technological complexity, and subjective norm.

Following the steps of scholars who studied the factors that affect the adoption of new instructions technologies, Sara M. Kardasz (2013) used the diffusion of innovations theory (Rogers, 2003) as a lens to guide her study of these factors. The author used the four elements of the diffusion of innovations theory and considered their effect on the adoption of e-portfolio by faculty in higher education institutions. The four elements are: the innovation, the communication channels, time, and social systems.

Diffusion of innovation theory framework
The literature is rich in theories that focus on studying the best approaches for encouraging faculty to use e-learning systems. Considering the questions that my research is seeking to answer, I found that diffusion of innovation theory as elucidated by Rogers (2003) provides theoretical guidance that can be used to direct my autoethnographic research study. Diffusion of innovation theory seeks to describe how, why and at what rate new technologies spread out. Surry and Farquhar (1997) described the innovation theory of diffusion in the field of instructional technology and how it has been used to form diffusion theories specific to the field of instructional technology. The authors presented two major IT related diffusion theories which are the systemic change and the product utilization theory. Surry and Farquhar (1997) stated that the diffusion theory is valuable to the study of the diffusion of instructional technology due to three reasons. The first one is that most instructional technologists do not understand why their product are adopted. The second reason is that instructional technology is inherently an innovation-based discipline, and the third reason is due the nature of the diffusion theory that can lead to the development of a systematic prescriptive model of adoption and diffusion.

Szabo and Sobon (2003) presented a case study about an educational reform that took place in a research university through the introduction of instructional technologies using the diffusion theory as lens to guide the process. The authors stated that the lack of technical knowledge results in fear of use by faculty.

Sara M. Kardasz (2013) used the diffusion of innovation theory as presented by Rogers (2003) to study the diffusion of instructional technology - ePortfolio use among faculty members at Stony Brook University. She presented recommendations on how to best encourage faculty members to use ePortfolios with their students. The author concluded by identifying the gaps and questions that need to be addressed in order to develop further the study of diffusion of innovations theory for instructional technologies.

We can conclude that while many scholars have investigated the factors the affect the adoption of e-learning systems in higher education institutions (Cigdem & Topcu, 2015; Graham et al., 2013; McGill et al., 2014), the factors provided by the diffusion of innovations theory as proposed by Rogers (2003) are more comprehensive and provide a wider lens that can be used to study these factors.

A brief description of the gaps
The reasons stated by Surry and Farquhar (1997) and combined with the case study of Szabo and Sobon (2003) provided some explanation to my personal experience with the adaptation of Blackboard Learn among the faculty of my department. However, the gaps identified by Sara M. Kardasz (2013) call for further studies in order to understand the factors that have direct impact on the diffusion of instructional technologies among faculty in higher educational institutions. I am confident that sharing my personal experiences through this autoethnography study will support bridging some of the gaps identified.

Theoretical Framework

The diffusion of innovation theory as presented by Rogers (2003) provides theoretical guidance that can be used to direct my autoethnographic research study. Roger (2003) stated that four main elements influence the spread of new ideas: the innovation itself, communication channels, time and the social system. Rogers defined his perceived attributes of each element as explained in Figure. 1. I will be using these four elements along with their perceived attributes as a conceptual lens to guide the development of my autoethnographic research.
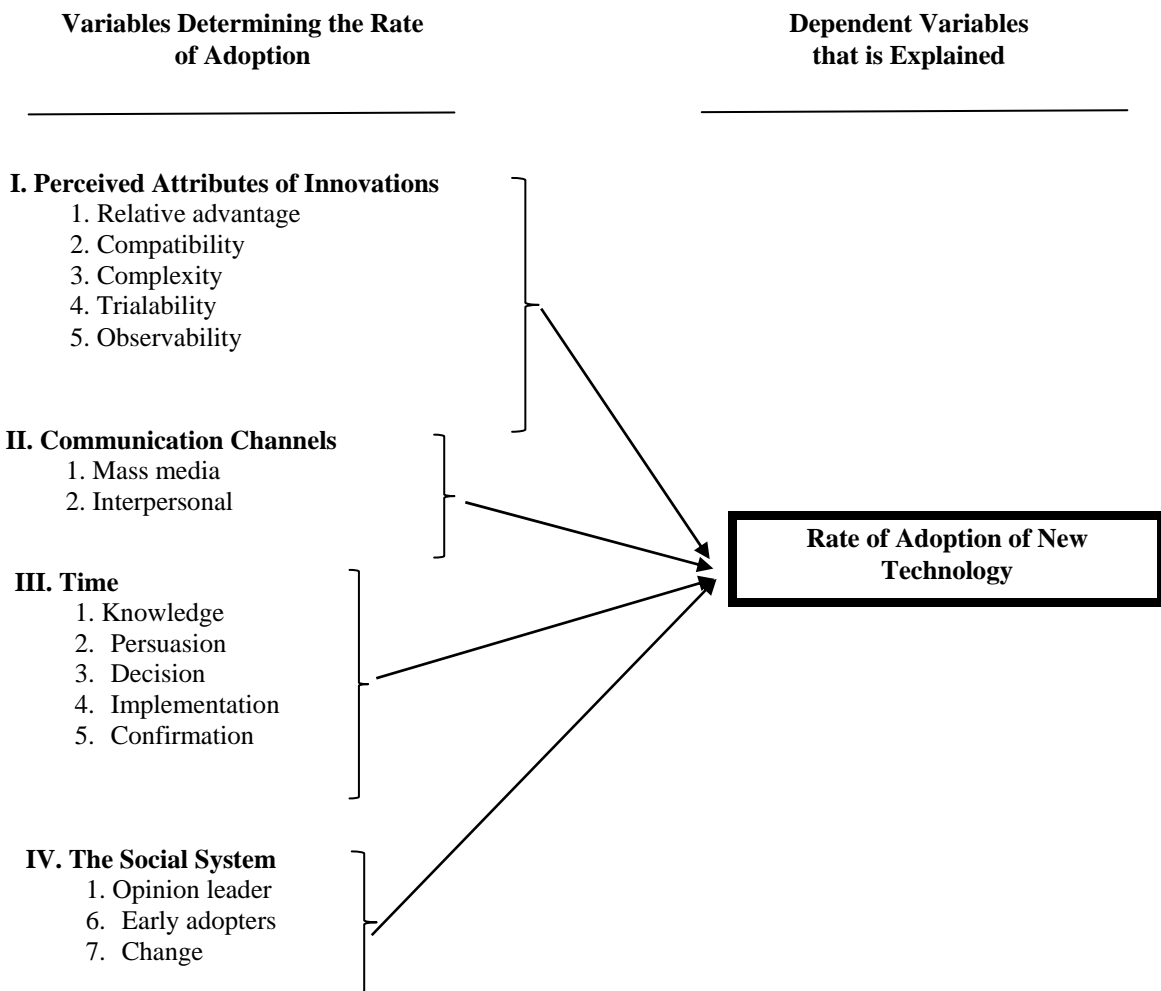
Variables Determining the Rate of Adoption

Dependent Variables that is Explained

I. Perceived Attributes of Innovations
    1. Relative advantage
    2. Compatibility
    3. Complexity
    4. Trialability
    5. Observability

II. Communication Channels
    1. Mass media
    2. Interpersonal

Rate of Adoption of New Technology

III. Time
    1. Knowledge
    2. Persuasion
    3. Decision
    4. Implementation
    5. Confirmation

IV. The Social System
    1. Opinion leader
    6. Early adopters
    7. Change

Figure 1. Rogers (2003) diffusion of innovation theoretical model

RESEARCH METHODOLOGY

Autoethnography is a form of qualitative research where self-reflections are used to explore personal experiences which allows authors to connect their autobiographical stories to the wider meanings and understandings (T. E. Adams, Holman Jones, & Ellis, 2015). Autoethnographic research methods might be considered to be unstructured and uncontrolled since they are centred around the personal experiences of authors and hence introduce subjectivity and anecdotal evidence to the research findings. Nonetheless, Many scholars find autoethnographic research methods as legitimate, familiar and a useful way to conduct research since they encourage researchers to include their self-experiences and reflections in their studies (T. E. Adams et al., 2015; Clark & Gruba, 2010; Sikes, 2015).

In this research, I used an autoethnographic research methodology to investigate my personal experiences and to examine fully, deeply and meaningfully the research problem and find the best answers to the raised questions. In addition to exploring my personal experiences, autoethnographic methodology allowed me to connect my autobiographical story to the diffusion of innovation theory and use it as a lens to guide this research.

Data Collection and Analysis

Data was collected from my own personal reflections presented in my personal experiences, and from my own recall of discussions with colleagues who are currently teaching with me. Discussion with my colleagues included interchange of emails and face to face personal discussions. All data collected was text based extracted from my own diary and from e-mail correspondences with my colleagues. A linear hierarchical approach was used to analyze the collected data by building from bottom to the top with multiple interactions between the steps (Patton, 2001; Shank, 2005). In the first step, I organized and prepared the collected data for analysis. I read through all the collected data and reflected on its overall meaning in the second step. In the third step, I started a coding process using the variables presented by Rogers (2003). I used the NVivo ("NVivo," n.d.) software to analyze and evaluate the collected data

Quality and trustworthiness of the study/findings

Data was collected from my personal experiences, and in order to improve the quality and trustworthiness of the collected data, data was also collected from discussions with two of my colleagues who are also using Blackboard Learn this semester. Like any autoethnographic study, the personal quality of the researcher plays a focal role in assuring the quality and trustworthiness of the study, and my 20 years of experience should have some value in assuring the required quality (T. E. Adams et al., 2015; Clark & Gruba, 2010; Sikes, 2015).

Ethical Issues and Limitations

I don't foresee any ethical issues since most of the data was collected from my own personal experiences and from my own recall of discussions with colleagues and I made sure no names or references to human subjects are included. According to Cozby (2008), there are three levels of research risks. The first one is the exempt research, the second one is the minimal risk and the third one is the greater than minimal risk. All risks are based on comparing the risk to harm the participants against the risk the participants face on daily basis during their regular work.

This research is under the exempt research type since the risk to harm the participants, who is me in this case, is not greater than the risk I encountered during my normal working activities.

Findings

I was fortunate to witness the introduction of e-learning instructional technologies in my institution right from the beginning. Online tutorials, virtual classrooms software, wikis, clickers, e-portfolios, Pearson e-college, moodle, sakai, lore, and iTunes U are just few examples of the e-learning instructional technologies that we tested and tried to implement at our institution. Last year, my college decided to use Blackboard Learn as the main online delivery platform for all courses. Our CIS department was among the first department to volunteer to publish all our courses on blackboard learn. Similar to the previous e-learning instructional technologies, I noticed that the acceptance rate among faculty was still low. With the start of the second semester, I wanted to investigate the factors that impact the diffusion of a new e-learning instructional technology among the faculty of my CIS department using the diffusion of innovation variables to guide my ethnographic study. To do that, I volunteered to coordinate two courses with 13 CIS instructors overall in 16 campuses and below are my findings. The first course was about e-business applications development. The second course was about human computer interactions.

Perceived attributes of innovations
- **Resources sharing**

With two CIS courses to coordinate this semester, it was quite an advantage for me and the faculty to have Blackboard Learn. As coordinator of these courses, my role was to organise the development and sharing of the content writing between faculty. I was also responsible organizing online assessments and the development of the final online exam including all items analysis and to make sure that questions follow Bloom's taxonomy.

The learning contents can be accessed at anytime and anywhere. Blackboard Learn makes document sharing very easy and accessible. It can happen in a matter of few clicks. The materials can be stored in a various form. This can be looked at as a great advantage in terms of availability and accessibility of course materials, lecture notes, slides, internet hyperlinks and audio/visual aids. I noticed that the 13 faculty started to share these documents with me and among themselves using the features provided. I distributed the content development among the 13 faculty, and using these sharing capabilities, we were able to complete the development accurately and in less time. I still remember the appreciation email that I received from one of the two colleagues stating how much these sharing resources contributed to saving time and accuracy of content development.

- **Communication**

Furthermore, using such an e-learning system, improved the communication among the faculty and students. Faculty started to use the announcements, discussions, and emails to communicate among themselves and with students. Students got the announcements immediately after logging in to the system. It is an advantage, as it ensures that all students are up-to-date immediately. Another great advantage was the discussion function since it allowed all the students in all campuses to carry out online discussions at any time of the day, with any students and with all faculty.

In terms of communication via email, students' email addresses are stored within the students' profile area. This was another excellent advantage for communication purposes that all faculty were happy to use. It is an excellent option. It gives the faculty a great flexibility to communicate with students. Blackboard Learn allowed me to communicate with all students on individual basis, groups of students, or with the whole cohort in one go. Faculty took advantage of the communication features and I noticed an increase in communication between faculty and their students. I still remember one email from one of the two colleagues appraising the increase in communication with students.

- **Compatibility**

Another feature is the compatibility of Blackboard Learn with other office applications. I experienced that in a variety of ways. The first was its compatibility with Excel uploading and downloading. Using Blackboard Learn, I can manage the course grades online, and then I can download them to Excel. I use the collected data on Excel to analyse and get grade distribution charts. I found the compatibility of Blackboard Learn with both MS Word and PowerPoint a major compatibility advantage of this e-learning system. Both my two colleagues and I were able to simply develop the content in Word or PowerPoint format and in one click upload it to Blackboard Learn for students' use and team sharing.

Blackboard Learn is also compatible with exam authoring systems. Blackboard Learn works very well with Respondus 4.0 ("Respondus 4.0: Exam Authoring Tool," n.d.). Respondus is an exam authoring system and is fully compatible with Blackboard Learn. I used it to prepare all the exams for these courses whether they were paper based or online exams. It is a great tool as Respondus 4.0 offers two ways to create an exam: within the application itself using simple question templates, or by converting an entire exam from MS Word format (images, tables, equations and formatting are retained). I noticed that all faculty in all campuses appreciated and took advantage of these compatibility features.

- **Usability**

I wish I could say the same about the usability of the Blackboard tools. They are complex, and the level of complexity is high. I am an IT instructor and the faculty with me are all experts in IT and still we found the usability of the tools and the tools themselves complex. For example, tools to release the material in a sequential way are not easy to configure or use. Preparing content to be used on different browsers is another complex procedure. I came to the conclusion and the two faculty agreed with me, that all faculty need time to get trained and practice in order to make use of this learning management system. I feel sometimes the training has to be very specific such as assessment, discussion, portfolio, and so on. This can be time consuming and needs some dedication.

Training alone will not be enough, I needed to test and try different features available before publishing. Blackboard provided a lot of features and options to present the content to students, we needed to try some of these options before we selected the right one for them. The problem is that what we choose today for one class, might not work for another, so we need to try other options. Trialability of all these options is essential to the adoption of Blackboard.

I also observed that faculty teaching this course with me used Blackboard Learn for the two CIS courses and their usage in other courses was minimum. This gave a negative impact on the overall observability of this initiative.

Analysis of the perceived attributes of innovations
Reading my above narration on the perceived attributes of innovations, it is clear that Blackboard Learn has positive relative advantages that my two faculty colleagues and myself are satisfied with. The same conclusion can be reached on the compatibility features of Blackboard Learn. On the other hand, it can be concluded from the narration above that the faculty and I perceive Blackboard Learn as a difficult system to understand and use. We also think that level of experimenting with Blackboard Learn is not adequate and hence the degree of

trialability is low. Finally, we believe that the degree of observability is low since faculty are only using Blackboard Learn for these two courses.

The narration above was coded in NVivo and using a word frequency query reveals that the words advantage and compatibility had higher frequency than the words complex, trialability and observability as listed in table 2. This analysis from NVivo supports my findings above that these last three attributes of innovation had lower presence than the relative advantage and compatibility attributes.

Table 2: *Weighted percentages which is the frequency of the word relative to the total words counted and count of the five attributes of Innovation as extracted from NVivo*

Word	Count	Weighted Percentage (%)
Compatibility	6	1.58
Advantage	6	1.58
Complex	4	1.05
Observability	2	0.53
Trialability	1	0.26

A text search using NVivo on the words advantage, compatibility, complexity, observability and trialability *shows* the relationship of these words with the sentences used in the narration, and again provide more tangible evidence of higher presence of the attributes advantage and compatibility versus the other three. Figure 1 shows the word trees of these five words.
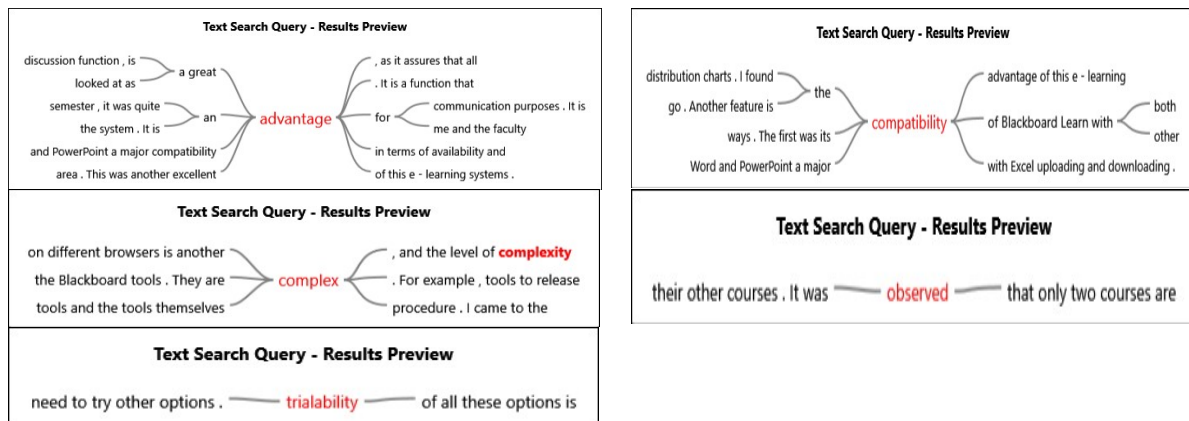

Figure 1. The text search results of the words *advantage, compatibility, complexity, observability and trialability* and their relationship with other sentences.

Communication channels
The first time I learned about Blackboard Learn was when we received an email from our IT support division announcing the acquisition of this system. A couple of weeks later, we received another email from our division announcing the usage strategy of this system and listing all the advantages. As an instructional technology expert, I started spreading the news about the features and capabilities of Blackboard Learn among the faculty of my department and to others. Few training sessions on Blackboard Learn took place during the official professional training weeks. These training sessions were conducted mainly by faculty who are expert in learning management systems. From my perspective, I can say that few emails, and limited interpersonal communications, and few training sessions helped to initiate the adoption process, but were not enough to diffuse the usage of Blackboard Learn at the speed we all hoped for. In summary, we can conclude that three different communication channels were used which were not enough to adequately start the diffusion process at the rate we were all looking for.

Analysis of the communication channels
The narration above was coded in NVivo and using a word frequency query shows that the words *training* and *email* were among the highest repeated words as listed in table 3.

A text search using NVivo on these three words produces a word tree that clearly links training and communication with the adjectives few and limited as per figure 2. This provides further tangible evidence of the limitation of the communication channels used to announce and diffuse Blackboard Learn. It is important to note that NVivo did not link *email* in this word tree.

Table 3 *Weighted percentages and count of the three words used to describe the communication channels as extracted from NVivo*

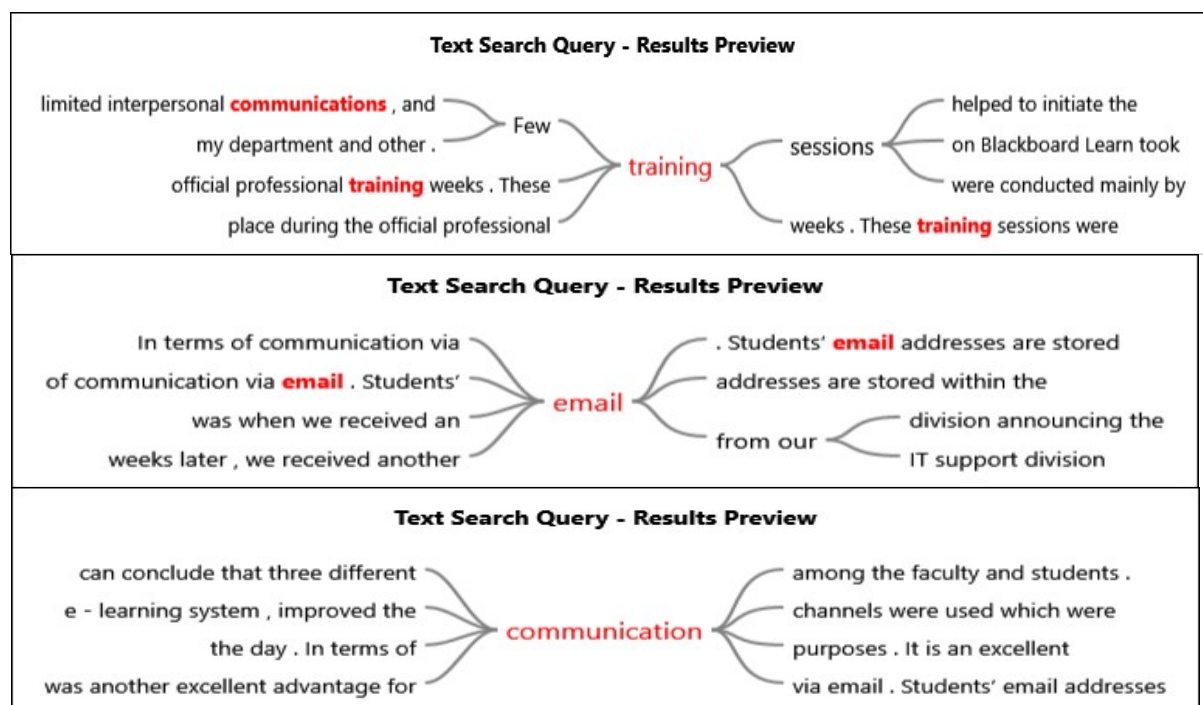| Word	Count	Weighted Percentage (%)
Training	4	4.49
email	3	3.37
communication (announcements, discussions, and emails)	2	2.25

Figure 2. The text search results of the words *training, email, communication* and their relationship with other sentences.

Time

It takes time for faculty to decide whether or not to adopt any new innovation and I can say it took them time to decide on the usage of Blackboard Learn (Rogers, 2003). There is agreement between scholars that the time needed for any e-learning innovation to diffuse is directly related to the following attributes: knowledge, persuasion, decision, implementation, and confirmation (Hardaker, 2014; Lee, Hsieh, & Hsu, 2011; Levin, Stephan, & Winkler, 2012; Rogers, 2003). At the *knowledge* level, I can confirm based on my discussion with my other two colleagues that faculty in my department have the necessary knowledge about e-learning and their capabilities. In the end, we are all IT faculty and it goes without saying that we should have the technology *knowledge* needed to use such systems. I cannot say the same about the *persuasion* and *decision* level among the faculty. As stated before, I couldn't deduct any adoption issues in our face to face meetings. It is clear that the level of *persuasion* and *decision* among our faculty is still not enough to convince them to use Blackboard Learn in their other courses. On the other hand, an *implementation decision* was taken at the college level which resulted in faculty using the e-learning system for these two courses that I am coordinating. The *confirmation* level is still not adequate since I noticed that faculty are still debating the capabilities and tools available in Blackboard Learn and comparing it with other e-learning systems. In summary, and based on my own

perspective, we can conclude that the time factor is still not supporting the diffusion at an acceptable rate since while knowledge is there, the levels of persuasion, decision, implementation and confirmation are still not adequate.

NVivo was not used to code the above narration. However, the five subcategories of the *Time* variable have been highlighted in italics to show their frequency in the narration above.

Social System
The social system as presented by Rogers (2003) is "a set of interrelated units that are engaged in joint problem solving to accomplish a common goal" (p.23). The first attribute to have a positive social system that will support the adoption of e-learning in higher education institutions is the *opinion leader*. *Opinion leaders* are the *early adopters* and they act like a catalyst in supporting the diffusion of e-learning. Few of our faculty are considered as *opinion leaders*. I am sure that there is a need to increase the number of *opinion leaders* as *early adopters* to increase the rate of diffusion of Blackboard Learn.

Overall, I was one of the *early adopters* as I was involved in this process from the very beginning of the adoption of Blackboard Learn. A lot of changes took place in terms of course and assessment delivery. A lot of learning and training took place to make this happen. It did take a lot of time for the faculty to learn and use the tools provided by Blackboard Learn.

The *change* agent is the second attribute in the creation of positive social system. Rogers (2003) stated that change agents are usually professionals from outside the social system that can help the opinion leaders. In our situation, faculty from other divisions played the role of change agents. Inviting faculty from other divisions to speak and share their experiences with our department faculty played a positive role as change agents in increasing the adoption rate among our faculty.

NVivo was not used to code the above narration. However, the three subcategories of the *Social System* variable have been highlighted in italics to show their frequency in the narration above.

CONCLUSION AND RECOMMENDATIONS
This autoethnographic research study aimed to identify the factors that positively affect the adoption of e-learning systems in higher education institutions in the UAE by analysing my current personal stance, my recalls of the opinions of two of my colleagues and researching the current literature. Two research questions were identified to guide the investigation of this autoethnographic study. This autoethnographic research revealed that the faculty of my CIS department use the four variables of the diffusion of innovation theory (Rogers, 2003) as the main factors that affect the diffusion of new e-learning instructional technology in their department. It confirmed that the faculty use the attributes of perceived innovation as one measurement of the success of the diffusion of new e-learning systems. Particularly, a high rate of innovation features and compatibility are considered as positive factors to increase the rate of adoption for Blackboard Learn. On the other hand, increased complexity and a low degree of trialability and observability are considered by faculty as negative factors that affect the rate of adoption and are used as negative measures on the success of the diffusion.

This autoethnographic study revealed the existence of three communication channels that faculty of my department believe have positive impact on the adoption of new e-learning systems. Mainly they are: emails, training and interpersonal communications. These three channels are also used by the faculty as indicators of the success of the diffusion. This research revealed the need to increase the number of channels used in communication. It also revealed the need to improve the current three channels. As per Rogers (2003) diffusion of innovation theory framework, time is a critical factor in determining the success of new innovations. This research confirmed the importance of time by revealing that faculty consider the four attributes of time as critical factors that affect the diffusion. While the existence of the knowledge attribute was confirmed and its role in measuring the success of the diffusion was also confirmed, this study revealed the need to increase the persuasion, decision, implementation, and confirmation attributes in order to increase the adoptions rate of Blackboard Learn among faculty.

This study confirmed the importance of the social system variable as a main factor in determining the diffusion of e-learning system in higher education institutions. This study established the role of opinion leaders, early adopters and change agents as positive factors in increasing the rate of diffusion of e-learning initiatives. It also revealed that faculty consider the increase in opinion leaders, early adopters and change agents as a measure of success and recommended to increase the number of these leaders and agents in order to increase the adoption of Blackboard Learn.

As per the findings above, this autoethnographic study answered the first research question by identifying four variables as the factors that affect the diffusion of a new e-learning instructional technology in my CIS department. The four factors are: *perceived attribute of innovation*, *communication channels*, *time* and the *social system*. Furthermore, this autoethnographic study answered the second question of this research by identifying the attributes of these four variables as the measurement used by my CIS department to measure the success of the diffusion of a new instructional technology. Particularly, two attributes of the *perceived innovation*, *relative advantage* and *compatibility* were confirmed to have positive impact on the success of the diffusion in my department. On the other hand, *complexity*, *trialability*, *observability*, *mass media*, *interpersonal communication*, *knowledge*, *persuasion*, *decision*, *implementation*, *confirmation*, *opinion leader*, *early adaptor* and *change* were confirmed to have negative impact of the success of the diffusion of a new e-learning instructional technology in my CIS Department.

In conclusion, this autoethnographic research study explored and investigated the factors that affect the diffusion of a new e-learning instructional technology from the perspective of the CIS faculty and identified the attributes they used to measure its success. Further research is needed to extend the findings of this study to other departments in my college.

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