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ABSTRACT

Advancements in mobile and wireless technologies hold the promise to reshape the way professionals work. With the help of these Information and Communication Technologies (ICTs), people can break free from the bounds of spatial and temporal constraints, being able to work anywhere, anytime. However, it is not clear what variables influence a user's willingness to transfer to a new ICT. Up to now, we know that users face a decision between mobility on one side and functionality on the other. Therefore, this work in progress investigates to what extent past experience with particular software applications predicts actual usage of the same applications on a mobile platform with respect to users' perceptions of system compatibility. An empirical study involving approximately 200 MIS students is proposed that uses Personal Digital Assistants (PDAs) for the duration of one semester.

Keywords

Mobile technology, wireless, PDA, experience, compatibility, usage

INTRODUCTION

Advancements in mobile and wireless technologies hold the promise to reshape the way professionals work. With the help of these Information and Communication Technologies (ICTs), employees can break free from the bounds of spatial and temporal constraints, being able to use the technology to work anywhere, anytime (Kakihara and Sorensen, 2002). Traditional investigations into the use and acceptance of a new technology have largely focused around two major research streams: the Technology Acceptance Model (TAM) (Davis, 1989) and the Perceived Characteristics of Innovations (PCI) (Moore and Benbasat, 1991), with both areas arguing that perceptions of a target system determine usage behavior. However, it seems little research to date have attempted to understand the (voluntary) acceptance process of transitioning from one ICT to another. In particular, how does one's prior experience with applications on one ICT influence the acceptance on another ICT?

THEORETICAL DEVELOPMENT

Prior Experience

In order to understand the impact of previous system experience on future system usage of a newly deployed ICT, we first examined the literature on the construct of "experience" within the TAM and PCI research domain.[1] Prior research has empirically demonstrated a positive relationship between prior experience and acceptance of microcomputer technology (Nelson and Cheney, 1997, Igbaria, 1993), as well as being a predictor of technology usage (Igbaria, Parasuraman and Baroudi, 1996, Igbaria and Iivari, 1995, Igbaria, 1990, Thompson, Higgins and Howell, 1994, Kettinger and Grover, 1997). However, despite its frequent usage in the IS literature, the construct of experience has not been theoretically understood.

[1] While TAM relies upon TRA (Theory of Reasoned Action) and TBP (Theory of Planned Behavior) respectively, the construct of experience was not an explicit part of the original theory. The construct has only been explicitly incorporated into subsequent TAM research.

Based upon our literature review, we could not find one instance where a researcher offered an explicit definition of "experience." However, using the operationalization of the construct through their data collection, we offer our interpretation of their view of experience in Table 1 below.

Author(s)	Definition
Igbaria (1990), Igbaria (1993)	"Prior computer experience" is understood as the length of usage
Igbaria and Iivari (1995), Igbaria et al. (1995)	"Computer experience" is understood as the level of experience with computer software and computer languages, and in developing computerized information systems
Igbaria et al. (1996)	"Computer skills" is defined as a combination of users' experience with computers, the training they obtained, and their overall computer skills
Nelson and Cheney (1997)	"Training" is defined as gaining the skills necessary to accomplish a task
Thompson et al. (1994)	"Experience with PCs" is understood as the length of time and computer skills acquired
Venkatesh and Davis (1996)	"Direct experience" is defined as the experience with the target system
Venkatesh (2000)	"Experience" is defined as prior (opposed to direct) experience with the target system

Table 1. Views of Prior Computer Experience

The lack of a clear-cut theoretical understanding of "prior experience" makes it necessary to propose a new definition that aids in our insights into the role of prior usage of related ICTs. According to the American Heritage Dictionary of the English Language ("Experience," 2000), experience is "active participation in events or activities, leading to the accumulation of knowledge or skill." Based upon this definition, we view experience as a higher-order construct involving two dimensions: active participation and the subsequent accumulation of knowledge. In turn, we define prior computer experience as an "end-user characteristic that encompasses both, an end-user's past exposure to a particular technology and the end user's subsequent level of expertise with the technology." We specifically define end-user exposure as "the extent to which an end user has engaged a given technology,"[2] while the level of expertise is "the degree to which a user perceives their mastery of knowledge of a given technology."

To understand the level of expertise of an individual, we will adapt the view of expertise articulated by Mayer (1997), who found that there are four types of knowledge about a task domain. Table 2 below reflects our adaptation of Mayer's schema to this context. We argue that each of these four types of knowledge (about the prior system) is the result of the experiences that the end user has with the prior system.

Type of Expertise	Our Adaptation
Syntactic Knowledge	Knowledge about how to operate the basic features of the ICT for task completion
Semantic Knowledge	Knowledge that allows the end user to develop a mental model of the ICT and the relationship between features of the ICT
Schematic Knowledge	Knowledge about how the features within the ICT can be combined into usage sets for problem solving
Strategic Knowledge	Knowledge about how to develop and use feature sets towards task completion

Table 2. Types of Expertise

Compatibility

Beyond the role of experience with a prior system, we suggest that the prior system has created a baseline within a user's cognition that is used as a comparison for any future system usage. We theorize this concept in the notion of compatibility,

[2] The notion of engagement entails an active participation with a technology, as opposed to passively seeing a technology.

stemming from the theory of Perceived Characteristics of Innovations (PCI) (Moore and Benbasat, 1991), defined as "the degree to which an innovation is perceived to as being consistent with the user's exiting values, needs, and past experiences." While the original definition incorporates three aspects, namely (1) values, (2) needs, and (3) past experiences, our literature review suggests that no research to date (e.g. Karahanna, Straub and Chervany, 1999; Venkatesh and Brown, 2001; Chin and Gopal, 1995; Agarwal and Prasad, 1998; Moore and Benbasat, 1996) has understood (and used) all three aspects of compatibility as it was originally presented. We suggest that compatibility (analogous to experience) is a higher order construct that includes three sub-dimensions: the compatibility (or consistency) of the ICT with the values of the individual,[3] the compatibility (or consistency) of the ICT with the needs of the individual, and the compatibility (or consistency) of the ICT with the past experience of the individual.

We have previously argued that experience is a higher order construct (exposure/level of expertise); however, we propose that the notion of compatibility with experience is limited to the compatibility with the level of expertise of the end user with the previous system. We have adapted the definitions of the types of knowledge within the context of compatibility in Table 3 below.

Type of Expertise	Our Adaptation
Syntactic Knowledge	The degree to which the current innovation is perceived as being consistent with the user's knowledge about how to operate previous innovation's basic features for task completion
Semantic Knowledge	The degree to which the current innovation is perceived as being consistent with the user's mental model of the previous system and the relationship between features within the previous system
Schematic Knowledge	The degree to which the current innovation is perceived as being consistent with the user's knowledge about how the features within the previous innovation could be combined into usage sets for problem solving
Strategic Knowledge	The degree to which the current innovation is perceived as being consistent with the user's knowledge about how to develop and use the previous innovation's feature sets towards task completion

Table 3. Types of Compatibility with Experience[4]

Control Variables

Given our theoretical roots within the PCI and TAM research, to ensure consistency with these streams of research, our research model includes the control variables of Ease of Use, Usefulness, and Subjective Norm. As previous research has argued, we propose that these three dimensions will independently impact the usage of a new ICT and include them in our research model. We further hypothesize that, as indicated in figure 1, the construct of overall compatibility will also have an impact on the perceptions of ease of use.

Dependent Variable

The dependent variable for our theoretical model will be the usage of an ICT. While multiple conceptualizations exist for this concept, we are attempting to understand what makes users use their technology for a longer period of time, more frequently. Thus, our conceptual definition of usage is to investigate the extent to which an individual uses an ICT and the frequency with which the ICT is used.

[3] For the sake of this research, we view "values" of the individual in a normative sense, i.e., what an ICT "ought" to do.

[4] For the definitions, we are arguing that the specific type of knowledge of the current ICT is compatible with the specific type of knowledge of the previous innovation, i.e., syntactic knowledge of the current innovation as compatible with the syntactic knowledge of the prior innovation, etc.

Level of Analysis

The level of analysis for this study is the usage of an application on a mobile ICT. This interests stems from two reasons. From a theoretical perspective, we believe that prior experience and compatibility are based upon the specific exposures that an individual had to a prior application on another platform before transferring to the new device. Second, in our examination of prior TAM and PCI research, concepts such as Ease of Use and Usefulness have consistently been investigated on the application level. Thus, our level of analysis will be on a specific application on a mobile ICT.

RESEARCH METHOD

Based on our theoretical discussions, we propose the research model depicted in Figure 1.[5]

To measure each of these constructs, we will use existing measures for constructs that have previously been measured and create new ones for the new constructs that we have presented. [6]

Research Context

The research model described above will be measured through approximately 200 MIS students using PDAs (Compaq IPAQs h5450) with integrated WiFi capability during the current and next semester. The transition from a desktop to a PDA environment represents a typical situation 14 million U.S. users are facing (or have faced) in the recent past (PalmInfocenter, 2004). Students will fill out a survey instrument reflecting the constructs in Figure 1 after two months of usage.

Data Analysis

Each of the constructs measured above represents a latent variable, or a variable that cannot be measured directly. Thus, an appropriate analysis tool should allow us to understand how the latent variables relate to one another. To achieve this objective, the chosen approach is Structural Equation Modeling (or SEM), a second order data analysis technique; specifically, we will utilize a PLS-based approach to analyze the data.

CONCLUSIONS

Advancements in mobile and wireless technologies hold the promise to reshape the way professionals work. Yet to take advantage of these advancements, organizations need to find ways to motivate their employees to use these new ICTs. Given the unique nature of mobile devices to extend one's work flexibility beyond geographical, temporal, and contextual constraints (Kakihara and Sørensen, 2002), we believe that this paper contributes to our understanding of an end user's move from a traditional environment to a mobile device. Thus, the paper elaborates on the construct of experience and provides a new conceptualization, tying experiences within a similar system to usage of a new system. Further, we examine the question of users' willingness to transfer from a traditional desktop/laptop environment to a mobile ICT through the lens of compatibility, broadening our understanding of compatibility to include the three dimensions of values, needs, and prior experience. Finally, this paper ties these all of these understandings into a conceptual model that is theoretically sound and will begin helping our colleagues-in-practice by giving them insights toward achieving the results that they desire – usage of mobile ICTs.

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[5] Each of the constructs has previously been defined within our literature review.

[6] They are available from the authors upon request.

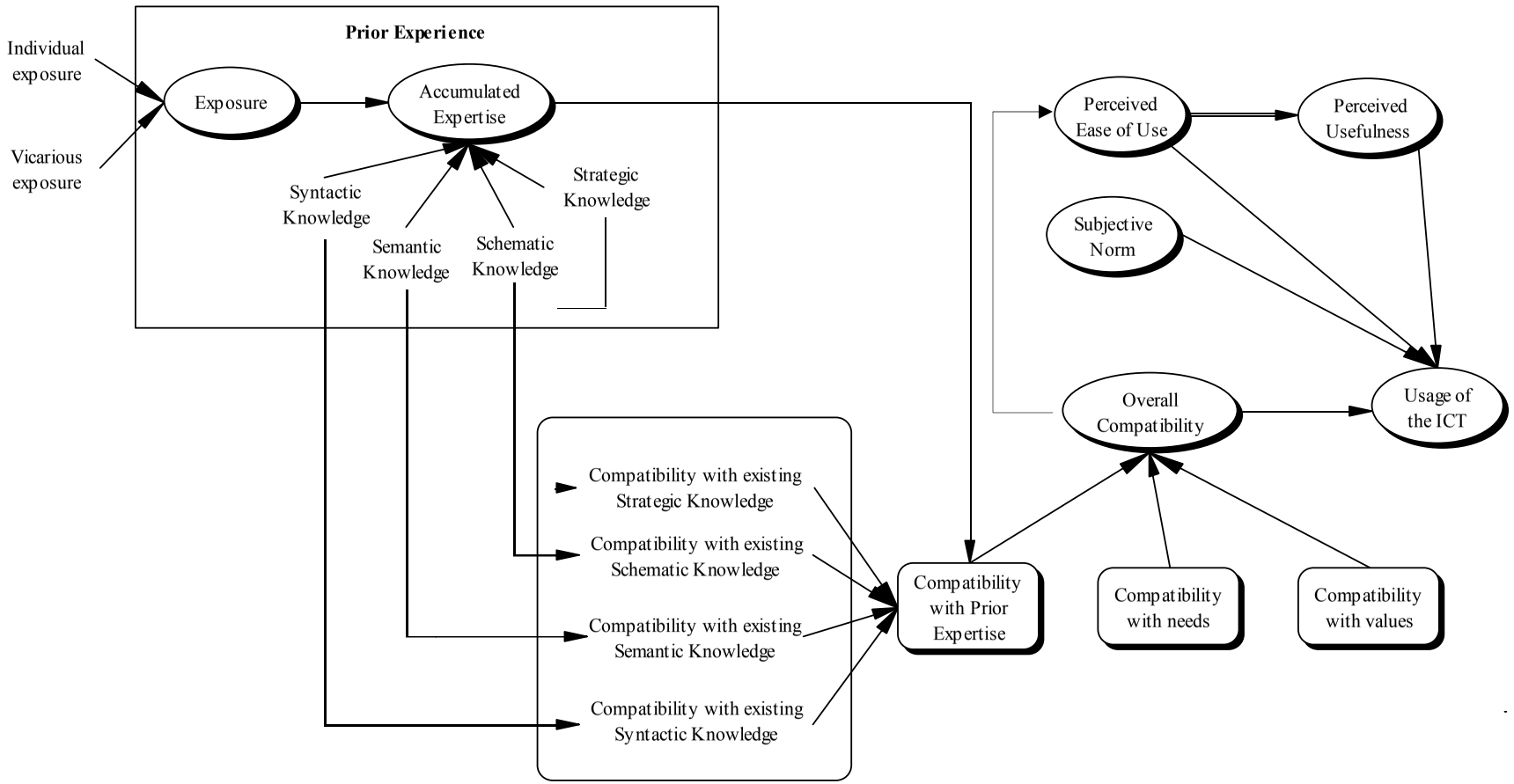

Figure 1. Proposed Research Model

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