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Abstract

The rapid pace of IT change is rendering the skill-sets of many IT professionals obsolete. Organizations are retraining software developers with proficiencies in legacy systems to Internet-based and object-oriented proficiencies. This type of retraining is not incremental, but entails discontinuous cognitive and procedural shifts. Given its importance and cost, processes that impact the effectiveness of retraining should be considered. Trainee motivation is one such process. Our research proposes and tests a model of motivational intentions and antecedents in the IT retraining context.

Introduction

Advances in IT continue to provide organizations with new opportunities. Organizations can reach global markets through electronic commerce, use agile organizational structures such as virtual teams, and expand their product offerings with knowledge-based products and services. Yet, to leverage these opportunities, firms are requiring new and different skills from their IT professionals. A recent survey of 500 companies found that recruiting and retraining employees are IT executives biggest nontechnology challenges (Chadbrow 2000). Firms should consider how to most effectively retrain existing employees to have updated skills. Pretraining motivation significantly affects training outcomes (Colquitt et al. 2000). Because pretraining motivation is more malleable than other factors, such as cognitive ability it is important for practitioners and researcher alike to understand the variables that affect the motivation to retrain in an IT context.

This paper proposes and tests a model of the individual motivation to retrain in IT. This is an extension to prior research in several ways. First, we specifically investigate *retraining*. That is, the training of employees whose current knowledge and skills have begun to obsolesce and will require significant, rather than incremental, change. Also, we specifically addresses the IT professional. Previous research concerning IT training and motivation has primarily concentrated on the end-user (e.g., Igbaria et al., 1996). However, in today's environment where technologies are rapidly changing, focus must also be given to the retraining of IT professionals. To investigate the retraining issue, we examine the transition from a legacy to an object-oriented development environment.

The theoretical basis for our investigation of the motivation to retrain is the Theory of Planned Behavior (TPB) (Ajzen 1991), a well-accepted model of motivation. We describe our extensions to this theory, proposing a motivational model customized specifically for the IT retraining context. Next, we outline a field study being conducted at multi-site organization in which this expanded theory will be tested. We conclude by briefly discussing the implications of the model.

Research Model

The TPB postulates that the direct antecedent of any behavior is the intention to perform it. Strength of intention has been equated with strength of motivation. Three constructs are proposed as determinants of intention: (1) *attitude* (A_B) - the individual's evaluation of the favorableness of the particular behavior, (2) *subjective norm* (SN_B) - the perceived social pressure from specific others to perform or not to perform the behavior, and (3) *perceived behavioral control* (PBC_B) - an individual's confidence in their ability to perform the behavior. Our first set of hypotheses relate to the original TPB model to test its applicability in this context. They are as follows:

HYPOTHESES 1a-c: Attitude (1a), subjective norm (1b) and perceived behavioral control (1c) all have positive and unique effects on the intention to retrain.

HYPOTHESIS 2a: Attitudes toward retraining are a positive function of the beliefs that retraining will lead to personal outcomes, multiplied by how positive or negative those outcomes are expected to be.

HYPOTHESIS 2b: A person's subjective norm about retraining is positively and interactively determined by normative beliefs that salient social referents think he or she should take part in retraining and motivations to comply with those referents.

HYPOTHESIS 2c: A person's perceived behavioral control about retraining is positively and interactively determined by control beliefs of resources or barriers that might influence retraining and the importance of those barriers or resources.

We propose other constructs are important in a retraining environment as well. They are discussed in the following sections.

Perceived Skill-Set Obsolescence

Current literature suggests that skill obsolescence is a concern of many IT managers and professionals (McGee 1998). With the pace of technological change ever increasing, maintaining the latest cutting-edge technological skills is a difficult challenge (Moore 2000). We propose that those who perceive that their skills are becoming obsolete, yet are offered the opportunity to update their skills, will be more favorable in their beliefs towards retraining.

HYPOTHESIS 3: There is a direct linear relationship between perceived skill-set enhancement and Σ *behavioral belief*$_i$ * *evaluation*$_i$

Anticipated Time Remaining in Software Development

Human Capital Theory (Becker, 1993) proposes that employees may differ in their desire to invest in training for new skills, as a function the anticipated payoff for their efforts. Individuals closer to retirement, or those who do not intend to remain in software development may be less willing to invest in retooling because of a shorter stream of payoffs. Shifting to a new environment comes at a greater cost. Therefore the beliefs and evaluations will tend to be more negative for those with a shorter time to reap the rewards of the efforts.

HYPOTHESIS 4: There is a direct linear relationship between length of time remaining in software development and Σ *behavioral belief*$_i$ * *evaluation*$_i$

Length of Time in the Development Paradigm

Individuals who have spent more time working with methodologies associated with legacy system development have a greater investment in terms of time and skills in this environment than those with less experience. Because of the sunk cost in the existing paradigm, shifting to a new environment may be viewed as more expensive (Staw & Hong 1995). Therefore the beliefs and evaluations will tend to be less favorable than those that have less invested in the older development methodology.

HYPOTHESIS 5: There is a direct linear relationship between length of time in the development paradigm and Σ *behavioral belief*$_i$ * *evaluation*$_i$

Those who have been using the same methods in their jobs for many years may lack confidence in the ability to learn new tasks, especially if the procedures are extremely different. Object-oriented methodologies require trainees to learn not only new procedural skills, but also major methodological shifts. Anecdotal evidence suggests that some individuals experienced in the traditional development methodologies may have difficulty in switching to the object-oriented paradigm (Lee and Pennington 1994).

HYPOTHESIS 6: There is a direct linear relationship between length of time in the development paradigm and the Σ *control belief*$_k$ * *perceived power*$_k$

Age

When considering the outcomes of retraining, an individual's age can influence evaluations. Several authors have suggested that age determines whether an individual is willing to learn new skills (Fossum et al., 1986). Human Capital Theory (Becker 1993) proposes that employees may differ in their desire to invest in training for new skills, as a function of age.

HYPOTHESIS 7: There is a direct linear relationship between age and Σ *behavioral belief*$_i$ * *evaluation*$_i$

The object-oriented paradigm requires different conceptualizations than traditional legacy system development (Scholtz et al., 1993). Past empirical evidence has found that older workers were not as likely to volunteer for training programs because they had little confidence in their learning ability (Rosen et al., 1965). Gist et al (1988) found that older employees who were trained with a self-efficacy enhancing training technique out-performed those trained with a different technique. Therefore, bolstering older employees' confidence in their ability to successfully master OO retraining may be a critical consideration for organizations.

HYPOTHESIS 8: There is a direct linear relationship between age and Σ *control belief*$_k$ * *perceived power*$_k$

Methodology

Software developers from a large firm in the travel industry were involved in this study. Employees from seven geographically dispersed locations participated. Our investigation consisted of three phases: an elicitation study used as basis for survey development, an extensive pilot study to modify the survey instrument, and the administration of the final survey.

The elicitation study was comprised of three focus groups of 27 developers, lasting approximately 1½ hours per session. Because the TPB prescribes that the scales used to measure the model's constructs be specific to the behavior under investigation (motivation to retrain in our case), using existing measures was not possible (Ajzen 1991). Based upon the elicitation study, survey items were developed. The written survey instrument was refined through an extensive pilot phase consisting of several iterations. 183 software developers completed the final instrument.

Implications of the Research

Because the requirement for retraining in the IT area continues to grow, a theoretical basis by which organizations can further investigate, understand and leverage motivation is useful and important Our research can potentially help organizations focus on these key variables in order to enhance motivation and subsequent achievement in IT retraining courses by uncovering the key attitudes that are important in motivating employees to retrain, the types of people who are most influential in encouraging retraining, and the potential barriers to retraining.

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