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USER SATISFACTION IN THE INTERNET-ANCHORED WORKPLACE: AN EXPLORATORY STUDY

CLAIRE A. SIMMERS, Saint Joseph's University
Department of Management and Information Systems, Erivan K. Haub School of Business, Philadelphia, PA 1913.
Tel: 610-660-1106, Email: simmers@sju.edu

MURUGAN ANANDARAJAN, Drexel University
Department of Management, Bennett S. LeBow College of Business, Philadelphia, PA 19104.
Tel 215-895-6212, Email ma33@drexel.edu

ABSTRACT

Empirical research on the impact of the Internet on work life is in its infancy. We report the results of an empirical study of the relationships among user satisfaction, job satisfaction changes, user's behavior (training, experience, and system usage) and demographics (age, gender, and organizational position) in the Internet-anchored workplace. Respondents who report higher levels of user satisfaction with the Internet also report that the Internet has increased their satisfaction with their jobs. Those who report more training, experience and usage and are younger also report higher levels of user satisfaction. Interestingly, there are no differences in user satisfaction reported by men and women. Respondents report more positive changes in job satisfaction with higher levels of Internet experience and time of use. Based on the results recommendations are made for managers and suggestions for future research are given.

INTRODUCTION

During the last two decades, user satisfaction has been an important construct in Information Systems (IS) behavioral research (DeLone and McLean 1992; Galletta and Lederer 1989; Ives, Olson, and Baroudi 1983). The continuing interest in user satisfaction can be linked to the development and central role of end-user computing (EUC). One of the most significant phenomenon to occur in the information systems industry in the 1980's and early 1990's EUC moved information systems from back office mainframes to front office microcomputers as end users used application software as well as the outputs of computer technology. With the growing importance of EUC, researchers focused on the antecedents

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and evaluation of the success of information systems through the lenses of the end user (DeLone and McLean 1992; Doll and Torkzadeh 1988). For the most part, research on user satisfaction focused on satisfaction of the end user with information products such as decision support, databases, exception reporting, monitoring and word processing, and the IS staff and service (Doll and Torkzadeh 1988; Galletta and Lederer 1989; Igbaria and Nachman 1990; Kettinger and Lee 1994; Ang and Soh 1997). Little research has focused on end user satisfaction with the Internet.

The reach and responsibility of the end user has moved into another phase as organizations integrate the Internet into all aspects of the business (Hamm, Welch, Zellner, Keenan, Engardio 2001). The Internet grew slowly as an electronic forum for academic and scientific researchers in the 1970s. Vast quantities of information were scattered about the network, primarily in a text-based format, but finding this information was difficult. The development that made the Internet a "twenty-five year overnight success" was the creation of HTML (Hypertext Markup Language) and the server/browser software to view the interconnected documents that became the World-Wide-Web or the Web. It is this layer of the Internet architecture, the Web, which has become synonymous with the Internet, with the two terms, Internet and Web, often being used interchangeably, a convention that we follow in this work.

The rapid development and pervasiveness of the Internet raises the question of the applicability and generalizability of previous research on the antecedents and relationships of user satisfaction in the microcomputer-anchored workplace vis-à-vis user satisfaction in the Internet-anchored workplace. Therefore, the purpose of this study is to explore how individuals have adjusted to the introduction of the Internet into their workplaces by examining user satisfaction with the Internet, its antecedents and its relationship with changes in job satisfaction. Specifically we are interested in discovering if there are differences in user satisfaction with the Internet based on workplace behavioral experiences with the Internet and whether user satisfaction is associated with Internet induced changes in overall satisfaction with the job.

User satisfaction with the Internet is an affective measure of satisfaction with one facet of the job. Internet induced job satisfaction changes is defined as the extent to which the Internet has changed the overall satisfaction with many facets of one's job. Internet induced job satisfaction changes targets the degree to which the Internet has increased or decreased job satisfaction. Both constructs are consistent with the job characteristics models of work, which suggest that satisfaction with the job derives from the nature of the job and job conditions (Hackman and Oldham 1980).

The definition and measurement of user satisfaction has evolved with the changes in the information system environment (see DeLone and McLean (1992) for a thorough literature review on user satisfaction research prior to 1990). Early research on user information satisfaction and the scales developed from that research was done in the traditional mainframe information system environment (Ives et al. 1983; Ives and Olson 1984). User satisfaction was defined as the "…extent to which users believe that the information system available to them meets their information requirements." (Ives et al. 1983: 785) and was measured in terms of general user satisfaction with the information staff and services, information product and user involvement. As EUC became the norm, Doll and Torkzadeh (1988) developed a 12-item scale that focused on assessing user satisfaction with specific end-user applications along five dimensions (content, accuracy, format, ease of use and timeliness), defining user satisfaction as "…an affective attitude towards a specific computer application by someone who interacts with the application directly." (p. 261). In this study, consistent with previous research (Igbaria and Nachman 1990), we adapt the Doll and Torkzadeh (1988) definition and define user satisfaction as an affective attitude towards workplace usage of the Internet by someone who interacts with the Internet directly.

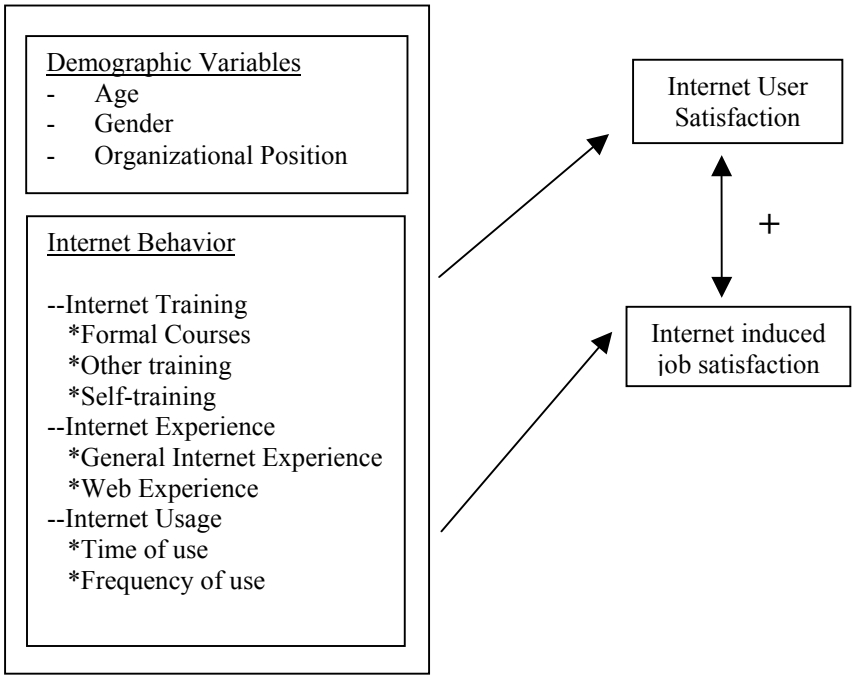

Figure 1. Researh Model

RESEARCH MODEL AND HYPOTHESES

Using theoretical frameworks on attitudes developed by social and cognitive psychologists, Melone (1990) posited that user satisfaction with information technology is an attitude. Attitudes are evaluative responses toward an object, person, issue, or event (Fishbein and Ajzen 1975). The use of affect-oriented constructs in measuring effectiveness or in evaluating a product or service is not unique to the IS field. Organizational theory and buyer behavior fields utilize attitudinal constructs such as job satisfaction and consumer satisfaction to express favorable or unfavorable feelings about either work or products /services (Melone 1990). In most research on IS user satisfaction, the family of expectancy-value models, such as the theory of reasoned action (Fishbein and Ajzen 1975) and the technology acceptance model (Davis, Bagozzi, and Warshaw 1989) are used as the framework for examining the relationships between attitudes and behaviors.

A less common, but more interesting approach for examining user satisfaction is to study this construct within the organizational change literature (Griffith and Northcraft 1993). In the first stage of change, a person holds beliefs and attitudes about the change, specifically new information technology, prior to the actual usage of a new system (Davis et al. 1989). This is what Louis (1980) called constructed understanding. Testing and modifying is the second stage of change where there is training, actual usage with the new technology, and an accumulation of experience. The third stage is assessment after usage, where the original constructed understanding is either modified or re-affirmed in light of the actual time spent with the new technology (Griffith and Northcraft 1993). Table 1 summarizes this model of information technology change.

The links between constructed understanding and the testing and modifying stages are well researched (Davis et al. 1989). However, the links between the second and third stage are less understood and have received less attention in IS research and are the focus of this study. Thus, as Melone (1990) contends, behavior may have an impact on attitudes, and in our model, consistent with this three-stage model of change, we propose that user satisfaction with the Internet is an outcome, influenced by behavioral factors. The job characteristics theory (Hackman and Oldham 1980) used by consultants and

organizational behavioral researchers contends that by modifying job factors, satisfaction with the specific job factor will change, which in turn will change overall job satisfaction. Thus, we also posit that given the increasing pervasiveness of the Internet in the workplace, there is a relationship between user satisfaction with the Internet and with another work related attitude that we call Internet induced job satisfaction changes.

Table 1. Model of information technology change

Stage 1: Prior to Usage	Stage 2: Usage	Stage 3: Assessment after usage
Beliefs and attitudes such as perceived usefulness and perceived ease of use	Behaviors such as training and actual usage. Experience accumulates	Attitudes formed based on Stage 2 such as user satisfaction. Prior attitudes either confirmed or modified.
Constructed Understanding	Testing and Modifying Understanding	Modifying or Confirming Understanding

In this study, the research model extends prior research (Ang and Soh 1997) by using the work of Melone (1990) and the job characteristics approach (Hackman and Oldham 1980; Herzberg, 1966; Turner and Lawrence 1965). The model links user satisfaction with the Internet, Internet induced job satisfaction changes, the users' demographic variables, and Internet behaviors (training experience, and usage). Figure 1 presents the research model examined here. The model proposes that there is a positive relationship between user satisfaction with the Internet and Internet induced job satisfaction changes. It also hypothesizes that there will be differences in user satisfaction with the Internet based on differences in demographic variables, and Internet behaviors. Additionally, the model suggests that there will be differences in Internet induced job satisfaction changes based on the antecedent variables. The total network of relationships among the variables in the model and the rationale for the proposed linkages are explained in the following sections.

Internet induced job satisfaction changes. Job satisfaction refers to an individual's general attitude toward work and may best be understood as a function of the degree to which psychological, social, and task knowledge needs are met in the workplace (Kaye and Sutton 1985). Meeting these needs revolves around: a) relatively stable dispositional or demographic characteristics of the person independent of work characteristics (Locke 1976; Staw and Ross 1985; Staw, Bell, and Clausen 1986), b) situational or job characteristics (Hackman and Oldham 1980; Herzberg 1966), and c) the social environment (Salancik and Pfeffer 1978). Understanding the relationships of job satisfaction with other work environment variables continues to intrigue researchers. Even though the bulk of evidence shows the correlation between satisfaction and individual performance to be relatively low (Iaffaldano and Muchinsky 1985), the intuitive belief, especially among practitioners, is that job satisfaction is an important determinant of performance. Interest in understanding job satisfaction continues, especially in the information technology driven workplace (Mannheim, Baruch, and Tal 1997; Organ 1988; Ostroff 1992; Williams and Anderson 1991).

Internet induced job satisfaction changes evaluates job satisfaction using items from the classic work of Hackman and Oldham (1980). The facets of job satisfaction that were captured were freedom, variety and autonomy in the job, relationships with fellow employees, general satisfaction with the job and work and overall productivity. While job satisfaction has been measured with a single, overall factor, there is more support for a multi-item measure. Job satisfaction has been generally captured by static questions that ask about degrees of satisfaction ("not satisfied" to "very satisfied") with general job characteristics (Judge, Locke, and Durham 1997). However, IT consultants and human resource practitioners are interested in assessing dynamic changes and want to know whether interventions or new technologies have impacted attitudes and performance. Yoon and Guimaraes (1995) asked

respondents to indicate their agreement or disagreement with how expert systems had changed eleven variables describing their jobs. Torkzadeh and Doll (1999) asked how extensively information technology applications impacted task productivity, task innovation, customer satisfaction, and management control. The response anchors ranged from "not at all" to "a great deal". Our study builds on this previous research and uses Internet induced job satisfaction changes as a dynamic measure of job satisfaction.

User Satisfaction with the Internet. User satisfaction with the Internet, within the work context, evaluates the Internet in terms of content, accuracy, ease of use and timeliness. Studies on user information satisfaction have examined: a) the conceptual support and validity of the construct (Hendrickson, Glorfield, Cronan 1994; Kettinger and Lee 1994), b) user information satisfaction as one of the factors influencing information system success (Cheney, Mann, and Amoroso 1986; DeLone and McLean 1992; Straub, Limayem, and KarahannaEvaristo 1995), and c) the relationship of user information satisfaction with user involvement (Lawrence and Low 1993) and job satisfaction (Ang and Soh 1997). It has been suggested that information success, through user satisfaction can improve organizational productivity and enhance managerial decision-making (McLeod and Jones 1987). Support has also been found linking highest levels of personal accomplishment with jobs combining high demands and high control (Dollard, Winefield, Winefield, and de Jonge 2000), an atmosphere that defines an Internet-anchored workplace.

A growing body of empirical evidence suggests that information systems affect the nature of work, and the quality of work life (Ang and Pavri 1994). The type of system interface used influenced office worker's interactions with clients, perceived task environment, and well-being (Turner 1984). Coates (1988) and Kaye and Sutton (1985) found that computerization had positively effected office work productivity as well as the quality of work life. Millman and Hartwick (1987) discovered that middle managers believe that office automation had given them increased autonomy, more freedom to do their work, and greater ownership of the results. Only a few studies report less positive effects of information technology on individuals' work experiences (Attewell and Rule 1984). Since the Internet is becoming more pervasive within the workplace and consistent with the job characteristics approach to job satisfaction, higher levels of user satisfaction with the Internet are expected to be positively associated with higher levels of job satisfaction. Therefore, the following hypothesis is proposed:

H1: There is a positive relationship between user satisfaction with the Internet and Internet induced job satisfaction changes.

Internet Behaviors. Internet training refers to instruction on the use of the Internet and focuses on efforts to transfer knowledge (Nelson and Cheney 1987). Training includes both formal and informal sources: college courses, vendor or outside consultants, in-house company training, training from a fellow worker, and self-training (Igbaria, Guimaraes, and Davis 1995). End user training is critical in the end-user computing world and increases in importance as the end-user takes on more reach and responsibility. Research on end-user training reported that training promoted greater understanding and more favorable attitudes. (Davis and Bostrom 1993; Igbaria et al. 1995). There has been some support for a direct link between training and technology acceptance (Amoroso and Cheney, 1991; Nelson and Cheney 1987). In a study on end-user training in public agencies, Cronan and Douglas (1990) found that a high degree of user satisfaction with the computer technology resulted from the training. While, knowledge acquisition on the new system is important, even more significant is the reinforcement of appropriate motivational levels, especially with novice end users and new technology (Sein, Bostrom, and Olfman 1987). Training is posited to reinforce confidence in user perceptions held prior to usage, or to change unfavorable perceptions prior to training, making it more likely that user satisfaction with the Internet will heighten with usage. Additionally, since the Internet is becoming integral to so many jobs, being trained in the Internet should increase control and feelings of comfort with the technology

thus satisfaction with a large component of one's job spills over to general satisfaction with the job. People who can use the Internet to complete their work should be more satisfied. Thus, we propose:

H2a: Internet training accounts for significant differences in user satisfaction with the Internet.

H2b: Internet training accounts for significant differences in Internet induced job satisfaction changes.

Internet experience is defined as a user's knowledge or expertise in performing tasks on the Internet. Based on work with microcomputers (Igbaria and Chakrabrati 1990) Internet experience includes a range of skills from basic (accessing the Internet) to advanced (programming in hypertext based software). Internet experience is likely to promote a more favorable attitude about the usefulness of the Internet in the work environment and studies of microcomputer usage provided empirical support for this linkage between experience and attitudes (Harrison and Rainer 1992; Igbaria, Parasuraman, and Baroudi 1996; Taylor and Todd 1995; Thompson, Higgins, and Howell 1994). Having experience increases perceived behavior control, heightening confidence and favorable feelings about the behavior as well as the job in general (Ajzen 1991). One of the important factors conducive to job satisfaction is mentally challenging work (Robbins 1997). Gaining and having experience, especially in the web skills of creating and maintaining web pages and programming in hypertext based software, likely qualifies as challenging work for most Internet users. Therefore the following is proposed:

H3a: Internet experience accounts for significant differences in user satisfaction with the Internet.

H3b: Internet experience accounts for significant differences in Internet induced job satisfaction changes.

System usage, as measured by self-reported time spent on the Internet and frequency of use, are used to conceptualize system usage. This is based on prior research that used system usage as an indicator of personal computer acceptance (Adams, Nelson, and Todd 1992; Davis et al. 1989; Igbaria and Chakrabrati 1990). System usage has practical value for managers who want to evaluate self-reported usage (Straub et al. 1995), potentially reconciling it with actual usage reports. As Melone (1990) notes, information system research on user attitudes has concentrated on the "attitudes – behavior relationship", however, looking at the "behavior – attitude relationship" may enrich our understanding. Etezadi-Amoli and Farhoomand (1996), also suggest that usage may change a user's perception of application software, affecting satisfaction. Therefore, consistent with the model of change discussed, we propose to investigate usage as a behavioral antecedent to user satisfaction. We suggest that those who use the system more will report heightened levels of user satisfaction with the Internet and also heightened levels of job satisfaction. Thus the following is proposed:

H4a: Usage and frequency of use account for significant differences in user satisfaction with the Internet.

H4b: Usage and frequency of use account for significant differences in Internet induced job satisfaction changes.

Demographic Factors. Prior research strongly supported the importance of demographic factors in examining information systems (Harrison and Rainer 1992; Mannehim et al. 1997; Zmud 1979). Age, gender, and organizational position were examined as relevant demographic factors likely to influence user satisfaction with the Internet and Internet induced job satisfaction changes.

Age is an important factor of work behavior in general (Terborg 1981) and end user computing specifically (Igbaria and Parasuraman 1989). Although there is some support for older employees reporting more favorable beliefs and outcomes in system usage (Ang and Soh 1997), stronger support has been reported for older employees having less favorable beliefs and outcomes than younger workers (Czara, Hammond, Blascovich, and Swede 1989; Harrison and

Rainer 1992; Nickell and Pinto 1986). Hence the following hypotheses:

H5a: Age accounts for significant differences in user satisfaction with the Internet.

H5b: Age accounts for significant differences in Internet induced job satisfaction changes.

Gender has been a key variable in the acceptance of technology (Gefan and Straub 1997; Truman and Baroudi 1994). The gender model of work predicts asymmetries in attitudes and behaviors of men and women and computer usage has been generally been viewed as a masculine activity (Gefen and Straub 1997; Harrison, Rainer, and Hochwarter 1997; Williams, Ogletree, Wodburne, and Rafeld 1994). On the other hand, the job model of work predicts that gender is not as salient a factor in the work environment as job type and individual qualifications. Recent research has been conflicting on the gender differences. Although the job model of work has received some support (Brosnan 1999; Gefen and Straub 1997), stronger support has been reported for the gender model of work (Harrison et al. 1997; Loch and Conger 1996). Based on gender role expectations and previous research, the following are proposed:

Table 2. Respondent profiles

Age	No.		Organizational Position	No.
Below 25	22 (6.6%)		Top level manager	57 (17.1%)
25-34	95 (28.4%)		Middle level manager	66 (20%)
35-49	130 (38.9%)		Lower level manager	30 (9%)
50 and above	81 (24.2%)		Professional	130 (38.9%)
missing	06 (.02%)		Administrative support	21 (6.3%)
Total	334		Other and missing	30 (9%)
			Total	334
Gender	No.			
Male	212 (63.4%)		Company has a website?	
Female	122 (36.5%)		Yes	282 (84.4%)
Total	334		No	51
			Missing	1
Types of Businesses	%			
Services	20.1%		Internet outside of work?	
Manufacturing	16.2%		Yes	253 (75.7%)
Finance/insurance/real estate	14.1%		No	81
Education	11.7%			
Government	10.8%		Length of employed	
Self-employed	3.3%		Range	1-38 years
Wholesale or retail trade	2.1%		Average time	8.7 years
Other	21.7%		(S.D.)	8.19 years
Size of Company				
Fewer than 500 employees	41%			
More than 500 employees	59%			

H6a: Gender accounts for significant differences in user satisfaction with the Internet.

H6b: Gender accounts for significant differences in Internet induced job satisfaction changes.

Organizational position is an important variable in both organizational theory (Cyert and March 1963) and information systems research (Ang and Pavri 1994; Orlikowski and Robey 1991). Organizational position is classified as top, middle, or lower management, professional, or administrative support. People in these different positions may have different attitudes about the Internet prior to usage not based on individual differences, but because of different expectations about the role of the Internet in their respective positions. Thus satisfaction with the Internet may vary depending upon one's position in the organization and overall satisfaction may differ by position.

H7a: Significant differences in user satisfaction with the Internet xist among users at different organizational positions.

H7b: Significant differences in Internet induced job satisfaction changes exist among users at different organizational positions.

RESEARCH METHODOLOGY

Sample. Data for this study were collected in 1998 as part of a larger research study on workplace Internet usage. A questionnaire (Appendix A) was sent to a random sample of 3,000 undergraduate alumni of a university in the northeastern United States. Where applicable, respondents reported Internet usage in a work context. The survey was pilot tested with MBA students (Anandarajan, Simmers, and Igbaria 2000). 325 surveys were returned within two weeks and another 170 received within a month after a follow-up postcard. There were 445 useable surveys, after discarding 50 unusable responses. The participation rate (15%) was consistent with other studies where potential respondents were not screened prior to participation (Miller, Burke, and Glick 1998; Scandura and Lankau 1997). Of the 445 individual responses, 334 had Internet access at work and were used in this study. Table 2 shows the profiles of the respondents based on the original 334. To evaluate non-response bias, comparisons between respondent and non-respondent individuals and between early responses and late responses were made on the basis of two objective measures (age and gender), that is, did the respondents and non-respondents and the early responses and the late responses differ in age and gender? No statistically significant differences were found at the $p > .05$ level, providing some confidence in the representativeness of the sample. However non-response bias cannot be ruled out and is a limitation of the study. We felt that for an exploratory study, a sample size of over 300 allowed us to test our hypotheses and provided preliminary insights into our research questions.

Measures. The measures used to operationalize the variables were selected from the literature and modified by substituting "Internet" where applicable.

Table 3 shows the variable means, standard deviations, and scale reliabilities. The criteria suggested by Nunnally (1978) were applied to determine the adequacy of the reliability coefficients obtained for each measure. Multi-item scales were constructed using principal components factor analysis with varimax rotation. We used the guidelines of Hair, Anderson, Tatham, and Black (1995) in determining the relative importance of the factor loadings with loadings greater than 0.30 considered significant; loadings greater than 0.40 onsidered more important; and loadings 0.50 or greater considered very significant.

Internet induced job satisfaction changes was measured by a seven item scale derived from Hackman and Oldham (1980), and represented an index of overall job satisfaction changes. The items were modified to evaluate how the Internet had changed respondents' job satisfaction. Examples are: "Evaluate how the Internet has changed: general satisfaction with your job, general satisfaction with the kind of work you do in your job, and your overall productivity." The response anchors for the questions ranged from (1) greatly decreased to (5) greatly increased.

Internet user satisfaction was adapted from microcomputer user satisfaction (Doll and Torkzadeh 1988; Igbaria 1992). Doll and Torkzadeh's original 12-item scale was reduced to 8 items and modified to provide a measure of the degree of satisfaction in the way the Internet met the user's requirements for content, accuracy, ease of use, and timeliness. Since there are no report outputs in the Internet equivalent to the microcomputer environment, the three questions pertaining to reports (one in content and two in format) were deleted. One, instead of two questions was included on accuracy to capture satisfaction with accuracy, rather than an assessment of the accuracy of the Internet. Respondents were asked to refer to their job and evaluate the Internet with statements like: 'The Internet provides the precise information I need', 'The information content on the Internet meets my needs', 'The Internet provides sufficient information', and 'The Internet is easy to use', using a five-point Likert scale ranging from 1 (almost never) to 5 (most often). Although prior research indicated that user satisfaction should be multi-dimensional, the factor analysis of user satisfaction with the Internet yielded only one factor with an eigenvalue of 4.935 and with 61.7% of the variance explained.

Table 3. Variable means, standard deviations, scale reliabilities

Variable	Number Of Items	Mean	Standard Deviation	Cronbach's alpha	Factor Loadings	Eigenvalues
Age	1	40.501	11.316			
Time usage	1	2.955	1.236			
Frequency	1	4.720	1.342			
General Internet experience	3	3.422	1.051	.854	.916, .891, .790	1.478
Web experience	3	1.473	0.923	.924	.914, .906, .915	3.507
Formal courses	1	1.189	0.562			
Other training	3	1.697	0.719	.575	.723, .775, .684	1.729
Self-training	1	3.855	1.161			
Internet User Satisfaction	8	3.385	0.739	.906	.834, .862, .847, .856,.790, .763, .737, .544	4.935
Job Satisfaction	7	3.404	0.464	.860	.688, .527, .833, .845,.753, .679, .778	3.794
Gender coded: 1 = Male 2 = Female						

To support our contention, based on prior research and theory, that user satisfaction with the Internet and Internet induced job satisfaction changes were two distinct factors, a factor analysis was done. As expected, the factor analysis revealed two independent factors with eigenvalues in excess of one. Factor one, labeled 'Internet induced job satisfaction changes', contained the seven anticipated items, with factor loadings greater than 0.50. The second factor consisted of eight items, labeled 'user satisfaction with the

Internet' and contained the expected questions with factor loadings greater than 0.50. The eigenvalues were 4.945 and 3.828 and percentages of variation explained were 32.9% and 25.5%, with a cumulative variance of 58.5%. The reliability coefficient for 'Internet induced job satisfaction changes' was 0.86 and for 'user satisfaction with the Internet' was 0.91.

Two indicators of Internet usage were used: (1) self-reported daily use of the Internet at work; and (2) the self-reported frequency of use. Daily usage and frequency of usage were adapted from studies of microcomputer usage (Cheney and Dickson 1982; Igbaria et al. 1996). *Daily usage of the Internet* was ascertained by asking individuals to indicate the amount of time spent on the Internet per day, using a six-point scale ranging from 1 (almost none) to 6 (more than three hours per day). *Frequency of use* was measured on a six-point scale ranging from 1 (less than once a month) to 6 (several times a day).

These scales were based on six-points as measures of time with each increasing number representing increasing time on the Internet. We choose not to use a continuous attitudinal measure to maintain consistency with previous measures of system usage (Lee 1986; Mittman and Moore 1984).

Self-report indicators are often used to operationalize system use, particularly where objective use metrics are not readily available. Since respondents accessed the Internet from a variety of organizations, objective logs were not obtainable. Self-reported usage and impact are not precise measures, but prior research suggests they are suitable as relative measures (Blair and Burton 1987).

Internet experience was assessed by asking the participants to indicate the extent of their experience with using the Internet on a five-point scale from 1 (none) to 5 (very extensive). Factor one, labeled "web page experience", contained three items, including: (1) creating web pages, (2) programming in hypertext based software, and (3) maintaining web pages. The mean of the three items was used to create an index of web page experience. The second factor, labeled "general Internet experience", consisted of three items: (1) accessing the Internet, (2) using Internet search engines, and (3) downloading files from the Internet. The mean was used as a measure of general Internet experience.

Internet training, based on a factor analysis, consisted of three indicators: (1) courses at a community college or university, (2) other training from vendors, outside consultants, in-house company courses, or by a fellow worker; and (3) self-training. The first indicator was labeled "formal courses". The second indicator, "other training", was calculated from the mean of the three items. The third indicator was a single item, "self-training". The items had a five point rating scale, ranging from (1) very little to (5) very extensive. Both Internet experience and Internet training measures were derived from Igbaria et al. (1996).

Single-item questions were used to ascertain age, gender and organizational position. *Age* consisted of one question where respondents were asked to record their age to the nearest year. Four age ranges were created: "1" = below 25 years of age; "2 " = 25 to 34 years of age; "3" = 35 to 49 years of age and "4" = above 50. *Gender* was assessed with a fixed response item (1 = male; 2 = female). Organizational position was ascertained by asking respondents to indicate which category best described their current position from top-level manager (1) to other (6).

Data Analyses. Bivariate correlation analysis and analyses of variance were performed to test the seven hypotheses. A one-way analysis of variance (ANOVA) was used to test that the mean scores for a quantitative dependent variable varied by a single factor (independent variable). For example to test hypothesis H2a on Internet training, three ANOVAs were run with user satisfaction with the Internet as the dependent variable in each run and formal courses, self-training, and other training as the single independent variable. This was to test if the mean score on user satisfaction with the Internet was equal for each category in the independent variable. We also used post hoc comparisons to identify which groups were significantly different from each other if a

significant *F* ratio for the entire model was obtained. We used the conservative Scheffe's test of significance for the post hoc tests, which is designed to allow all possible linear combinations of group means to be tested, requiring a larger difference between means for significance (Huck, Cormier, and Bounds 1974).

Multiple regression analyses were done to test the strength of the relationships among all the model variables. Variables were entered stepwise into the regression equation in blocks to assess the impact of that block of variables, first on user satisfaction with the Internet and then in the second model on Internet induced job satisfaction changes. With user satisfaction with the Internet as the dependent variable, demographic variables were entered first, then the experience variables, then the training variables, and finally the system usage variables. The blocks were the same for Internet induced job satisfaction changes except for the addition of user satisfaction with the Internet in the fifth block. Thus in the first model there were four blocks and in the second model there were five blocks. In a stepwise regression variables pass a tolerance test and only the significant variables are selected and added to the regression model. The descriptive statistics and model definitions are shown in Table 4.

RESULTS

Table 5 shows the Pearson correlation coefficients among all the study variables. Internet user satisfaction and Internet induced job satisfaction changes are significantly correlated (r = .40, p > .001), supporting H1. Time of use, frequency of use, general Internet experience, web experience, other training, and self-training are positively correlated with both user satisfaction with the Internet and Internet induced job satisfaction changes.

Analyses of variance (ANOVA) were performed to test the differences in user satisfaction with the Internet and Internet induced job satisfaction changes by demographic factors (age, gender, and organizational position), and by Internet behavior (experience, usage, and training). Table 6 shows the ANOVA results. Hypothesis 2a is partially supported. There are significant differences in Internet user satisfaction based on Internet experience (H3a), system usage (H4a) and on age (H5a). Hypotheses 6a and 7a are not supported.

There are significant differences in Internet induced job satisfaction changes based on general Internet and web page experience supporting H3b and on time of use partially supporting H4b. No significant differences were found in Internet induced job satisfaction changes based on either training (H2b) or the demographic variables (H5b, H6b and H7b).

Once it had been determined that differences existed in means among the groups post hoc tests were run. Those that were very extensively self-taught and those that had very extensive general web experience reported significantly higher user satisfaction with the Internet than those reporting less extensive self-teaching and less extensive general web experience. Those who spent 2-3 hours working on the Internet expressed the highest levels of user satisfaction with the Internet.

Those who accessed the Internet several times a day had significantly higher mean user satisfaction with the Internet than those who reported accessing the Internet less than once a month. Those younger than 25 expressed significantly higher user satisfaction with the Internet than those between the ages of 35 and 49.

Respondents who reported very extensive web page experience had significantly higher Internet induced job satisfaction changes than those who had very little web page experience. Those who reported using the Internet for more than 3 hours reported higher levels of Internet induced job satisfaction changes than those who reported almost none to 1-2 hours per day.

The regression analysis with user satisfaction with the Internet as the dependent variable had an adjusted r^2 of .230 and all four models were significant. In the full model, the significant predictors of user satisfaction with the Internet were general web experience (β = .280, p < .000) and time usage (β = .171, p < .003). Results are depicted in Table 7.

Table 4. Descriptive statistics and model definitions

Model 1: Descriptive Statistics and Model Definitions

	Mean	Std. Deviation	N
Dependent Variable			
User satisfaction with internet	2.9668	.7909	301
Model 1 - Demographic Variables			
Age	2.8306	.8686	301
Gender	1.3522	.4784	301
Organizational position	3.1927	1.4797	301
Model 2 – Experience Variables			
General skills	3.19	1.13	301
Web skill	1.37	.86	301
Model 3 – Training Variables			
Courses	1.18	.55	301
Other training	1.44	.69	301
Self-taught	3.8638	1.1539	301
Model 4 – System Usage			
Time use	2.9701	1.2230	301
Frequency of use	4.7542	1.3112	301

Model 2: Descriptive Statistics and Model Definitions

	Mean	Std. Deviation	N
Dependent Variable			
Internet induced job satisfaction changes	3.1063	.4187	301
Model 1 - Demographic Variables			
Age	2.8306	.8686	301
Gender	1.3522	.4784	301
Organizational position	3.1927	1.4797	301
Model 2 – Experience Variables			
General skills	3.19	1.13	301
Web skill	1.37	.86	301
Model 3 – Training Variables			
Courses	1.18	.55	301
Other training	1.44	.69	301
Self-taught	3.8638	1.1539	301
Model 4 – System Usage			
Time use	2.9701	1.2230	301
Frequency of use	4.7542	1.3112	301
Model 5 – User satisfaction with the Internet	2.9668	.7909	301

Table 5. Pearson correlations

	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	1.000											
2. Gender	**-.269**	1.000										
3. Organizational Position	**-.279**	**.280**	1.000									
4. Time of use	.021	.005	.035	1.000								
5. Frequency	-.029	-.036	.010	**.685**	1.000							
6. General experience	**-.218**	-.048	.075	**.449**	**.556**	1.000						
7. Web experience	**-.183**	-.009	.093	**.311**	**.225**	**.419**	1.000					
8. Formal courses	**-.168**	.001	-.025	.035	.063	**.126**	.053	1.000				
9. Other training	.049	**.120**	.042	**.249**	**.155**	**.134**	**.112**	**.157**	1.000			
10. Self-training	**-.216**	.034	.041	**.410**	**.412**	**.597**	**.265**	-.029	.036	1.000		
11. Internet satisfaction	**-.232**	**.132**	**.145**	**.308**	**.278**	**.437**	**.204**	**.**068	**.112**	**.375**	1.000	
12. Job satisfaction	-.053	.068	.046	**.334**	**.278**	**.260**	**.217**	**.**015	**.121**	**.232**	**.400**	1.000

$r > .11$, $p < .05$; $r > .14$, $p < .01$; $r > .20$, $p < .001$
n = 305 (sample size will vary due to missing data in any one variable)

Table 6. Analyses of Variance results

Dependent Variables	Results	Hypotheses	Independent Variables	Degrees of Freedom	*F*-value	Prob > *F*
User Satisfaction						
	H2a Partial support	2a	Training: Formal Courses			ns
		2a	Training: Other training	4	3.35	.011
		2a	Training: Self-training	4	11.79	.000
	H3a supported	3a	Experience: General Internet Experience	4	18.73	.000
		3a	Experience: Web Experience	4	5.00	.001
	H4a supported	4a	Time of use	5	9.82	.000
		4a	Frequency of use	5	6.01	.000
	H5a supported	5a	Age	3	6.71	.000
	H6a not supported	6a	Gender			ns
	H7a not supported	7a	Organizational Position			ns
Internet Induced Job Satisfaction Changes						
	H2b not supported	2b	Training: Formal Courses			ns
		2b	Training: Other training			ns
		2b	Training: Self-training			ns
	H3b supported	3b	Experience: General Internet Experience	4	2.62	.035
		3b	Experience: Web Experience	4	5.90	.000
	H4a partial support	4b	Time of use	5	4.90	.000
		4b	Frequency of use			ns
	H5b not supported	5b	Age			ns
	H6b not supported	6b	Gender			ns
	H6b not supported	7b	Organizational Position			ns

ns = not significant

Table 7. Regression Results
Dependent Variable - User Satisfaction with the Internet

Model 1 Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.178	.032	.028	.7796
2	.448	.200	.195	.7097
3	.467	.218	.210	.7031
4	.490	.240	.230	.6942

a Predictors: (Constant), AGE
b Predictors: (Constant), AGE, GENERAL SKILL
c Predictors: (Constant), AGE, GENERAL SKILL, SELFTAUGHT
d Predictors: (Constant), AGE, GENERAL SKILL, SELFTAUGHT, TIMEUSE

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.948	1	5.948	9.787	.002
	Residual	181.719	299	.608		
	Total	187.668	300			
2	Regression	37.591	2	18.796	37.322	.000
	Residual	150.077	298	.504		
	Total	187.668	300			
3	Regression	40.863	3	13.621	27.556	.000
	Residual	146.805	297	.494		
	Total	187.668	300			
4	Regression	45.039	4	11.260	23.367	.000
	Residual	142.629	296	.482		
	Total	187.668	300			

COEFFICIENTS

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
1	(Constant)	3.426	.153		22.332	.000
	AGE	-.162	.052	-.178	-3.128	.002
2	(Constant)	2.239	.205		10.934	.000
	AGE	-7.555E-02	.048	-.083	-1.560	.120
	GENERAL SKILL	.295	.037	.421	7.927	.000
3	(Constant)	1.964	.229		8.569	.000
	AGE	-6.105E-02	.048	-.067	-1.264	.207
	GENERAL SKILL	.236	.043	.337	5.429	.000
	SELFTAUGHT	.109	.042	.159	2.573	.011
4	(Constant)	1.929	.227		8.511	.000
	AGE	-8.121E-02	.048	-.089	-1.686	.093
	GENERAL SKILL	.196	.045	.280	4.359	.000
	SELFTAUGHT	8.101E-02	.043	.118	1.882	.061
	TIMEUSE	.111	.038	.171	2.944	.003

Table 8. Regression Results[1]
Dependent Variable – Internet Induced Job Satisfaction Changes

MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.259	.067	.064	.4052
4	.281	.079	.073	.4032
5	.389	.151	.142	.3877

a Predictors: (Constant), WEBSKILL
b Predictors: (Constant), WEBSKILL, TIMEUSE
c Predictors: (Constant), WEBSKILL, TIMEUSE, USER SATISFACTION
d Dependent Variable: INTERNET INDUCED JOB SATISFACTION CHANGES

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
2	Regression	3.518	1	3.518	21.433	.000
	Residual	49.080	299	.164		
	Total	52.598	300			
4	Regression	4.155	2	2.078	12.780	.000
	Residual	48.443	298	.163		
	Total	52.598	300			
5	Regression	7.945	3	2.648	17.615	.000
	Residual	44.653	297	.150		
	Total	52.598	300			

COEFFICIENTS

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta		
2	(Constant)	2.934	.044		66.919	.000
	WEBSKILL	.125	.027	.259	4.630	.000
4	(Constant)	2.840	.065		43.927	.000
	WEBSKILL	.109	.028	.224	3.853	.000
	TIMEUSE	3.946E-02	.020	.115	1.979	.049
5	(Constant)	2.502	.092		27.313	.000
	WEBSKILL	8.696E-02	.027	.180	3.167	.002
	TIMEUSE	1.036E-02	.020	.030	.517	.605
	USER SATISFACTION	.153	.030	.289	5.021	.000

[1] Stepwise regression in SPSS 10 drops the insignificant models, those that do not contribute to explaining variance. In our study, with Internet Induced Job Satisfaction Changes as the dependent variable, Model 1 – the demographic variables, and Model 3 the training variables were insignificant.

The regression analysis with Internet induced job satisfaction changes as the dependent variable had an adjusted r^2 of .142 and three of the five models were significant. The models with the demographic variables and the training variables were not significant. In the full model, web page experience (β = .180, p < .002) and user satisfaction with the Internet (β = .289, p < .000) were significant predictors of Internet induced job satisfaction changes. These results are given in Table 8.

DISCUSSION

The results provide interesting insights into differences in user satisfaction with the Internet based on behavioral and demographic groups. In line with our expectations, different levels of experience and system use resulted in different levels of user satisfaction with the Internet. Differences in training levels were weakly supportive of different levels of user satisfaction with the Internet. Surprisingly, and contrary to our expectations, groups based on the demographic variables of gender and organizational position did not account for significant variation in user satisfaction with the Internet. However, the age group younger than 25 reported significantly higher user satisfaction with the Internet than did those workers in the 35 to 49 age group, which reported the lowest mean score on user satisfaction with the Internet of the four age groups. This is contrary to the findings of Ang and Soh, (1997) who found older workers reporting higher levels of user information satisfaction. A possible reason for this finding is that this middle age group has more career and job uncertainty and are less committed to their work roles and the organization, supporting the disengagement approach to the work cycle and is contrary to the findings of Mannheim et al. (1997). Examining life stress, career stress, and job involvement would increase our knowledge in this area. The finding that the youngest workers expressed the highest levels of user satisfaction with the Internet is not surprising as this generation generally has positive attitudes about all aspects of information technology. These differences in age groups supports previous research that age is an important variable in the management of information technology.

Surprisingly, there are no gender differences in user satisfaction with the Internet. This supports the job theory of work, which posits that gender is increasingly becoming less important as a predictor of work related attitudes and experiences. Women in the Internet-connected workplace may be as comfortable with information technology as men. Women also may have little choice but to add Internet proficiency to their skill sets if they want to prosper in the workforce. This finding is contrary to Gefen and Straub (1997) who found that women and men differed in their perceptions of, but not use of email but it is consistent with Igbaria and Nachman (1990) who found gender and end user satisfaction were not correlated. Additional work needs to be done on gender and the Internet, looking more closely at leadership styles and other attitudinal variables such as trust and organizational commitment. Additionally bringing in social norms and other social constraints in the examination of user satisfaction may provide a more robust research model.

Consistent with our expectations and prior research, higher levels of training, particularly self-training, experience, and system usage contribute to higher levels of user satisfaction with the Internet. Our results suggest that formal training should be planned and implemented so that the positive attributes of self-training (flexibility, moving at one's own pace, freedom, and autonomy) can be blended with organizational requirements, creating a better training experience for both the individual and the organization. Additional work in other settings, especially outside the United States would reinforce the importance of training, experience, and system usage in models of user satisfaction with the Internet.

The lack of support for differences in Internet induced job satisfaction changes by demographic factors and Internet behaviors is contrary to our predictions, but not surprising since it may be that Internet usage was not as pervasive in the workplace at the time of this survey. Over 80% of the respondents recorded that the Internet had made no change in their job satisfaction. A follow-up survey might provide different results.

There is a significantly positive correlation between user satisfaction with the Internet and Internet induced job satisfaction changes, supporting hypothesis (H1) and is similar to previous findings on computer-mediated use (Ang and Soh 1997). This has important implications for managers since improving satisfaction with Internet use could spill over to general job satisfaction. This may become particularly salient as Internet usage permeates the work environment, and the Internet increases in importance as a competitive weapon used by most employees (Bremer 1996).

The findings of the present study contribute to a better understanding of workplace Internet usage. The relatively low response rate (15%) calls into question generalizability of the findings; additional research is required to see if similar results are obtained with other samples. A few possible extensions of this work include examining additional work environments both in the United States and globally, and conducting experiments. Expanding the analysis to include additional variables, as well as models of analysis such as structural equation modeling will build on the exploratory work done in this paper. Additionally, while cross-sectional studies, such as the present one, are useful for identifying patterns of relationships among relevant variables, longitudinal research design is essential to confirm causal linkages. The strengths of the findings would also be enhanced by the use of both subjective and objective measures, as common method variance contributing to the results cannot be ruled out.

In conclusion, the study extends prior research on user satisfaction to the Internet-connected workplace. It examines behavior as an antecedent to attitude and attempts to link an information technology attitude to a more comprehensive work attitude within the theoretical frameworks of organizational change and job characteristics. The Internet mediated work environment has many challenges for both researchers and managers as we grapple with how to harness the Internet's tremendous potential.

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THE AUTHORS

Dr. Claire A. Simmers is an Assistant Professor in the Management and Information Systems Department in the Erivan K. Haub School of Business at Saint Joseph's University, Philadelphia, PA. Her research interests are in strategic decision making, work/life issues, and understanding the sociotechnical interface in Internet usage. Her work has been published in *Behavior and Information Technology*, *The Journal of Business and Economics Studies*, and the *Journal of Organizational Behavior.* She is a co-editor of *Internet Usage in the Workplace: A Social, Ethical and Legal Perspective* (Idea Group Publishing, 2001.

Dr. Murugan Anandarajan is an Associate Professor of Management Information Systems in the Department of Management in the Bennett S. LeBow School of Business at Drexel University, Philadelphia, Pa. His current research interests include Artificial Intelligence-based classification, artificial life, and Internet addiction and abuse. His research has appeared in journals such as *Behavior and Information Technology*, *Computers and Operations Research*, *Decision Sciences*, *Industrial Data Management Systems*, *Information and Management*, *International Journal of Information Management*, *Journal of Computer Information Systems, Journal of Global Information Systems*, *Journal of International Business Studies*, and *the Omega-International Journal of Management Science*. He is a co-*editor* of *Internet Usage in the Workplace: A Social, Ethical and Legal Perspective* (Idea Group Publishing, 2001. He is editor of a special section on Internet Abuse in the Workplace in the *Communications of the ACM* (December 2001). He co-authored *Artificial Neural Networks in Glaucoma Classification: A Concise Approach* (2001).

APPENDIX A
SURVEY

These questions in the survey are concerned with your background and work experience.

1.1. Indicate which of the following categories best describes the business or industry your company is in (please check one)

1. □ Manufacturing
2. □ Services
3. □ Wholesale or retail trade
4. □ Finance, insurance, or real estate
5. □ Education
6. □ Self- Employed
7. □ Student
8. □ Other _____ *(Please Specify)*

1.2. What is your best estimate of the number of people who work for your company?

1. □ 2-49
2. □ 50-99
3. □ 100-249
4. □ 250-499
5. □ 500-999
6. □ 1,000-4,999
7. □ 5,000-9,999
8. □ more than 10,000

1.3 How many years have you been employed in this company? _____ *(to the nearest year)*

1.4. Which of the following categories best describes your current position *(check one)*

1. □ Top level manager
2. □ Middle level manager
3. □ Lower level manager
4. □ Technical position
5. □ Administrative support
6. □ Other _____ *(Please Specify)*

1.5. Your age (to the nearest year): _____

1.6. Gender: 1. □Male 2. □Female

1.7 Does your company have a website? 1. □Yes 2. □No

1.8 Do you have Internet access at work? 1. □Yes 2. □No

Please rate your experience working with the Internet, by checking the appropriate choice.

1 = Very Little 2 = Some 3 = Moderate 4 = Extensive 5 = Very Extensive

		1	*2*	*3*	*4*	*5*
2.1	Accessing the Internet	1 □	2 □	3 □	4 □	5 □
2.2	Using Internet search engines, such as Yahoo, Infoseek	1 □	2 □	3 □	4 □	5 □
2.3	Downloading files from the Internet	1 □	2 □	3 □	4 □	5 □
2.4	Creating web pages	1 □	2 □	3 □	4 □	5 □
2.5	Programming in hypertext based software	1 □	2 □	3 □	4 □	5 □
2.6	Maintaining web pages	1 □	2 □	3 □	4 □	5 □

What extent of training have you received from the following sources :

1 = Very Little 2 = Some 3 = Moderate 4 = Extensive 5 = Very Extensive

		1	*2*	*3*	*4*	*5*
2.7	General courses at a community college or university	1 □	2 □	3 □	4 □	5 □
2.8	Vendors or outside consultants	1 □	2 □	3 □	4 □	5 □

2.9	In-house company courses	1 □ 2 □ 3 □ 4 □ 5 □
2.10	By a fellow worker	1 □ 2 □ 3 □ 4 □ 5 □
2.11	Self-study; self-taught	1 □ 2 □ 3 □ 4 □ 5 □

3.1 On an average working day that you use the Internet, how much time do you spend on the system in performance of your job?

1. □ Almost never
2. □ Less than ½ hour
3. □ From ½ hour to 1 hour
4. □ 1 -2 hours
5. □ 2 - 3 hours
6. □ More than 3 hours

4.2 Please estimate how frequently you access the Internet, while at work in performance of your job?

1. □ Less than once a month
2. □ Once a month
3. □ A few times a month
4. □A few times a week
5. □About once a day
6. □ Several times a day

You are asked to evaluate how the Internet has changed some of the characteristics of your current job. Please check the response that best describes your opinion.

1 = Greatly decreased 2 = Decreased 3 = No change 4 = Increased 5 = Greatly increased

		1	***2***	***3***	***4***	***5***
5.1	Freedom in how to do your job	1 □	2 □	3 □	4 □	5 □
5.2	Your relationships with fellow employees	1 □	2 □	3 □	4 □	5 □
5.3	General satisfaction with your job	1 □	2 □	3 □	4 □	5 □
5.4	General satisfaction with the kind of work you do in your job	1 □	2 □	3 □	4 □	5 □
5.5	Your overall productivity	1 □	2 □	3 □	4 □	5 □
5.6	Autonomy in your job	1 □	2 □	3 □	4 □	5 □
5.7	Variety in your job	1 □	2 □	3 □	4 □	5 □

Referring to your job, please check the appropriate number that corresponds to your evaluation of the Internet

1 = Almost Never 2 = Seldom 3 = Often 4 = Usually 5 = Most often

		1	***2***	***3***	***4***	***5***
6.1	The Internet provides the precise information I need	1 □	2 □	3 □	4 □	5 □
6.2	The information content on the Internet meets my needs	1 □	2 □	3 □	4 □	5 □
6.3	The Internet provides sufficient information	1 □	2 □	3 □	4 □	5 □
6.4	I'm satisfied with the accuracy of the Internet	1 □	2 □	3 □	4 □	5 □
6.5	The Internet is user friendly	1 □	2 □	3 □	4 □	5 □
6.6	The Internet is easy to use	1 □	2 □	3 □	4 □	5 □
6.7	The Internet provides up-to-date information	1 □	2 □	3 □	4 □	5 □
6.8	My access to the Internet is fast	1 □	2 □	3 □	4 □	5 □