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# **Application of a Framework for Information Technology Use and Individual Performance**

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Research investigating the use of I/T is motivated by the desire to help understand, predict, and to some extent control the factors which influence I/T use and individual performance. Despite a common motivation for investigation, a very diverse group of research efforts has emerged. The objective of the research reported here is to synthesize these divergent efforts into a common conceptual framework, titled UTIP (Utilization of Technology and Individual Performance) which is presented in Figure 1. Note that construct names in UTIP are intended to encompass constructs from multiple sources (e.g., complexity beliefs encompasses ease of use and technology complexity).

Because of space limitations, only a small subset of the relevant references are cited. The underlying theories include motivational theories of attitudes and behaviors (Ajzen, 1985; Triandis, 1980); the application of attitude theories to an I/S context (Davis et al., 1989; Thompson et al., 1991); computer self efficacy (Bandura, 1986; Compeau and Higgins, 1995); computer playfulness (Webster and Martocchio, 1991); expectancy theory (DeSanctis, 1983; Robey, 1979); the diffusion of innovations (Cooper and Zmud, 1990; Moore and Benbasat 1991; Rogers, 1983); task/technology fit (Goodhue, 1995); investigations of I/S utilization and I/S success (Trice and Treacy, 1988; DeLone and McLean, 1992); and previous efforts to consolidate some of these research streams (Goodhue and Thompson, 1995; Thompson and Rose, 1994).

When these research efforts are examined closely, it appears that the definitions and measures of many of the underlying concepts and constructs have strong similarities (see Table 1). For example, beliefs about the complexity of the IT (Rogers, 1983) or perceived complexity (Moore and Benbasat, 1991, 1993; Thompson et al., 1991, 1994) appears similar to ease of use (Davis, 1986, 1989; Davis and Bagozzi, 1989). There are also strong similarities with the concept performance expectations (Campeau, 1993), expected outcomes (DeSanctis, 1983), perceived usefulness (Davis et. al., 1989). On the other hand, differences exist in some basic conceptualizations, such as whether attitudes (affect) intervene between beliefs and intentions to behave (Davis, 1989), or whether intentions are even that important within the context of IT adoption and use (Goodhue, 1993).

The UTIP model argues that the influence of system utilization on individual performance is moderated by two important factors; (1) the relevant expertise (skill level) of the individual, and (2) the actual (not perceived) degree of fit between the job tasks and the information technology (or information system) being used. The dashed line from task characteristics to performance is intended to illustrate that performance is also influenced by many other factors, one of which is the design of the tasks. The dotted lines represent feedback loops; for example, utilization influences relevant expertise. The remaining lines indicate the primary hypothesized influences (secondary influences are omitted).

## **Application of the Model**

The UTIP model is too large and complex to use effectively in a single research study, although support has been obtained from previous research for many of the paths. The intent of this ongoing research effort is to (1) identify criteria (for example, the stage in the diffusion of the I/T) for determining the most appropriate subset of the model to employ for a given research application; (2) identify relevant dimensions of the higher order constructs (such as task/technology fit), and identify appropriate measures of these dimensions; and (3) continue to update the model by testing subsets and incorporating relevant research as it is disseminated.

To illustrate use of the model, a subset (Expertise, Self Efficacy, Expectations, Intentions, etc.) was selected for a specific situation (the optional use of the Microsoft Exchange e-mail system). A cross-

sectional study was designed, and responses to a survey instrument obtained from approximately 50 respondents. At the time of writing, the data analysis had not been completed.

A longer version of this paper, which details the theoretical underpinings of the model and provides a more comprehensive comparison of constructs from numerous research efforts, is available from the author. Once the data analysis has been completed for the study mentioned previously, the paper will be updated to reflect the results. It should be noted, however, that the specific research study is secondary to the model. The intent is to use the model as a framework to guide future research efforts.

### **Table 1**

**Task Characteristics** (interdependence with other jobs; non-routine nature of tasks, etc.)

**Technology Characteristics** (compatibility, trialability, complexity, visibility, etc.)

**Relevant Expertise** (relevant experience, skill, training)

**Computer Playfulness** (cognitive spontaneity in IT use)

**Task/Technology Fit** (actual degree to which the IT matches needs of job tasks);

**Social Factors** (roles, norms, etc.)

**Habit** (continued use of a technology without a conscious decision to do so)

**Facilitating Conditions** (objective factors which make utilization easy or difficult)

#### **Perceived T/T Fit**

Relative Advantage (Rogers, 1983; Moore and Benbasat, 1991, 1993)

Perceived Usefulness (1989; Davis et al., 1989)

Job Fit (Thompson et al., 1991, 1994)

Task/Technology Fit (Goodhue, 1988, 1992, 1993)

**Self Efficacy** (Bandura; Hill et al., 1987; Campeau, 1993)

**Social Image** (beliefs about how referent others will view my use of the IT)

Image (Moore & Benbasat, 1991, 1993)

Social Factors (Triandis, 1980; Thompson et al., 1991, 1994)

**Performance Expectations** (belief that a certain level of use will result in certain performance outcomes)

Long-Term Consequences (Thompson et al., 1991)

Expected Outcomes (DeSanctis, 1983)

Outcome Expectations (Campeau, 1993)

**Complexity Beliefs** (perceived difficulty in using IT)

Complexity (Rogers, 1983; Moore & Benbasat, 1991, 1993; Thompson et al., 1991)

Ease of Use (Davis, 1986, 1989; Davis et al., 1989)

**Personal Expectations** (belief that use will result in certain personal outcomes)

- Personal Outcome Expectations (Campeau, 1993)

**Perceived Control** (perceived control over decision of whether or not to use the IT)

Voluntariness of Use (Moore & Benbasat; 1991, 1993)

Facilitating Conditions (Thompson et al., 1991)

Perceived Behavioral Control (Ajzen, 1991)

**Affect** (feelings of like/dislike related to use of the IT)

Affect (Davis, 1986, 1989; Davis et al., 1989; Thompson et al., 1991, 1994)

**Intention to Use** (intent to use IT)

**Utilization** (frequency and duration of use; dependence on the IT)

**Performance** (measurable outcomes from IT use)

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Figure 1