The effects of individual differences on e-learning users' behaviour in developing countries: A structural equation model

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ABSTRACT

The main objective of our study is to (1) empirically investigate the factors that affect the acceptance and use of e-learning in Lebanon, and (2) investigate the role of a set of individual differences as moderators (e.g., age, gender, experience, educational level) in an extended Technology Acceptance Model (TAM). A quantitative methodology approach was adopted in this study. To test the hypothesized research model, data was collected from 569 undergraduate and postgraduate students studying in Lebanon via questionnaire. The collected data were analysed using Structural Equation Modeling (SEM) technique based on AMOS methods in conjunction with multi-group analysis. The result revealed that perceived usefulness (PU), perceived ease of use (PEOU), subjective norms (SN) and Quality of Work Life (QWL) positively affect students' behavioural intention (BI). We also found that experience moderates the relationship between PEOU, PU and SN on e-learning use intention, and that age difference moderates the effects of PEOU, SN and QWL on BI. In addition, educational level moderates the effects of PEOU, SN on BI, and gender moderates the effects of PU, SN and QWL on BI. Contrary to expectations, a moderating role of age on the relationship between PU and BI was not found. Similarly, gender was not found to affect the relationship between PEOU and BI, and educational level did not moderate the relationship between PU or QWL and BI. In light of these findings, implications to both theory and practice are discussed.

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1. Introduction

The development of information and communication technologies (ICTs) has provided the universities and other educational institutions a significant opportunities to support both face-to-face and remote course delivery (Fletcher, 2005; Ngai, Poon, & Chan, 2007). E-learning environments reduce the cost of provision and therefore increase revenues for academic institutions (Saadé & Bahli, 2005). They also afford students with more study flexibility and improve their learning experience and performance (Nora & Snyder, 2009).

Despite the perceived benefits of e-learning mentioned above, the efficiency of such tools will not be fully utilized if the users fail to use the system. Therefore, the successful implementation of e-learning tools depends on whether or not students are willing to adopt and accept the technology (Clay, Rowland, & Packard, 2009). This is crucial, especially in developing countries such as Lebanon where e-learning is still in its infancy and universities

and higher education institutions support traditional styles of pedagogy in education (Baroud & Abouchedid, 2010; Nasser, Khoury, & Abouchedid, 2008). In addition, the other challenge for online learning system is the consistently high drop-out rates (Dodge, Mitchell, & Mensch, 2009). A study conducted by Rovai (2007) revealed that drop-out rates in online courses have been cited to be 10–20 percent higher than face-to-face courses. Patterson and McFadden (2009) indicated that dropout rates in online courses may be six to seven times higher in comparison to face-to-face courses. Thus, it has become imperative for practitioners and policy makers to understand the factors affecting the user acceptance of web-based learning systems in order to enhance the students' learning experience (Liaw & Huang, 2011; Tarhini, Hone, & Liu, 2013a).

During the past decade and with the support of the government, the rate of e-learning system usage in higher education has been steadily increasing in Lebanon (Matar, Hunaiti, Halling, & Matar, 2011; Nasser et al., 2008). Additionally; as a context of study; Lebanon differs socially and culturally from Western countries (see Hofstede & Hofstede, 2005) where most of the studies that examined user acceptance and usage behaviour towards new technologies were conducted. It should be noted that in the case of Lebanon,

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the use of web-based learning system (e.g. Blackboard) by students and instructors is mandatory in education. It is, therefore, clear that both students and instructors from Lebanon are exposed to web-based learning system literacy differently. For this reason, it may influence the way they think about, feel about and view e-learning in education.

In the technology acceptance and adoption literature, a considerable number of models have been applied (e.g., the theory of reasoned action (TRA), the theory of planned behaviour (TPB) and the Technology Acceptance Model (TAM), unified theory of acceptance and use of technology (UTAUT)) to investigate and explore the determinants of user's behaviour towards adoption and using information technology. Among these models, the Technology Acceptance Model (TAM) (Davis, 1989) is the most frequently cited and influential model for explaining technology acceptance and adoption. Since it has been developed, TAM has been extensively used, tested, and extended to explain technology adoption and success in a number of application areas e.g. see (Bagozzi, 2007; Venkatesh & Bala, 2008; Yousafzai, Foxall, & Pallister, 2007a) and in e-learning (Park, 2009; Saeed & Abdinnour-Helm, 2008; Teo, 2011; Yi-Cheng, Chun-Yu, Yi-Chen, & Ron-Chen, 2007; Zhang, Zhao, & Tan, 2008).

User acceptance and usage behaviour towards technology can be influenced by a variety of factors such as cultural, individual differences and social influence. The limitation of TAM in explaining these factors in addition to the inconsistences in previous studies limit its applicability. Additionally, many TAM studies focus on Western/developed countries while TAM has not been widely tested within non-western/developing countries (Teo, Luan, & Sing, 2008). Additionally, TAM showed bias when tested in non-western countries (McCoy, Everard, & Jones, 2005; Srite, 2006) and the applicability of TAM less clear in the educational settings as much of the research has been carried out in non-educational contexts.

In an attempt to increase the explanatory power of TAM, moderator factors such as individual differences potentially play an important role in the explanation of TAM's limitations (Venkatesh, Morris, Davis, & Davis, 2003). For example, when including gender and experience in TAM2, the explanatory power increased from 35% to 53% (Venkatesh et al., 2003). Furthermore, after testing eight models, Venkatesh et al. (2003) found that the predictive validity of six models was increased significantly after the inclusion of the moderating variables. Users may hold different perceptions based on their individual differences about e-learning technologies; understanding of such different perceptions is therefore essential for policy makers to provide better design and features. Despite finding many examples of the use of TAM in the Information Systems literature, thus far little published research includes moderator factors in technology acceptance (Yousafzai et al., 2007a) especially in the case of acceptance of e-learning (Castañeda, Muñoz-Leiva, & Luque, 2007).

To address these limitations, this study will extend TAM to include two constructs, social norms and quality of work life (Kripanont, 2007; Venkatesh & Bala, 2008; Zakour, 2004) and a set of individual differences (age, gender, educational level and experience) as moderators (Venkatesh et al., 2003) in order to enhance the understanding of the e-learning users. Specifically, our research will empirically investigate the factors that affect the acceptance and use of e-learning in the developing world, particularly in Lebanon as a cultural context. Second, this study also investigates the role of a set of individual differences as moderator (e.g., age, gender, experience, educational level) in an extended Technology Acceptance Model (TAM).

The paper is structured as follows. Section 2 presents and explains our research model and describes the research hypotheses in detail. The data collection method, analysis and results are then described in Sections 3-5 respectively. Section 6 discusses the implications of the findings for both theory and practice. The limitations of this study as well as future work are highlighted in Section 7. Finally, Section 8 concludes the paper.

2. Research model and hypotheses

This paper proposes and tests a conceptual model of e-learning technology acceptance based on TAM and drawing from previous literature that used TAM in an educational context. The model extends TAM through the inclusion of subjective norms (SN) and Quality of Working Life (QWL) as additional predictor variables and through the inclusion of a number of individual differences as moderators. The overall conceptual model is illustrated in Fig. 1 and the sections which follow explain and justify each of the predicted relationships in light of previous findings from the literature.

2.1. Perceived ease of use and perceived usefulness

Perceived ease of use (PEOU) is defined as 'the degree to which a person believes that using a particular system would be free of effort' (Davis, Bagozzi, & Warshaw, 1989 p. 320). Perceived usefulness (PU) is defined as "the degree to which a person believes that using a particular system would enhance his/her job performance" (Davis et al., 1989, p. 453). Reviewing the literature, several studies in the educational context were found to be inconsistent. Some claim that PEOU and PU had a significant influence on the intention to use the system (Liu, Chen, Sun, Wible, & Kuo, 2010; Park, Nam, & Cha, 2012; Tarhini, Hone, & Liu; 2013b). However, the degree of significance was different between the findings in the literature. The difference in the findings was based on the field of study, sample size, or techniques used for analysing. For example, Peng, Su, Chou, and Tsai (2009) found that PEOU was the strongest determinant on the intention to use the system, which supported the findings of Chang and Tung's (2008) study. Furthermore, Saeed and Abdinnour-Helm (2008) found that PEOU have a direct and significant influence on BI. However, it was not the strongest predictor on the BI to use to the system. In addition, some researcher found that PU was the most influential variable in TAM in predicting the intention to use the web-based learning system (Tarhini, Hone, & Liu, 2014; Liu et al., 2010). On the other hand, Chang and Tung's (2008) found that PU has an influence on the intention to use but was not the most influential factor. Based on the above discussion, it is hypothesized that:

H1. PU will have a direct positive influence on the intention to use web-based learning in the Lebanese sample.

H2. PEOU will have a direct positive influence on the intention to use web-based learning system in the Lebanese sample.

2.2. Social norms impact usage behaviour

SN was adopted and included in the TAM model, in order to overcome a limitation of TAM in measuring the influence of social environments (Venkatesh & Davis, 2000). SN is defined as a person's perception that most people who are important to him or her think he or she should or should not perform the behaviour in question (Ajzen & Fishbein, 1980). SN was studied in some research as an antecedent of BI and in other studies as an antecedent to PU. However, as Venkatesh et al. (2003) argue the influence of SN is very complex. This view is supported by the fact that there has been some inconsistency in the literature about the influence of SN on the intention to use the technology. For example,