



Factors affecting engineers' acceptance of asynchronous e-learning systems in high-tech companies

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Abstract

With the rapid change in all types of working environment, there is a need to implement electronic learning (e-learning) systems to train people in new technologies, products, and services. However, the large investment in e-learning has made user acceptance an increasingly critical issue for technology implementation and management. Although user acceptance received fairly extensive attention in prior research, efforts were needed to examine or validate previous results, especially in different technologies, user populations, and/or organizational contexts. We therefore proposed a new construct, *perceived credibility*, to examine the applicability of the technology acceptance model (TAM) in explaining engineers' decisions to accept e-learning, and address a pragmatic technology management issue. Based on a sample of 140 engineers taken from six international companies, the results strongly support the extended TAM in predicting engineers' intention to use e-learning.

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1. Introduction

The shift from a product-based to a knowledge-based economy has resulted in an increased demand for knowledge workers who are capable of higher-order thinking and reasoning to solve intricate problems in the work place. This requires organizations to

educate and train anyone, anytime, and from anywhere. For this task, asynchronous e-learning, defined as instructional content or learning experience delivered or enabled by electronic technologies including the Internet, intranets, and extranets [16,25], breaks the limitations of time and space and also creates many benefits, including reduced cost, regulatory compliance, meeting business needs, retraining of employees, low recurring cost, and customer support [4,15,17]. The impact of e-learning is real and it has received fairly extensive attention from practitioners and information system (IS) researchers [31]. Furthermore, analysts forecast that corporate spending on e-learning programs will top US\$ 23 billion by 2004 [21].

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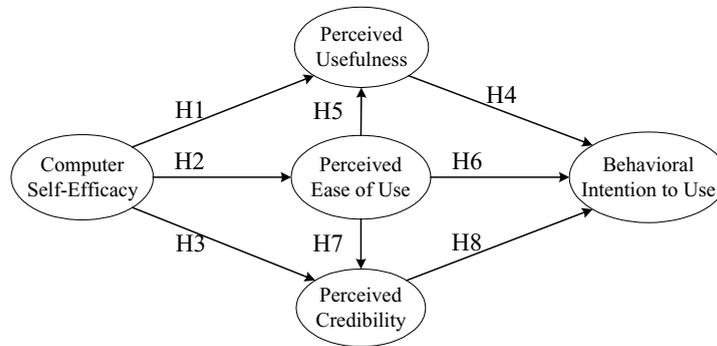


Fig. 1. Research model.

E-learning is reported to be a means of solving learning and performance problems and has become an increasingly critical issue.

Although there have been rapid advances in hardware and software capabilities, the problem of underutilized systems still remains [22,28,29,39]. The technology acceptance model (TAM) [10,11], adapted from theory of reasoned action (TRA) [3,13], has been used as the theoretical basis for many empirical studies of user technology acceptance [33,35,37]. Apparently, it is the most promising way to overcome the problem of underutilized systems. However, e-learning is relatively new and electronic learners (e-learners) are a specific user group. Thus, existing variables of TAM cannot fully reflect e-learners' motives, requiring a search for additional intrinsic motivation factors.

Privacy and security features have been heavily emphasized in the e-commerce context [5,14,32]. Protecting private information (e.g., education records³) will also affect e-learners' willingness to accept e-learning. These issues have not yet been empirically examined in an e-learning context. This study was started to respond both to prior studies' indication of the need for a broader exploration of factors beyond the original TAM [20,23] and to a prior study's suggestion for more examination of the role computer self-efficacy plays in predicting IT usage behavior [7]. The study proposes a new construct, "perceived credibility," to enhance understanding of an engineer's acceptance of e-learning. Also, it shows that computer self-efficacy

has a significant effect on behavioral intention to use e-learning.

2. Theoretical development

Similar to prior research on TAM [6,19,24], the "attitude" construct was removed to simplify the model. Fig. 1 depicts the research model for the study, excluding actual behavior but expanding computer self-efficacy and perceived credibility. This is based on prior research, which suggested that user acceptance is determined by two key beliefs: perceived usefulness and perceived ease of use. In addition, two variables, computer self-efficacy and perceived credibility were integrated into TAM to adapt it for the empirical study of e-learning.

2.1. Computer self-efficacy

In an IS/IT context, computer self-efficacy is defined as "an individual's perceptions of his or her ability to use computers in the accomplishment of a task rather than reflecting simple component skills" [8]. Significant influences of computer self-efficacy on perceived usefulness have been empirically validated. Additionally, the relationship between computer self-efficacy and perceived ease of use was based on theoretical argument [26] and this was empirically examined to see whether there exists a causal link between computer self-efficacy and perceived ease of use [2,36]. These suggest that computer self-efficacy has a significant positive effect on perceived ease of use of e-learning. The relationship between computer

³ Family Educational Rights and Privacy Act (FERPA) defines educational records as: student's date and place of birth, parent(s) and/or guardian addresses, grades, test scores, courses taken, etc.

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