Abstract

Although the soft (i.e. non-technical) skills of information systems (I/S) professionals are recognized as important for job performance, few attempts have been made to study systematically the concept of soft skills. We draw upon the pioneering work in the area of practical intelligence and creativity at the workplace to develop the concept of soft skills and to validate an instrument to assess soft skills within the I/S profession. We define soft skills as a set of self-management and self-regulation strategies for managing self; managing careers; and managing others within the I/S work context.

A computer-based instrument is developed to elicit these strategies of I/S professionals when faced with I/S related work situations. Based on the instrument, we benchmark a group of experienced I/S professionals against a group of inexperienced first-year undergraduates in a computer science program. The respondents' self-management strategies are then evaluated for quality by a panel of senior I/S managers.

Our findings indicate that inexperienced undergraduates possess as good a set of soft skills as their experienced counterparts in managing themselves, peers, and their superiors. However, experienced I/S professionals possess better soft skills strategies for managing subordinates, clients and vendors than do inexperienced I/S undergraduates. The results confirm the importance of work exposure and work experience in developing soft skills. Experienced I/S professionals have been exposed to more complex situations at work and have therefore evolved a more complex set of self-management and self-regulation strategies and mental schema. We conclude with implications for selection, training, and development of I/S professionals in soft skills.

1. INTRODUCTION

Prior research on the skills of I/S professionals has identified and underscored the importance of soft skills (e.g., Earl 1995; Todd, McKeen & Gallupe, 1995). However, little has been done beyond recognizing the importance of soft skills. What is missing is a strong theoretical framework on soft skills and a way of measuring soft skills.

We draw on the theories of practical intelligence by Wagner and Sternberg (1985) and creativity at work by Sternberg, O'Hara and Lubart (1997) to understand soft skills of I/S professionals. We begin by defining the concept of soft skills as a set of self-management and self-regulation strategies for managing self; managing careers; and managing others within the I/S work context. We then describe a conceptual framework that delineates the various dimensions of soft skills required of I/S professionals at work. Based on our conceptual framework and adopting a knowledge base methodology, we have developed a computer-based instrument that measures the soft skills of I/S professionals.

To validate the instrument, we administered the instrument to two groups of respondents with different levels of I/S work experience: (1) an experienced group of I/S professionals with an average of three years of work experience and (2) an inexperienced group of undergraduate computer science students. A panel of five senior I/S managers acted as experts to rate the quality of the self-management and self-regulation strategies elicited from the two groups. We conclude with the findings from our validation of the soft skills instrument and outline the implications for selection,
training and development of I/S professionals in soft skills.

2. CONCEPTUAL FRAMEWORK FOR SOFT SKILLS IN THE I/S PROFESSION

Sternberg, O’Hara and Lubart (1997) conceptualize creativity to be composed of six dimensions: knowledge; intellectual abilities; motivation; thinking styles; personality; environment. They suggest that creative performance at work is a result of the amalgamation of these components, for example, financial investors who “defy the crowds” because they know that “not every stock with a low price-earnings ratio is a good financial investment” (p. 9). Within the I/S context, effective performance at work involves not only managing the technical but also the non-technical or softer skills. The more common descriptions of soft skills found in I/S literature include “people skills”; “generalist skills”; and the “ability to work closely with customers and maintain productive user or client relationships” (e.g., Lee, Trauth, Farwell, 1995). In this paper, we define soft skills to represent a set of self-management and self-regulation strategies for managing self; managing careers; and managing others in resolving situations at work.

Drawing on the pioneering research in practical intelligence and tacit managerial knowledge by Sternberg and his associates (Wagner and Sternberg 1985; Wagner and Sternberg, 1990) we characterize the soft skills of I/S professionals in terms of the management of four different aspects: tasks; career; self; and others.

Managing Tasks refers to the self-regulation strategies required to perform a specific piece of work. In the I/S context, managing tasks may include knowing the activities required to elicit user requirements. Managing Self refers to self-regulation strategies of applying self-motivation and self-organizational aspects of individual performance with the objective of improving one’s productivity (Wagner and Sternberg, 1990). In the I/S context, overcoming the problem of procrastination or knowing how to prioritize projects based on importance and urgency are examples of knowledge and skills utilized in managing self. Managing Career refers to the self-management strategies an individual adopts to progress in his or her work life. In the I/S context, managing one’s career may include knowing which projects to undertake to advance one’s technical and soft skills and hence, one’s career.

Finally, Managing Others refers to management strategies for interacting and working with others at the work place. It is perhaps the most important dimension for the I/S profession because of the diverse groups of “others” I/S professionals face in the course of their work. With outsourcing, and use of team-based organizations, an I/S professional must learn to work not only with his or her superior, users, and peers, but also with permanent and contract subordinates, clients; and vendors.

The most dominant sub-dimension of managing others is in managing subordinates. Taggart and Silby (1979) showed that almost half of all incidents an I/S manager faces at work are related to managing subordinates. In managing a team of I/S professionals, the I/S manager must be aware that the interests, knowledge and skills that subordinates bring to the team may vary (Boddy and Buchanan, 1992). I/S professionals must know how to manage subordinates who might either be contingent workers (managing contract subordinates) or regular employees (managing permanent subordinates). Although contract subordinates offer technical knowledge that the organization may lack, they can disrupt the unity of regular employees due to their lack of understanding of the organizational culture, norms and practices at the work place.

Peers are the I/S professional’s counterparts in other I/S functions at the business unit or corporate level. These may include the regional I/S managers, I/S Operations Manager or the I/S training and development manager. As a result of mergers and acquisitions, I/S professionals from two or more legal entities must often learn to work together to integrate systems from these disparate organizations. They must possess not only the technical skills to integrate complex systems, but also a whole range of soft skills to manage the smooth transition and implementation of a seamless system that merges two or more organizations.

We distinguish between clients and users as two types of stakeholders I/S professionals have to interact with from the user community. Clients are users that pay for I/S projects while users are those that actually use the system operationally. With the rising I/S sophistication of the user community, it is not sufficient to deliver an operational I/S system to end-users. Rather, clients are demanding that I/S professionals justify and show value from investments made to I/S (Boddy and Buchanan, 1992).

Finally, with the increasing use of outsourcing, I/S professionals must work with and manage vendors and consultants (Earl, 1995). As the I/S organization
undertakes partnerships and alliances with external service providers to serve the I/S needs of the organization. I/S professionals must develop the necessary soft skills to select appropriate service-providers, and develop strong vendor relationships.

Based on our conceptual framework, we proceeded to develop an instrument to elicit the self-management and self-regulation strategies of I/S professionals. The section below describes our methodology for developing and validating this instrument.

3. DEVELOPING A COMPUTER-BASED INSTRUMENT FOR MEASURING I/S SOFT SKILLS

We employ a knowledge base approach to develop a computer-based instrument that measures soft skills of I/S professionals. The knowledge base approach (Wagner and Sternberg, 1985) involves: (1) the critical incident methodology to develop a set of work scenarios typically encountered by an I/S professional at work; and (2) an experiment in which self-management and self-regulation strategies of I/S professionals are elicited. These strategies are then evaluated in response to a variety of work situations derived from the critical incident methodology.

The Critical Incident Methodology
To derive a representative set of incidents and typical work situations faced by I/S professionals, we interviewed 37 experienced I/S professionals comprising managers, project leaders and systems analysts from both I/S vendor and user organizations. Each I/S professional was interviewed separately, and each interview lasted between one to one and half-hours. At each interview, the I/S professional was asked to relate “war stories” -- typical work scenarios and situations they faced at their workplaces. The interviews were tape-recorded and transcribed. Collected incidents were then collated and edited. After discarding duplicate incidents, we arrived at a working sample of 125 incidents.

The 125 incidents were then classified according to the soft skills framework. Two research assistants who were unaware of the purpose of this study classified the incidents into the dimensions of the framework. The research assistants were initially given a random set of ten incidents to classify. This initial inter-rater reliability measured using Cohen's Kappa was .699. The research assistants resolved coding differences, created explicit coding rules for classification, and proceeded to classify the next set of ten incidents. After the second round of classification, the inter-rater reliability improved from .699 to .896. The research assistants continued the process of dispute resolution and classification until all 125 incidents were classified into their respective dimensions of soft skills in the conceptual framework.

From the 125 incidents, ten incidents were selected to be included in the soft skills instrument. The ten incidents represented a random selection of the incidents appearing in each dimension of managing self, task, career, superiors, subordinates (permanent), subordinates (contract), peers, users, clients, and vendors. A computer based soft skills instrument was developed using Microsoft Visual Basic 5.0 to run on the Microsoft Windows 95 platform. The instrument consists of two parts: Part A presents ten work related situations and requires the respondent to generate self-management and self-regulation strategies in answer to each work situation. Part B requires the respondent to provide some background and demographic information of him or herself.

Measuring Soft Skills
To validate the instrument, the incidents presented must able to elicit differences in self-management and self-regulation strategies from groups of participants who have different levels of I/S work experience. We focus on work experience as a key differentiator between strategies for self-management and self-regulation as soft skills are acquired from on-the-job experiences (McCall, Lombardo and Morrison, 1989).

Accordingly, we administered the computer-based instrument to 81 respondents from two distinct groups. The first group of 27 participants was drawn from students in a part-time MBA program who are also full-time I/S professionals with an average of at least 3 years of I/S work experience. The average age of this group is 29. The second group of 54 participants was drawn from the first year students of an undergraduate computer science program. These students have an average age of 20 and no work experience.

We administered the soft skills instrument to the participants in a large computer laboratory. The two groups participated on a voluntary basis and at different times. Participants interacted one-on-one with the instrument on separate workstations. Participants were asked to generate response scripts in response to work scenarios displayed on the screen. To avoid any order effects or systematic differences in the response patterns as a result of the order in which the scenarios was presented, each participant received a different order of scenarios from his or her software. The order
of scenarios presented was determined through the use of a random selection algorithm embedded in the software.

After all data were collected, a researcher coded the open-ended response scripts from each participant into a closed set of response themes for each scenario. To ensure inter-rater reliability, another research assistant independently classified the open-ended response scripts into response themes. The overall Cohen's Kappa between the researcher and the research assistant was at .890.

To rate the quality of the responses from the participants, a panel of five senior I/S managers and CIOs rated the response themes to each work situation on a 7-point scale ranging from (1) very poor response to (7) an excellent response.

4. RESULTS OF THE VALIDATION STUDY

Based on the ratings provided by the panel of experts, we graded the responses from the 81 participants. We find that experienced I/S professionals scored higher on the overall soft skills assessment (Hotelling’s T, F = 1.625; p = .05). Subsequent univariate analyses indicated that experienced I/S professionals performed better on dimensions of managing permanent subordinates (F = 8.073; p < .01); managing users (F = 5.372; p < .05); managing clients (F = 3.325; p < .05) and managing vendors (F = 3.171; p < .05).

Experienced I/S professionals also scored marginally higher on dimensions of managing careers (F = 2.660; p < .10); managing task (F = 2.173; p < .10); and managing contract subordinates (F = 1.808; p < .10). On the dimensions of managing self, superior, and peers, there was no difference in the quality of the response strategies between the two groups.

5. DISCUSSION AND IMPLICATIONS

The differences in the quality of response strategies between the experienced I/S professionals and inexperienced undergraduates are intriguing. These differences suggest that exposure to work situations is extremely important in developing soft skills or self-management and self-regulation strategies.

Compared to the computer science undergraduates, experienced I/S professionals performed significantly better in managing subordinates, users, clients and vendors. They were also better at managing careers, I/S projects, and work tasks. Situations of managing subordinates, users, clients, vendors, and careers are typically not found in any classroom setting. Consequently, computer science undergraduates with no work experience would not have the opportunity to form good response scripts to cope with these situations. In contrast, computer science undergraduates fared as well as experienced I/S professionals on dimensions of managing self, superior, and peers. We attribute this finding to the fact that in formal school learning environments, undergraduates would have faced situations that require them to manage themselves (e.g., avoiding procrastination), superiors (i.e., their professors), and peers (i.e., fellow students). Accordingly, they would have learned to develop and generate response scripts to cope with these situations.

There are three research and practical implications that flow from this study relating to training and development of soft skills; selection of I/S professionals; and development of organization memory. Results of this study show that when conceptualized as self-management and self-regulation strategies, soft skills can be measured systematically. With the use of the soft skills instrument, organizations can detect varying levels of soft skills and surface strengths and weaknesses on specific dimensions of soft skills for their I/S professionals. Once weaknesses are identified, an I/S professional can undergo training on specific dimension(s) of soft skills. For example, (s)he may be exposed to a specific sets of scenarios, taught appropriate response strategies to those scenarios and role play such strategies before facing real situations at the work place.

In addition to soft skills training and development, the soft skills instrument can also be used to improve the selection of new I/S professionals. Currently, organizations often select I/S professionals based on their hard skills or technical competence. As soft skills become imperative for high performing I/S professionals, it is necessary to select I/S professionals based on their self-management and self-regulation competence as well. Organizations can gauge the level of soft skills inherent in the candidate by eliciting response strategies from potential candidates on problematic work situations and scenarios found in the soft skills instrument. Such probing is analogous to the use of structured interviews (Motowildo, Carter, Dunnette, Tippins, Werner, Burnett & Vaughan, 1992). In structured interviews, work related incidents are used in the selection interview to predict the behavior of applicants in future situations that may occur in the organization.
While the previous two implications focus on developing soft skills at the level of the individual, we believe the knowledge base approach also offers a unique opportunity for organizations to develop a corporate organizational memory of soft skills management. In essence, the organizational memory is a collection of knowledge about problems and resolutions held by individuals, embedded with processes or even expounded by organizational values (Walsh and Ungson, 1991). As such, the collection of typical as well as critical work related incidents that are faced by I/S professionals within the organization and their corresponding appropriate strategic responses becomes a valued body of knowledge for the organization. The collection of incidents and their responses can be regarded as a library of best practices endorsed by senior I/S management. These best practices then reflect the valued behaviors and responses when dealing with the various stakeholders within the organization and can be used as an excellent socialization and training tool for new I/S professionals joining the organization.

To the best of our knowledge, this study presents the first attempt to conceptualize and measure soft skills in the I/S profession. The study significantly adds to the existing body of literature on skill sets for I/S professionals by suggesting a framework by which soft skills can be better understood and categorized and by developing an instrument that can measure soft skills. Our methodology and approach to develop and validate an assessment instrument for soft skills may be useful to researchers studying the measurement of other kinds of I/S skills. As part of our research program in soft skills development and measurement, we intend to extend the research by further validating our instrument with other I/S professionals in various organizations including both I/S vendor and user organizations. A valid instrument to assess soft skills can also be used in future studies that determine the relative importance of soft skills in I/S work performance.

6. REFERENCES


1 Microsoft Visual Basic 5.0 and Microsoft Windows 95 are Trademarks of the Microsoft Corporation, Inc.