An Exploration of the Culture of Information Technology: Focus on Unrelenting Change

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Abstract

Based upon sociological theories of occupational culture (e.g., Van Maanen & Barley, 1984), this study focuses on information technology (IT) culture as perceived by experienced IT professionals. Using a qualitative methodology, this exploratory study examines perceptions of these professionals regarding technological change utilizing data gathered from individual interviews as well as from focus groups.

The findings are presented in three sections: (1) the constructive aspects of change: change energizes, change offers interest and diversity, and change involves excitement and variety; (2) the difficult aspects of change: the frustration of relentless change, the frequent lack of support by the organization for retraining, and the never-ending cycle of "learning"; and (3) change and IT culture.

Keywords: information technology, technology work, occupational culture, continuous change

Introduction

Since the 1990s, information technology (IT) has emerged as an essential element in the business environment and has been recognized as a critical component of business strategy. Technology not only enables organizations to compete in global markets and to increase responsiveness to customers and partners, but also has the potential to transform how organizations operate by affecting the nature of work processes (e.g., Blanton, Watson, & Moody, 1992; Ferratt, Ahire, & De, 2006; Lee, Trauth, & Farwell, 1995; Masino, 1999; Pearlson & Saunders, 2006). The IT industry—driven by the speed of technological advances as well as radical changes in hardware, systems, and applications—exerts pressure on organizations at all levels, and professional, technical employees are particularly impacted. Technology professionals are expected to keep technical skills up-to-date, to keep computer applications functioning flawlessly 24 hours a day, seven days a week, and to develop relevant, responsive applications that meet organizational needs (e.g., Biskup & Kautz, 1994; DeMarco & Lister, 1999; Gordon & Gordon, 2000; Longenecker, Simonetti & Mulias, 1996).

IT Professionals

In 2004, the information technology workforce in the United States was reported to consist of approximately 10,500,000 people, including the job categories of programming, technical support, enterprise systems, database, web development, network administration, digital media, and tech writing

Accepting Associate Editor: Alf Steinar Sætre

(ITAA, 2004). The most valuable IT workers are those consistently able to solve business problems and address business opportunities with information technology.

IT workers have been described as dedicated and involved in the work they perform for their organizations, and they express an interest in solving business issues (e.g., Melymuka, 2000; Ross, Beath, & Goodhue, 1996; Smits, McLean, & Tanner, 1993). The desire to make a contribution and to have an impact on the organization's success concerns these workers. When technology workers "aren't allowed to play an important role in their organization's success, are misunderstood and kept at arm's length by the business side or are given an unreasonable set of expectations from management, you can expect unrest in the ranks" (Ouellette, 1999, p. 50).

Mottl (2000) reports that for both IT employees and managers, "money isn't the only factor that's important…The most important criteria for both groups are job challenge and responsibility level, flexible work schedule, and job stability" (p. 223). In instances where IT workers are not as satisfied with current salary levels, Radcliff (1999) reported that "training, or the opportunity to work with leading-edge technology, is why they stay with their current employers, despite lower-than-average pay" (p. 44). Melymuka (2000) states:

> In IT, you're either going forward or backward, there's no in-between. Information technology folks who are moving forward—learning new skills, taking on stretch assignments and building their careers—are satisfied in their jobs. Those who are unable to get the training they want or who lack opportunities to take on challenging new assignments say they're unhappy because they feel they aren't working to their full potential. (p. 54)

In short, this profession requires that workers continually retrain.

IT Work

In a competitive environment driven by economics and technology, successful organizations must weigh the risk of implementing systems that employ new technologies against the cost of falling behind technologically (e.g., AlBanna & Osterhaus, 1998; Nunamaker & Briggs, 1996). The shortened market life of software products and accelerated time-to-marketplace also exert pressure upon systems developers (Sawyer, Farber, & Spillers, 1997). Success in this environment depends "less on the transfer of technological implements than on adopting the characteristics of a learning organization: a mature process, a culture supportive of continuous change, and effective management" (AlBanna & Osterhaus, 1998, p. 7). The ability to manage continuous business change through software development projects puts increased demands upon technology workers as well as upon the software itself.

One of the largest challenges for all classifications of IT professionals continues to be the energy and effort required to keep technical skills current. The necessity to assimilate increasing amounts of new knowledge (e.g., Benamati & Lederer, 2001; Lee et al., 1995; Ryan, 1999; Swanke, 1999) is a source of major stress for those engaged in IT work. "Maintaining competence is a continuous challenge resulting from the continuous stream of technical innovation in applications, as well as the capability, diversity, and complexity of IT and the importance of IT innovation in the overall performance of organizations" (Schambach & Blanton, 2002, p. 83). Not only are advancements being made in technology's hardware (microprocessors, storage medium, optical disks, etc.), but countless changes also affect software development methodologies (Lee et al., 1995). Technology is changing so rapidly and is so complex that IT professionals find themselves caught in the turbulence of contemporary organizations (e.g., AlBanna & Osterhaus, 1998; Biskup & Kautz, 1994).

IT Culture

Traditionally, sociologists have referred to the study of how groups of people share meaning and resolve their common problems as the study of *culture* (e.g., Barley, 1983; Hofstede, 1991; Louis, 1980; Schein, 1992). Later research describes contemporary organizations as multicultural entities (e.g., Barley, 1996; Gregory, 1983; Martin, 1992; Schein, 1996). Within this literature, Van Maanen and Barley (1984) describe the subculture component as an *occupational culture*, defined as:

> a group of people who consider themselves to be engaged in the same sort of work; who identify (more or less positively) with their work; who share a set of values, norms, and perspectives that apply, but extend beyond, work-related matters; and whose social relationships meld the realms of work and leisure. (p. 295)

Thus, the occupational culture perspective focuses on the meaning of the work role from the perspective of those who engage in it (Chase, 2002). "Members of occupational communities are favourably oriented toward their jobs and careers. To them, work is more than merely 'making a living;' it is a source of meaning and value" (Van Maanen & Barley, 1984, p. 308).

Several studies have identified elements of an occupational culture in technical employees of various kinds. The research of Gregory (1983) examined the "native" viewpoint of Silicon Valley technical professionals and focuses on how technical professionals from a wide variety of companies managed their careers. Kaarst-Brown and Robey (1999) presented a cultural theory relative to the management of IT utilizing the metaphor of myth and magic to describe archetypes of IT culture.

Prager (1999) maintained, "We all know intuitively that IT professionals behave differently than everyone else. . . . In fact, separate organizational cultures exist for IT professionals and non-IT employees based on a different set of organizational behaviors" (p. 12). Interestingly, Prager also reported that the world view of IT professionals has a tendency to change over time, and eventually these professionals may behave more like non-IT employees. This finding parallels the study of Sørnes, Stephens, Sætre, and Browning (2004) which discovered few differences between the use of information and communication technologies by knowledge workers of Norway and the United States. Travica (2008) investigated the concept of information culture as a component of organizational culture and explored its influence on the implementation of self-service software.

"Within the discipline of information systems, the concept of culture is generally regarded as being very important" (Avison & Myers, 1995, p. 47). Keen (1997) supports this statement and maintains that "the main source of sustainable competitive advantage through information technology is the most neglected: the IS culture. It makes much more sense to invest in the IS organization and build a culture, not a collection of jobs and tasks" (p. 70). The present study was based upon Chase's (2002) grounded theory inquiry into IT professionals in the utility industry as constituting an occupational culture, and focused upon one of the propositions from that research. "The world-view of veteran technology professionals tends toward high resilience in the face of change" (p. 185).

Research Method

By design, this study focused specifically on the perceptions of IT professionals themselves, rather than exploring the perceptions of managers, co-workers, or other workplace professionals. This research employed qualitative methods in order to focus on a limited number of individuals, producing in-depth information. A qualitative approach typically lends itself to exploration, discovery, and inductive logic (Patton, 1990), beginning with specific individual information and moving toward general categories and patterns. The interview of individuals and groups is the

most common form of data collection for qualitative studies because it involves interactive conversation (Fontana & Frey, 1994). The researcher was interested in exploring human experience and meaning, with the intent to bring understanding to the concept of IT as an occupational culture, which mandates use of qualitative rather than quantitative methods (Denzin & Lincoln, 1994). Suddaby (2006) suggested that the "reality of grounded theory research is always one of trying to achieve a practical middle ground between a theory-laden view of the world and an unfettered empiricism" (p. 635). This study investigated the midrange phenomenon of relentless change faced by professionals within the culture of IT in the utility industry. Daft and Lewin (1993) described the application of midrange methods as "studying a limited number of case examples or innovative outliers to understand and develop the labels, variables, and models to explain and define the phenomenon" (p. ii).

Sample selection for this study was theoretical, or criteria-based, rather than random. One advantage to theoretical sampling is that the researcher is allowed to specify characteristics and experience that would contribute to the focus of the study (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Patton, 1990). An important criterion for inclusion in this study was that the individual be actively involved in the day-to-day operation (development or maintenance) of information systems or technical infrastructures supporting information systems. Participants held positions such as programmer analyst, database administrator, systems analyst, systems engineer, or network administrator. Additionally, in order to focus on experienced IT professionals, participants were required to have at least eight years of experience within the IT industry and be at least 30 years old at the time of the interview. These criteria excluded those individuals who had recently entered the IT profession and allowed for the potential inclusion of individuals who had established competency in the field, and who may have worked in more than one area of IT. The contact person for each organization created a pool of eligible participants based on the researcher's parameters. Subsequently, a selection process was undertaken at the organizational level, and the researcher was provided with contact information for each of the individual participants.

Data for this exploratory study were gathered from 25 in-depth individual interviews (18 males and 7 females) and five focus groups in three geographically separate organizations within the utility industry in the western United States. Table 1 contains additional demographic information for study participants. Each participant completed an informed consent form prior to the individual interview and prior to the focus group session. All individual interviews at a given geographical location were completed before the focus group interviews occurred. Every effort was made to protect the privacy, confidentiality, and anonymity of individuals and organizations participating in this study.

The in-depth individual interview protocol (Appendix A) commenced with introductory comments by the researcher about the study and description of the model building activity to be undertaken by the participant prior to the interview questioning. Many technology workers utilize model building in their work as a method of easily communicating difficult concepts. The purpose of model building in this study was to graphically capture each participant's perception of the interrelationships between IT work, IT culture, and the individual. The individual's model was used as a reference point to initiate the discussion with the participant. This discussion included both open-ended and close-ended questions. Each interview lasted between one and two hours. The professionals who completed an individual interview were also invited to participate in one of five focus group sessions, although professional commitments prevented some participants from joining a focus group session.

Table 1: Demographics for Study Participants

				IT Experience		
Org	Participant	Age	Gender	Total	Utility Industry	Position
A	1	42	F	20	12	Sr. Programmer Analyst
A	2	55	M	25	9	Sr. Analyst - Special Projects
A	3	57	F	36	36	Sr. Operations Specialist
A	4	39	M	15	15	Sr. Programmer Analyst
A	5	41	M	14	12	Sr. Class Librarian
A	6	54	M	33	33	Sr. Desktop Analyst
A	7	40	M	12	9	Sr. Programmer Analyst
A	8	57	F	16	10	Sr. Desktop Analyst
A	9	54	M	21	21	Sr. Programmer Analyst
A	10	43	M	15	9	Sr. Programmer Analyst
A	11	39	F	18	10	Sr. Systems Engineer
B	12	57	F	34	27	Sr. Analyst
B	13	34	M	9	3	Sr. Programmer Analyst
B	14	64	M	38	4	Sr. Project Manager and Analyst
B	16	32	M	8	8	Contract Programmer Analyst
C	17	43	F	21	0.5	Sr. Project Manager
C	18	55	M	25	8.5	Sr. DBA
C	19	48	F	26	16.5	Sr. Programmer Analyst
C	20	54	M	25	23	Sr. Production Support Analyst
C	21	47	M	18	1	Sr. Unix Administrator
C	22	37	M	12	7	Sr. Network Analyst
C	23	41	M	18	3	Sr. Tech Support Analyst
C	24	49	M	15	2	Sr. Project Manager
C	25	30	M	9	9	Sr. Programmer / Application Support
C	26	53	M	34	13	Sr. GIS Developer

Exploratory focus group sessions (Fern, 2001) were intended to investigate aspects of IT culture that were common to participants, as well as to explore the perceived differences in their respective experience of IT culture. Krueger and Casey (2000) describe a focus group as a "carefully planned series of discussions designed to obtain perceptions on a defined area of interest in a permissive, nonthreatening environment" (p. 5). A pilot focus group was conducted with three individuals in order to refine the content and sequence of interview questions.

Each of the focus group sessions was guided by the researcher and lasted approximately two hours. The protocol for each session (Appendix B) was explained: a predetermined list of questions would be asked, but responses could also lead to other questions. Individuals were not required to respond to every question; all responses were voluntary. Participants were requested to honor confidentiality with each other, and the researcher retained a copy of each informed consent.

All interviews and focus group sessions were tape recorded and transcribed verbatim by a contract transcriptionist. Interviews were transcribed as quickly as possible in order to accurately

clarify comments or reactions. The researcher reviewed and made corrections to every transcribed file prior to the participant verification process. Subsequently, participants received a copy of their transcribed file and were asked to verify the information provided in the interview. The transcribed data files contained 15,444 lines or approximately 735 pages.

Due to the volume of data involved, analysis started upon participant approval of the transcribed interview. Because the three organizations were geographically dispersed, interviews were completed at one organization before the data collection process was initiated at another. Consequently, data analysis overlapped with data collection. Eisenhardt (1989) maintains that "[o]verlapping data analysis with data collection not only gives the researcher a head start in analysis but, more importantly, allows researchers to take advantage of flexible data collection" (p. 539).

A comparative analysis (Glaser & Strauss, 1999) commenced in which the interview transcriptions were extensively examined for recurring patterns that eventually led to general categories. This process involved an examination of each transcript line by line (Strauss & Corbin, 1998) and resulted in an initial set of data categories. As interview transcriptions became available, labelling of content into initial categories continued. Although the transcription process progressed fairly quickly, several delays occurred, which allowed the researcher the opportunity to compare categories across interviews, and to rectify inconsistencies in the naming of categories. Somewhat simultaneously, the axial coding process explored the interconnections between categories by analysing influencing conditions and consequences (Creswell, 1998). Again, the axial coding activity progressed incrementally and iteratively, moving from a granular to a more wide-ranging level. Finally, selective coding integrated the refined categories with the empirical environment by including explanatory and illustrative participant stories.

In order to work with a manageable set of data and to gain access to technical professionals, the study was limited to three distinct organizations within the utility industry. Additionally, the selection criterion to include "experienced" IT professionals (at least eight years of experience within the IT industry and at least 30 years old) is an arbitrary designation.

Findings

Computer technology has contributed in significant ways to the complexities and demands of the contemporary world. One of the driving forces and primary characteristics of IT work is continuous change. Technological change often originates from advancements in technology, such as hardware, software, and telecommunications products, and comes from the external marketplace. Over 20 years ago, Huber (1984) described post-industrial society as increasingly complex and increasingly turbulent. Further, he stated that "post-industrial society will be characterized by qualitatively greater levels of knowledge, complexity, and turbulence, and that in each case these levels will be increasing at a considerable rate" (p. 933). In short, chaotic and turbulent change is prolific and is likely to continue accelerating into the future (Benamati & Lederer, 2001).

The purpose of this study was to explore the impact of relentless change on experienced IT professionals in the utility industry. The findings are presented in three sections: (1) the constructive aspects of change, (2) the difficult aspects of change, and (3) characteristics of IT culture.

Change – Constructive Aspects

As participants described their perceptions and experiences of continuous change, three constructive aspects emerged from the individual interviews and focus groups: (1) change energizes, (2) change offers interest and diversity, and (3) change involves excitement and variety.

Participants agreed that the appearance of new problems, new applications, and new technology keeps them interested in their work. "There will [always] be new problems, new releases of applications, or new government requirements, things like that. So there are new technology opportunities and that's something that we have to keep up on; [we] can't escape that requirement" (Participant 21, p. 15). Similarly, participant 6 commented, "I've really tried to adapt by doing the training that I need to do, learning the different products and stuff that we have here. You can't just stand still, you know, you really can't" (p. 17). Participants related that they utilize a variety of techniques in an attempt to keep current with technology.

> I try to read [technical journals]. I try to keep up, but I've also learned who to rely on for information. There are some people, and I'm not one of them, who just thrive on staying absolutely current with every single thing that goes on. So you kind of learn who those people are. (Participant 11, p. 6)

Another participant described change as a constant upsetting of things, carrying with it chaos and turmoil. "Chaos is a good word. The changes that I experience are good change, are natural change, are expected change" (Participant 25, p. 4). Some participants admitted that they don't want to get bored by doing the same thing every day. "Continuous change is important to me because I don't ever want to be obsolete or bored. I've quit jobs because I was bored, but never because I was overworked" (Participant 26, p. 7). Participants also embraced improvements brought about by change. "There is continuous change, but the thing to me that is interesting in the IT industry [is that] there's continual evolution, getting better, new things being introduced" (Participant 19, p. 12).

Many participants also indicated that one attractive aspect of technology is the diversity and the flexibility of the work. One participant commented, "I like the fact that things are always changing and evolving; there's that variety" (Focus Group 4, Participant 22, p. 3). Another participant remarked, "I don't want to do the same thing every day; I like to do a variety of things" (Participant 16, p. 3). Finally, one participant explained that even though keeping up with technology can be a nuisance, he believes that "it's good to get pushed, to keep the brain fresh. There's a difference between twenty years of experience and one year of experience for twenty years; I enjoy doing different things" (Participant 22, p 13).

References to flexibility revolved around the technical work itself in addition to the elements of planning and scheduling the work. The creative nature of this type of work allows an individual a wide range of options to achieve the desired outcome. Participant 7 observed that flexibility is required because IT is continuously changing and evolving. "In this type of work environment, priorities change and change rather quickly. I know in the area that I'm supporting, we probably change almost weekly. You have to be flexible" (p. 6). Participants acknowledged that although their current work situation might not involve high levels of stress, assignment to a critical, high visibility project could change that situation at any given moment.

Five participants found the problem-solving aspect of technical work to be energizing. One participant admitted, "I think what gets me most energized is learning something new and being able to solve a new problem" (Participant 10, p. 15). Another participant believes that team work contributes to a better product and enriches learning possibilities. She also proposed that the quality of work improves when people work together. "When people are off doing their own things, not necessarily the best solution comes out of that. Bouncing ideas off people, doing things with others, makes the morale [better] and teamwork makes a better product" (Participant 17, p. 5). Several participants suggested that no one person knows the best way to do things, that a particular end point or solution might be solved in a multitude of different ways (Participants 2, 7, 18). Another participant added:

> It's best to involve everyone in the [problem solving] process. Otherwise, you get single-minded solutions. And sometimes they [the solutions] aren't always the best, even though in IT, there are a lot of people who think they know the best way to do something. (Participant 18, p. 17)

In short, several technology workers equated working in teams with increased learning opportunities and an improved product for the organization.

This section presented the positive components of change as expressed by study participants. They admitted that continuous change provides numerous opportunities for learning and creativity, which many of them portrayed as having an energizing effect upon them. Participants expressed a dread of being bored by their work and would rather be challenged and overworked than not have exciting, or at least interesting, work to accomplish. Additionally, they disclosed that change revolving around problem solving requires not only creativity, but also flexibility and a willingness to be open minded to the ideas of fellow workers. Finally, it was suggested that working as part of an effective team contributes to improved quality of services and products within the technology environment.

Change – Difficult Aspects

As participants described the impact of constant change on their work lives, three difficult aspects emerged: (1) the frustration of relentless change, (2) the frequent lack of support by the organization for retraining, and (3) the never-ending cycle of "learning",

Eight participants reported that continuous change resulted in frustration with their work. The consensus was that a certain amount of change has appeal, but it can also contribute to frustration. The difficulty to remain an expert in any given area of IT contributes to individual frustration and is a direct effect of continuous technological change. One participant pointed out that for twenty years he was the senior technical person who knew that particular technical environment inside and out. However, the past two years required working in an environment where he had to relearn everything, and presently, he is once again moving to a completely different IT area. "I'm moving on to another area of expertise that is all new to me—all new. So yeah—it's frustrating" (Participant 20, p. 15).

Another challenge facing IT professionals is finding the time, whether at work or at home, to attain the skills necessary to keep current with the industry. "There needs to be almost a continual training, but you're trying to keep up with the other responsibilities you have. So a lot of times, training, while it's essential, kind of goes out the window" (Participant 7, p. 4).

Five participants maintained that difficulties related to training have an effect on frustration. The causes stem primarily from three elements: (1) lack of training on software that must be used immediately, (2) training on products that will not be used in the near future, and (3) management assumptions that technical workers will learn software tools or packages on their own time.

For example, one participant explained that she has taken multiple training classes and experienced frustration because "what the manager thinks that it [training] does for you, it doesn't. It just gives you the tip of the iceberg" (Participant 8, p. 5). Similarly, participants expressed frustration when required to attend a class or workshop and the acquired skill is not utilized in their work.

Most participants spoke of the rapid change in the development of new technologies they were required to work with and of the continual learning necessary to keep up. "Continuous change means we have to be ready to transform ourselves. We have to be ready to pick up new software, new technology, new everything, and I'm struggling with that" (Participant 1, p. 18). In short, continuous change mandates ongoing mastery of technology.

> [I]n this industry . . . you almost need to totally relearn what you do several times over. The concepts may be the same, but to learn a new language and some of the new tools takes a lot of training, a lot of learning and retooling. Retooling can be exciting when it's done in a situation where you're not feeling under the gun. But unfortunately, usually retooling occurs within some pretty tight deadlines and under stress. (Participant 7, p.15)

Several participants reported that sometimes after an extended length of time in the IT industry, keeping skills current becomes more and more difficult. "Continuous change has both been an appeal to this industry, and a frustration. Just when you feel like you're getting to know a tool, things are changing" (Participant 7, p. 10). Another participant admitted, "One of the real tough ones for me is continuous change; I find that the older I get, the harder this work becomes" (Participant 6, p. 2). Several professionals expressed the opinion that keeping up with relentless change is like being on a tread mill; you wonder if it will ever stop.

This section presented the difficult components of change as articulated by study participants. The predominant off-putting view of relentless change revolved around participants' frustration related to having to continuously learn the intricacies of evolving and emerging technologies. The thrill of learning new languages, techniques, hardware, and so forth can quickly deteriorate when workers are subjected to tight deadlines, are not allocated the time for learning, or are not trained in a timely fashion. Lastly, participants expressed that, over time, the industry mandate for continuous learning prompts them to refocus on the constructive elements of change or seriously consider a move to a position that does not required knowledge of the most current technology.

Change and IT Culture

One characteristic of the IT industry that received comments from virtually all participants involved in this research was that of continuous change. Most participants acknowledged that the pervasiveness and unrelenting nature of change demands continuous learning, which can contribute to the excitement and variety experienced by the workers, but which can also contribute to individual frustration and stress. On participant lamented, "There's always that push to read more magazines, read more articles, research more stuff on the Internet, get to know this. We have to change ourselves for our customers and recommend [new technology] to them" (Participant 1, p. 18). Indeed, one of the tougher aspects related to changing technology is the insight to discover where it is headed so that learning can enhance the individual's skill set.

The participants of focus group 3 concluded that relentless change could be considered a norm for the information technology industry, both historically and currently. Participant 12 summarized for the group:

> So even though you may be an expert today, in another six weeks that knowledge might be obsolete, or the product might not be supported anymore. You continuously have to remain aware of where the industry is going. You **cannot** ignore it. Our business is a little bit unique in that way. Once you attain the esteemed status or whatever in other professions, you've attained it. In this business, it's not a static thing. It's not something that you achieve. You have to keep continually achieving it because things change so quickly. That's kind of a norm. It's something that we have to continuously deal with even when we acknowledge how different it is now than it was twenty years ago. It's extreme—the difference between now and ten years ago, or now and five years ago. There's a chasm there that you don't necessarily find in other professions, and eventually, having to continuously change gets harder and harder. (Focus Group 3, Participant 12, p. 31)

Many of the IT professionals who participated in this study had worked in the technology industry for many years and could speak of changes to their work during their tenure. This individual summarized the historical perspective of change—and its cumulative effects:

> I didn't notice so much then, the continuous change, because all of it was new then…I know that when [one of the senior programmers] retired, that one of the things he said was that he had just gotten tired of keeping up. And I hear that in my own mind a lot. The deadlines and the continuous change are what make this job difficult. (Participant 5, p. 10)

Thus, most participants realize from the beginning of their careers that working with technology requires embracing continuous change. However, this realization can take on a new dimension as the individual ages. The initial excitement involved with mastering new and different technologies can evolve to less enthusiasm or even dread when faced with learning something new.

Discussion

This study builds upon prior work relating to IT culture and extends the inquiry to relentless change faced by professionals engaged in technology work. Furthermore, it focuses on the mid-range phenomenon of change as it occurs in the IT culture within the utility industry. By moving to the middle range, the researcher confines the scope of the exploration to a manageable size (Weick, 1989).

For many participants, the positive aspects of change include: change energizes, change provides interest and diversity, and change offers excitement and variety. On the other hand, the negative elements of change that challenge professionals engaged in IT work include: the frustration of relentless change, the frequent lack of support by the organization for retraining, and the never-ending cycle of learning,

The IT professionals participating in this study acknowledged the ubiquity of unremitting change in their work lives. They accept the inevitability of change and regard it as both a positive and negative element that requires constant attention and necessitates an active response. The experienced IT professionals who participated in this study also recognize the necessity of lifelong learning required by the information technology industry. In many cases, the element of continuous change was a factor that not only attracted them to the industry in the first place, but also kept them interested and energized by their work. These professionals enjoy being challenged by diverse problems and being able to resolve a difficult situation.

On the other hand, over time, the appeal of unrelenting change wears thin and the quest to achieve competence with new technologies becomes a source of individual frustration and stress. In some cases, IT professionals also perceive that their organizations do not always support them as they attempt to remain at the forefront of technology. They report that often they are expected to obtain the technical skills on their own time, or that when training does occur, it is not helpful for their current pressing situation in the workplace.

A different concept of continuous change was also discussed by some of the interviewees. This type of change was seen as internal to the work itself (rather than coming from the external environment); IT work was described as possessing an inherently high degree of task variety, an ever-changing nature of the kinds of work they were expected to perform.

The IT professionals in this study suggested that the ability to adjust to continuous change is critical to those in the technology industry. They acknowledged that whatever the work environment involves today in terms of technology, that reality could be different tomorrow and is probably different now from what it was in the past. Finally, many of the IT professionals involved in this study described not only a propensity toward high resilience in the face of change but, also, a desire to be energized by interesting and challenging work.

Further Research

This study provides contributions both to academic researchers and to IT practitioners. The examination of continuous change in the work experience of seasoned IT professionals offers insights into the perceptions, both positive and negative, of workers in this occupational culture. The findings present insights that may help practitioners understand which elements of change energize IT workers and which elements frustrate them from the perspective of the IT employees themselves rather than from a management perspective or strategic perspective. These insights may improve an organization's ability to provide appropriate organizational support for IT workers as they attempt to apply a suitable skill set to the work they are engaged in to support the goals of the organization.

In terms of further academic research, the suggestion by participants that continuous change is a norm or a dimension of IT culture requiring ongoing learning and mastery of new technologies deserves further investigation by researchers.

One limitation of this research is that it involved only three organizations within the utility industry (middle ground approach). Although many participants had IT experience in other industries, research should be conducted utilizing companies from diverse industries to determine if the findings would support consistent results regardless of the industry of the employing organization.

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Appendix A: Individual Interview Protocol

1. Explain "Informed Consent Form" and request signature of the participant.
2. Begin tape recorders.
3. What is your current age?
4. What is your current job position?
5. How many years have you worked in IT?
6. How many years have you worked at this organization?
7. Explain model building process.
   - Use the card provided to build a model reflecting the relationships between your technical work, the IT culture at this organization, and your personal life
   - You do not have to use all of the cards. You may discard any card that is not important to you.
   - You may "invent" any card you choose to put into your model if there is an important element that is missing for you.
   - Please talk out loud as you proceed so that your thoughts regarding this process will be captured on the tape.

   The following elements (derived from the literature) were provided on preprinted cards:

Adequate resources	Balance	Caring for others
Compensation	Continuous change	Deadlines
Decision making	Diversity	Energized
Family/Friends	Flexible	Friendships at work
Frustration	Illness	Management support
Meaningful work	Morale	On-Call
Overload	Planning	Quality of product
Recognition	Recreation/Relaxation	Spiritual life
Stress	Teamwork	Time
Training		

8. Provide cards to participant.
9. Lightly tack model to paper with masking tape.
10. Request participant to fully explain the model.
11. Capture the visual model with digital camera.

INTERVIEW QUESTIONS

1. Please explain why you have excluded certain cards.
2. Would you like to add additional elements to your model? If yes, why?
3. Would this model look differently if you had constructed it when you were working on a critical project? Why?
4. What aspects of your current reality have affected this model? Age? Current assignment? Current manager? Current team members?
5. What are the significant relationships in your model?

Appendix B: Focus Group Protocol

1. Greeting
    - Sign Informed Consent forms
    - Discussion protocol / "Ground Rules"
        1. Speak one at a time and clearly [Name = "I'm Sally….]
        2. You don't have to agree with others
        3. No right or wrong answers
        4. Listen respectfully
        5. Need active participation
        6. Moderator role – Keep the discussion on track
        7. Confidentiality of responses
    - Start tape recorder – Introduction of participants, moderator

2. Purpose of the focus group sessions
    - Explore "culture" of IS
    - Explore concept of IS as an "occupational culture"
        - Regions, organizations, cultures of occupations (e.g. Nurses: language beliefs, values; see the world the same way)
        - Exploring the possibility of an occupational culture of IS workers—Is there one? If so, what does it look like?

3. Questions
    1. OPENING: When you hear the words "IS culture", what comes to mind?
    2. INTRODUCTORY: What attracted you to IS work?
    3. TRANSITION: "Think back" to when you were first hired into IS work. How did you learn about the culture?
    4. KEY: If I were a fly on the wall watching the IS people at this organization, what would I see?
    5. KEY: How do you think others in the organization see IS people?
    6. KEY: Describe the values (shared beliefs) that exist in IS culture.
    7. KEY: Describe the norms (unwritten guide to behavior) that exist in IS culture.

4. Conclusion
    1. Summary by moderator
    2. FINAL QUESTION: Is there anything else we should have talked about?
    3. Thank you for participating.

Biography

Dr. Nancy Chase is currently Assistant Professor in Management Information Systems at Gonzaga University in Spokane, Washington. She has taught undergraduate courses in systems analysis and design, Java programming, introduction to MIS, and database management systems, as well as information systems theory and practice at the MBA level. Formerly an Information Technology professional, she worked for over 20 years in the utility, banking, and state government industries. Her specific areas of interest include the effects of IT culture on technology professionals, the tension between quality in IT work and organizational demands, and the impact of electronic communication on workplace environments.