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Identifying the Constructs of IT Personnel Transition

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Abstract

This paper reports the initial findings from a National Science Foundation supported study of IT personnel transition. The findings are the result of a revealed causal mapping process (Nelson et al. 2000) that elicited what IT personnel believe are the constructs and concepts of IT personnel transition. This paper reveals new knowledge and insight into factors that enable IT personnel to transition as their organization evolves.

Keywords: IT personnel, transition, causal mapping

Introduction

Information technology (IT) organizations within companies are experiencing a great deal of change. In-house IT organizations are transitioning from legacy system technology to distributed and advanced technology. Work practices that were ad hoc are being redefined with software engineering discipline. IT professionals who once produced products and services that were "thrown over the fence" to in-house customers are now expected to be full business partners. All of these organizational changes require individual IT professionals to make significant personal transitions. At the same time that in-house IT organizations are being redefined, a significant shortage of qualified IT personnel exists (Brancheau et al. 1996). This shortage makes it difficult to hire new employees, and results in a greater need for IT professionals successfully transition.

Theory and Methodology

IT personnel transition is a phenomenon not well understood, and not well studied in the IT literature. A high proportion of the literature on general personnel transition deals with the individual transition from worker to manager (Cole 1979, Burke and McKeen 1994). However, several studies have shown that IT personnel do not always hold management as a career goal. As the IT field continues to evolve, the need for non-management personnel to transition to new roles will be strong (Reich and Kaarst-Brown, 2000). IT personnel hold a great deal of business domain knowledge about their organizations, and this knowledge must transition with them as the IT role evolves. As organizations change and grow, learning occurs that results in new needs and new types of jobs (Miner and Robinson, 1994). This phenomenon can be greatly accelerated in the IT area, due to new technologies constantly being introduced and new work methods, such as rapid application development and software engineering, being utilized to maximize these technologies.

No theories exist that address IT personnel transition, but some general theories of personnel transition can be used to understand the phenomenon. Therefore, revealed causal mapping (RCM) was used to explore IT personnel transition, to elicit its constructs and concepts, and to build mid-range theory in this critical area of IT. A thorough tutorial of RCM can be found in Nelson et al. (2000). Revealed causal mapping is an excellent method to build mid-range theory because it uses generalized frameworks and

theories from existing domains to elicit domain specific constructs, concepts, and linkages where none have previously been revealed (Nelson et al. 2000).

Eighty IT analysts from eight organizations were interviewed for this study. The respondent's causal statements were categorized and coded into concepts through the extensive RCM validation process described in Nelson et al. (2000). The point of redundancy, where no new constructs were revealed by the respondents, was calculated to be thirty, demonstrating a more than adequate sample size. This paper presents only a fraction of the interpretation of the final RCMs: the constructs and concepts of IT personnel transition. Respondent demographics are shown in Table 1.

Table 1. Descriptive Statistics of Respondents

	Mean (n = 80)	SD
1. Experience with current project (years)	5.80	6.10
2. Tenure with company (years)	10.77	8.61
3. Age (years)	42.41	9.94
4. Gender	Female n = 36 Male n = 44	
4. Education:		
High School (%)	15.00%	
Associates degree	16.25%	
Undergraduate degree	46.25%	
Graduate degree	16.25%	
Post Graduate degree	2.50%	
Not reported	3.75%	

The Concepts and Constructs That Enable It Personnel Transition

Personal Competencies

During periods of transition, individuals are required to adapt to new role expectations and job requirements. In the past, competencies have been defined narrowly in terms of job skills and abilities (Elkin 1990), or have been broadly characterized as everything that people know and can accomplish (Mischel 1979). Our respondents described personal competency as the set of skills, traits, and abilities that uniquely identify an individual and influence the person's personality and behavior. Table 2 lists the critical concepts elicited from interviewees.

Table 2. Personal Competencies

Concept	Respondents' perception of concept
Technical skills	Application of new technology to IT projects
Training	Availability of formal and informal training courses and the time to take advantage of the training resources
Team skills	Necessity of working well in teams to accomplish project goals
Logical and analytical thinking	Ability to methodically analyze projects and define solutions
Business domain knowledge	Understanding of the organizational goals and direction and how it relates to IT

Interviewees were asked open-ended questions about their personal contributions to their organizations and their short- and long-term goals. Our respondents indicated that IT personnel need opportunities to attend training and a chance to apply the techniques they learn to projects in order to develop sustained and practical knowledge that will benefit the organization. One respondent said: "*We don't know what it is we're going to need to know in the future, because we don't know what's gonna (sic) be required of us. It's difficult to know what to go out and train for*." So, for some workers, it is important for them to know what skills will be required before they will commit themselves to change.

Domain knowledge is also an important enabler of IT personnel transition. One respondent stated: " *I've talked with almost all of the field managers and I've talked with people here in the building at several different levels. So, I think I've got a pretty good knowledge and understanding of what people are using, where they're headed, what they're going with on that*." This person sees the advantage of developing business knowledge to assist him in meeting user needs on IT projects, both now and in the future. Technology should assist organizations in leveraging their business knowledge (Duffy 2000). When analysts understand the problem within the context of the business domain, they are more likely to be able to transition to new business environments.

Environment

As a construct, environment often appears in the literature, but is infrequently defined. A common understanding seems to be assumed (Reger, et al. 1994). For this study, environment is the perceptual result of a temporal, physical or social frame within which an entity resides and/or functions. This frame is fairly stable over time, however, in this period of transition, technology is shifting from a legacy environment to a distributed, advanced technological environment (Griffith and Northcraft 1996). Table 3 identifies the most important concepts regarding the transition environment that were elicited from our respondents.

Table 3. Environment

Concept	Respondents perception of concept
Integration of new technology	Adoption and use of new technology, integration with legacy systems, and opportunities to apply new skills
Work identity	Understanding of changing role expectations
Training goals	Taking advantage of available training
Team Environment	Importance of collaboration and being part of a team

Interviewees were asked to describe their current work environment and corporate support for adapting to change. The environment impacts employees at several levels. The technology environment occurs at the organizational level. Teamwork is a group level environmental factor. Work identity and training goals are within the individual's personal environment, but interact closely with the organizational and group environmental factors.

The work identity of the IT professional is changing due to changes in both the organizational and group environments. By "work identity" we mean the individual's assessment of job-related expectations and responsibilities. As touted in practitioner journals, in many organizations, IT professionals are no longer called programmers, a term characterizing employees who write code for software applications (Hayes 1998). With the adoption of the term "analyst", responsibilities are often enhanced to include requirements gathering, training, testing, and integration, among others (Todd, et al 1995). The implication is that the IT professional is not simply writing code, but is also expected to understand and translate business processes into a technology solution (Markus and Benjamin 1996, Nelson and Cooprider 1996).

One item we found particularly interesting was the lack of transferable skills mentioned by the respondents. Many of the IT professionals defined themselves only in terms of technical abilities, such as programming expertise. In contrast, few identified general capabilities that also contribute to the performance of the organization. One transferable skill is business domain knowledge, which develops over time and is very difficult to replace. Newly hired workers may be in cutting-edge technologies, but they lack basic awareness of the functions of the organization. Another desirable skill is project management. Experience in working a number of projects enables IT professionals to gain confidence and their organizational capabilities. Additionally, IT organizations are becoming more customer-focused and people skills are becoming more crucial. The respondents appear to place greater value on their technical abilities, and discount the vast array of generalizable abilities that would help them make IT transitions. In a fast changing technical environment, transferable skills become more important than technical expertise (Carrillo 1997).

Attitude

Although several definitions of attitude exist, the construct of attitude may generally be defined as an evaluative judgment of some person, object, or event (Fishbein, and Ajzen 1975). The attitude concepts identified most frequently by our respondents as enabling IT personnel transition were:

Table 4. Attitude

Concept	Respondents perception of concept
Acceptance of change	Understand the need for change and the benefits that will result from change
Attitude toward change	Look forward to change and seek out opportunities to be involved in change
Impact of pace of change	The way IT professionals feel about change processes and the nature of management imposed deadlines for change efforts
Attitude toward new technology	Attitude toward a work environment where technology is consistently upgraded
Perceived support through management communication	The perceived amount of communication respondents have from management regarding change, the extent to which IT personnel believe managers will listen to their concerns and consider them valuable to the transition process

All interviewees were asked open-ended questions about their feelings toward change. One respondent's response was; *"I love it. Change keeps me going. I mentioned earlier that I get bored very easily and that is probably the thing I am most sensitive to in a work environment"*. This quote reflects the fact that the respondent values change and has a positive attitude toward transition.

Previous research has demonstrated that employee attitudes directly correlates with organizational commitment and job satisfaction (Schappe 1996). This implies that positive employee attitudes result in an increased level of commitment to the organization, and commitment can lead to employee support for organizational change and the individual's willingness to continually transition (Karahanna and Straub 1999, Ajzen and Fishbein 1980).

Motivation

Much of the general literature on personnel transitions cites individual motivation and goals as key factors in successful transitions (Atkinson 1964, Vroom 1964, Steers and Porter 1991, Jones and Harrison 1996). This finding has also been relatively consistent in studies specifically looking at IT personnel (Couger and Adelsberger 1988, Igbaria et. al 1993, Reich and Kaarst-Brown 2000). Our respondents also indicated that motivation was a key enabler of IT personnel transition. Motivation concepts most frequently identified by our respondents as enabling IT personnel transition were:

Table 5. Motivation

Concept	Respondents perception of concept
Job satisfaction	Enjoyment of the functional nature of work
People environment	The level of social interaction and cultural acceptance within the IT professional's department and/or the organization, and the extent to which they like their coworkers
Job challenge	The amount of creative problem solving required in job tasks, autonomy in finding solutions to problems, and the amount and frequency of new skills needed to achieve job success
Compensation	Salary, bonus, monetary rewards
Continual learning	Ongoing training, formal classes, and peer learning

One respondent said: *"It is a great place to work. I get to learn a lot. I get to play with lots of very close to state of the art equipment and I get to work with some great people"*. Continual learning and people environment were consistently cited as contributing factors to work motivation. Although it was not mentioned as frequently as other concepts, "playing with toys" and experimenting with new, fun technology did emerge as a motivating factor as well, as is evidenced in the above quote. The IT professional quoted also indicates that change is viewed as a cognitive stimulus, creating an interesting work environment which serves as an intrinsic motivator, which is a function of the nature of the task being performed (Gill, 1996). People environment also served as a motivating concept, in that the nature of social interaction with coworkers and the extent to which respondents felt included in the social culture of the organization determined their level of motivation.

Individual Outcomes

The individual outcomes construct was described by our respondents as expected future outcomes of experiencing a change in their job. The most common responses described outcomes relating to job satisfaction, job performance, acquiring new technical skills and feelings of achievement. Outcomes at other levels were also mentioned; team level and organizational level, but the number of responses that dealt with individual level outcomes was far greater. Table 6 identifies important concepts regarding individual outcomes elicited from our respondents:

Table 6. Individual Outcomes

Concept	Respondents' Perception of Concept
Job Satisfaction	Expected enjoyment of the functional nature of work
Job Performance	The ability to successfully fulfill job requirements
New Technical Skill Acquisition/Retraining	Acquiring new technical skills through experience or retraining
Achievement	The extent to which the worker expects to "see results" and feel productive

In general, respondents like the type of work that they do and expect to continue enjoying their job. One interviewee commented, "*I enjoy this kind of work where I'm working in an atmosphere that I feel I'm contributing and I'm getting along with the people*." Respondents tend to see change as part of the job and the transitions that come with change leading to long-term benefits in their career. As part of those transitions, employees often look forward to learning new skills and the challenge of learning new technology.

IT Support and Direction

IT support was described by our respondents as the support an employee receives from higher levels in the company such as immediate supervisors and upper management. This support can be in the form of support at the individual level, or at the company level. Individual level support includes support from the immediate supervisor in terms of one-on-one emotional or career support, and indirectly through the manager's style of managing the group as a whole. Company level support is provided through company-wide policies such as training availability, personnel policies, and opportunities to use new skills.

IS direction is identified as the current strategic direction and focus of the company that is perceived by the employee. To the extent that employees understand the corporate direction and focus, they understand the need for change and are more willing to embrace the change.

Table 7 shows the concepts of IS support and direction most frequently mentioned by our respondents:

Table 7. IT Support and Direction

Concept	Respondents' Perception of Concept
Support from Manager	Perceived emotional and career support from the immediate supervisor
Availability of Training	The amount of training that is made available through formal company channels
Corporate Support of Personnel Training	Company support of individual efforts to acquire training
Corporate Technology Direction	Company technology direction that is forward-looking and consistently communicated

Two levels of support, individual and company level emerged from our respondents. IT personnel felt most supported by managers who provided encouragement during transitions. Prior research also shows that organizational encouragement at all levels increases employee risk taking, idea generation, and valuing innovation, all necessary elements of embracing change.

At the organization level, interviewees identified availability of training and support for training as most important for enabling transition. Researchers have also identified corporate level training support as a contributor to the efficacy of organizational change strategies (Brown and Seidner 1998). Although most IT employees like learning the new technical tools, at the same time they feel vulnerable to technical obsolescence (Sanders, 1999) and also feel that they should not shoulder the burden of retraining alone when changes in technology are imposed from the top (Brown and Seidner 1998). One respondent said, "*[Administrators] are committed to reaping the benefits of their investment in technology …They understand the benefit and therefore, generally do a good job of supporting us and that kind of flows down from them to the bosses in our department and which in turn, flows down to us*." When employees feel that the technical direction of the company is part of an overall business strategy, they are more willing to embrace technical changes. Employees who have a positive attitude toward the company's technical direction will be more willing to undergo training and hence, successfully transition (Carlson et al. 2000).

Conclusions

This paper is a first report of a large-scale study of IT personnel transition. The six constructs and their underlying concepts were evoked using the RCM method. While IT personnel transition is an individual level phenomenon, this study reveals that environment, and both managerial and corporate IT support and direction are constructs that influence the ability of individuals to transition. The next phase of this study takes the revealed causal maps of IT personnel transition and develops a survey instrument to further validate the constructs listed in this paper using confirmatory factor analysis.

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