NOTES AND SHORT PAPERS

A Note on Interpersonal and Communication Skills for IS Professionals: Evidence of Positive Influence

James J. Jiang[†]
Department of Management Information Systems, University of Central Florida,
Orlando, FL 32816-1400, e-mail: jjiang@bus.ucf.edu

Gary Klein
College of Business and Administration, The University of Colorado at Colorado
Springs, P.O. Box 7150, Colorado Springs, CO 80933-7150, e-mail: gklein@mail.uccs.edu

Craig Van Slyke
Department of Management Information Systems, University of Central Florida,
Orlando, FL 32816-1400, e-mail: cvanslyke@bus.ucf.edu

Paul Cheney
Department of Management Information Systems, University of Central Florida,
Orlando, FL 32816-1400, e-mail: pcheney@bus.ucf.edu

ABSTRACT

A recent article by Byrd and Turner (2001) reported that interpersonal skills on the part of information systems personnel had a negative influence on the success of systems as measured by competitive advantage. Several reasons were forwarded to account for this unexpected result, including lack of richness in the measure of these skills, the use of strategic success measures, the true complexity of interpersonal relations within an organization, and the sample of CIOs who may have a bias in favor of technical skills. We address these concerns by incorporating a set of communication skills into the interpersonal skills set, sampling users for a different set of stakeholders, and employing a more complex model based on theories of expectation. The results indicate that the impacts of interpersonal skills on system success is not a simple function of the perceived level of the IS staff's skill proficiency but is also determined by the understood expectations of skill requirements.

Subject Areas: Consonance, Information Technology Personnel, and MIS/DSS; Methodological Area: Survey Research.

The importance of effective interpersonal relations between users and developers has been advocated in the information systems (IS) literature for decades (McKeen, Guimaraes, & Wetherbe, 1994; Beath & Orlikowski, 1994; Robey & Markus, 1984;

[†]Corresponding author.

Green, 1989). Such skills are particularly important for large software development projects that require a significant coordinated effort among various stakeholders at different stages of development. Certainly analysts and users must be able to effectively share their respective understanding of the problems being addressed in all phases of a project (Beath & Orlikowski, 1994; Ives & Olson, 1984). Recent research and practitioner literature has stressed the value of the communication skills of IS professionals in meeting the operational requirements of modern organizations (Cheney & Lyons, 1980; Nelson & Cheney, 1987; Todd, McKeen, & Gallupe, 1995; Lee, Trauth, & Farwell, 1995). Researchers argue that communication and coordination breakdowns are a leading cause of additional effort or errors in software development projects (Nidumolu, 1995; Zmud, 1980). Interestingly, these breakdowns are most likely to occur when communication and coordination must take place across organizational boundaries, such as when IS developers interact with user representatives.

In spite of the recognized importance of interpersonal and communication skills, empirical investigations that examined the relationship between IS skills, including interpersonal skills, and system success variables have been lacking in the IS research literature. To address this lack, Byrd and Turner (2001) conducted a study using the perceptions of chief information officers (CIOs) to evaluate IS personnel skills and the success of information technology (IT) in building competitive posture. Technical skills were found to be strongly related to the success measures selected. Business and technology management skills were found to be less strongly related. Interpersonal skills, however, were found to be negatively related to the success of IT, which was defined in the Byrd and Turner study as "competitive posture." Why should an empirical study contradict experience and research that indicate that poor interpersonal communications and relationships will result in misunderstandings that cause flawed software, excessive costs, and late delivery (Nelson & Joshi, 1995)?

Byrd and Turner offer a number of potential explanations for the unexpected results. One is the fact that CIO perceptions were used rather than those of other stakeholders. They state that "these results might be the uncertainty in the minds of the CIOs about how these softer skills actually fit into the success of designing, developing, and implementing IS applications" (2001, p. 41). As a result, Byrd and Turner (2001) call for research using the perspective of other IS stakeholders. The CIOs and IS users will likely differ in their view of various aspects of skills importance and performance because of the perception differences across stakeholders (Linberg, 1999; Jiang, Sobol, & Klein, 2000). Thus, these skills may best be evaluated by those working with the IS staff, the users. Another possible explanation is the range of the IS interpersonal skills measured in Byrd and Turner's study. Skills such as writing and oral communications were not included in the scale, indicating a need for a more complete canvas of skills. One other concern was the success metric selected, competitive posture, which may be hard to identify with specific skills, but is appropriate for executive levels.

The remaining explanation offered may be the most important: The relationships in an organization where interpersonal skills are applied have too many complexities to be modeled accurately. If nothing else, perceived success is often

related to a set of expectations, as well as delivery. Expectations of IS specialist skills have been widely examined in the literature from an importance perspective (Cheney & Lyons, 1980; Green, 1989; Trauth, Farwell, & Lee, 1993). Such user expectations were one of the most critical factors in determining user satisfaction (Doll & Ahmed, 1983; DeSanctis, 1983; Ginzberg, 1981). Recent research indicates that success, relevant to the stakeholder being investigated, is related to both expectations and performance (Klein, Jiang, & Sobol, 2002; Klein & Jiang, 2001). Wade and Parent (2001–2002) found that the gap between webmasters' skills' usefulness and skill proficiency was significantly related to the perceptions of job performance. Thus, evidence indicates that both skill importance and skill proficiency levels may need to be incorporated in a model to discover its impacts on system success.

HYPOTHESES

When conducting research that involves the IS user, outcomes are considered in terms of user satisfaction (Barki & Hartwick, 1994; Ives, Olson, & Baroudi, 1983; Baroudi & Orlikowski, 1988). Users are concerned with system characteristics and a working service relationship with the provider, therefore, the skills of the IS specialist are important and evident to the user (Cheney & Lyons, 1980; Lee et al., 1995; Todd et al., 1995). The satisfaction users derive from the final system clearly depends on the skills of the specialist to work effectively with others and develop a quality system (DeLone & McLean, 1992). If the requisite level of skills set by an understanding of the importance is not exhibited, users will be less satisfied with the system, while excess skills may serve to improve the satisfaction commonly used to measure system success.

Skills researchers have measured *deficiency* and *surplus* by connecting a measure of proficiency in a skill with an importance measure of expectation of that skill (Nelson, 1991; Nelson & Cheney, 1987). Specifically, deficiency was defined as the difference between the importance of a skill and an individual's proficiency in that area (Nelson, 1991). Past findings indicate that IS personnel were deficient in organizational skills and knowledge, including interpersonal and managerial abilities (Nelson, 1991; Nelson & Cheney, 1987; Trauth et al., 1993). Wade and Parent (2001–2002) found that technical skill deficits will lead to lowered webmasters' job performance ratings.

Discrepancy theory states that individual satisfaction is determined, in part, by a psychological comparison process involving the appraisal of a current experience against a personal standard of comparison (Locke, 1969). This psychological comparison considers both positive and negative discrepancies, such as a surplus and deficiency of skills. The effects of positive and negative discrepancies depend on the specific combination of what the individual perceives to have and what the individual wanted to begin with (Locke, 1969, 1976). Discrepancy theory is modified and applied in many contexts. In IS research, user satisfaction is related to consumer satisfaction and found to have a direct relationship with the confirmation of expectations (Oliver, 1993; Bhattacherjee, 2001). Also, job satisfaction of IS professionals is related to differences between desired job traits and those

delivered by the organization (Jiang & Klein, 2000). Based upon discrepancy theory and the empirical findings, we propose the following hypothesis:

> H1: Users with interpersonal skill expectations lower than their per-
> ceived level of IS staff's skill proficiency (a positive gap) will
> have a higher level of satisfaction than users with expectations
> that are higher than their perceptions (a negative gap).

From the above hypothesis and theory, one may conclude that to increase user's satisfaction one should somehow create a lower level of user expectations and then perform to exceed the lowered desires. However, evidence about the relationship between the levels of user expectation and user satisfaction is varied (Doll & Ahmed, 1983; DeSanctis, 1983; Rushinek & Rushinek, 1986; Rice, McFarlin, &. Bennett, 1989). Other factors may be involved (Byrd & Turner, 2001). In contrast, Ginzberg (1981) posited that implementation failures are more likely to occur when users hold unrealistically low expectations. Szanja and Scamell (1993) also found that there was a direct relationship between expectations and satisfaction; the higher the expectations, the higher the satisfaction.

Theories of expectation posit that people tend to seek congruence in their expectations and perceptions (Festinger, 1957; Snyder & Stukas, 1999). When expectations are in play, great cognitive effort is expended to confirm them. Under numerous conditions, the perceiver uses confirmatory strategies (Snyder & Stukas, 1999). Marketing literature tests differences in perception and expectation of a product and the resulting behavior is a generally accepted explanation of consumer behavior (Engel, Blackwell, & Miniard, 1990; Cohen & Goldberg, 1970; Ross & Kraft, 1983). If a consumer has unrealistically high expectations about a product, perceptions about the product will be higher than for those consumers whose expectations are unrealistically low. In the IS setting, the skills possessed by IS professionals are part of the service offered to IS users. Expectation theories imply that an IS user with unrealistically high levels of importance will experience greater satisfaction than those users who have them at unrealistically low levels. Here we use the IS staff ratings as the realistic anchor, as done in prior studies (Ginzberg, 1981). Thus, an IS user has unrealistically high expectations when exceeding those of the IS staff. Based on the above argument, we propose the following hypothesis:

> H2: Users with unrealistically high expectations will have higher sat-
> isfaction than users with unrealistically low expectations.

METHODS

This paper concerns differences in levels of importance between IS users and IS staff. As a result, paired subjects were extracted from another study consisting of individuals who worked on a systems development project together. Each pair is made up of an IS staff member and an IS user. Information systems managers from a sample of 28 organizations in the south-central United States were contacted and asked to participate in the study. The 17 managers who agreed to participate were asked to distribute a survey instrument to IS users and staff members who had recently worked on the same development project. The managers were asked to

Table 1: Demographics of the sample.

	IS Staff	IS Users
Gender:		
Male	111	76
Female	57	74
Age:		
<30 years old	45	37
31–40	89	52
41–50	23	40
>=51	6	15
Education:		
Graduate degree	19	13
Bachelor degree	120	87
Some college/		
Vocational school	28	49
Work Experience:		
<10 years	79	65
11–20	70	62
21–30	12	20
>=31 years	5	7

distribute the survey to several pairs within their organizations, with each pair representing a different project. A total of 156 responses was received from users and 172 from IS personnel. Table 1 provides demographics for the respondents. Eighteen responses were discarded due to incomplete data. The remaining observations yielded 108 matching pairs of subject-returned surveys. The full set of observations was used in the analysis of data quality, but only the matched observations were used in the testing of the hypotheses.

Testing the hypotheses stated earlier requires conducting a gap analysis. Examining Hypothesis 1 requires measuring the gap between users' importance and perception ratings. Hypothesis 2 concerns the gap between users and IS staff expectations of the importance of communications skills. The need for accuracy when measuring different perspectives on the same issue represents a major difficulty in gap analysis. For this study, identical items concerning skills were administered to a user of a system and an IS staff member who worked on the development of that system. The users were also asked to indicate their level of satisfaction with the skills they perceived. So, in summary, there are four measures used in this study: (1) skill importance rated by an IS staff member, (2) skill importance rated by an IS user, (3) user perception of skills exhibited by IS staff, and (4) users' satisfaction with the information system (user satisfaction).

Interpersonal skills include items from previous studies plus a number of communication skills. Items recommended by Quible (1991) were used to measure the written communication skills of the IS staff. Oral communication skills were derived from a review of the communication literature (Olney & Bedar, 1989; Willmington, 1989). Other interpersonal skills were measured with the items identified in previous IS studies (Lee, et al., 1995). The specific items are provided

Table 2: Convergent validity and reliability of user importance skill ratings.

Item	Loading	T-value
Writing Skills		
Write coherently	.80	11.55*
Spell words correctly	.85	12.84*
Use grammar correctly	.89	13.92*
Write decisively	.88	13.64*
Use words correctly	.90	14.14*
Construct effective sentences	.90	14.11*
Write concisely	.84	12.58*
Use effective arrangement of ideas	.77	11.05*
Write concretely	.81	11.94*
Organize material well	.82	12.30*
Oral Communication		
Have effective oral communication skill	.77	10.82*
Ask appropriate questions	.71	9.66*
Use a clear, distinct, pleasant voice	.72	9.83*
Use correct grammar	.80	11.60*
Organize ideas	.78	10.95*
Have good presentation skills	.80	11.38*
Interpersonal Skills		
Ability to plan and execute work in a collaborative environment	.72	9.68*
Ability to deal with ambiguity	.71	9.55*
Ability to work closely with customers and maintain productive user/client relationships	.62	8.01*
Ability to teach others	.76	10.33*
Ability to be self-directed and proactive	.72	9.64*
Ability to be sensitive to the organization's culture/politics	.74	10.02*

Note: * indicates significance at $p < .05$ level.

in Table 2. A five-point importance scale was used where a response of "1" corresponded to "unimportant" and "5" indicated a response of "very important." All items were anchored such that a higher score represented greater importance. Perceptions of exhibited skills were measured using a similar scale where a response of "1" indicated "unsatisfied" and "5" indicated "very satisfied."

    The construct validity of the measures was examined using confirmatory factor analysis (CFA). A CFA was performed for each instance of the skill metrics. The results of the CFA for these skills, Table 3, indicate a good fit for the data for the user, and the fit is very close to the recommended levels for the staff as well (Kline, 1998). Cronbach's alpha was used to assess internal reliability. The values, shown in Table 4, all fall within the recommended range of greater than .70 (Nunnally, 1978). Convergent validity is assessed through t-tests for all items used to measure a construct. When all of these tests are significant, convergent validity is demonstrated. All of the t-tests for these measures in the user importance scale are significant at $p = 0.01$, shown in Table 2. They are also all significant for the user perception and staff importance measures.

Table 3: Confirmatory factor analysis fit of skill ratings.

Fit Indices	Recommended level	User Expectation (Importance)	User Perception (of delivery)	IS Staff Expectation (Importance)
Root Mean Square Residual	(<=.10)	.04	.05	.04
Chi-square/degrees of freedom	(<=3)	2.39	2.30	2.89
Comparative Fit Index	(>=.90)	.90	.92	.88
Non-normed Fit Index	(>=.90)	.90	.91	.88

Table 4: Reliability of interpersonal and communication skill ratings.

	User Expectation (Importance)	User Perception (of delivery)	IS Staff Expectation (Importance)
Cronbach Alpha			
Writing skills	.96	.97	.96
Oral communication	.89	.93	.92
Interpersonal skills	.86	.92	.88

Table 5: Discriminant validity of user expectations of skills.

Factors	Estimate	Standard Error	Lower Bound	Upper Bound
Writing: Oral communication	.86	.03	.80	.92
Writing: Interpersonal skills	.71	.05	.61	.81
Oral Communication: Interpersonal	.74	.05	.64	.84

Discriminant validity, the degree to which items differentiate between constructs, can be demonstrated empirically when correlations among factors used to measure different constructs are not excessively high (Kline, 1998). Discriminant validity for written communication, oral communication, and interpersonal skills was assessed through confidence interval tests. These tests calculate a confidence interval of plus or minus two standard deviations around the correlation between pairs of factors. Discriminant validity is demonstrated when the confidence interval does not include +1 or −1. Table 5 shows the confidence intervals for correlations between factors representing written communication, oral communication, and interpersonal skills. As can be seen in Table 5, none of the intervals contains +1 or −1.

Baroudi and Orlikowski's (1988) 13-item scale was used to measure user satisfaction. Though used frequently in published studies, a CFA was conducted to validate the quality of the metric for the collected user sample. The fit indices for the CFA indicate that the measures have an acceptable level of fit with the data, with a root mean square residual (RMSR) of .06 (<= .10 recommended), a chi-square to degree of freedom (dof) ration of 2.89 (<=3 recommended), a comparative fit index

(CFI) of .92 (>=.90 recommended), and a non-normed fit index (NNFI) of .90 (>=.90 recommended). Internal reliability was also acceptable with a Cronbach's alpha value of 0.85. Discriminant validity holds according to interval test results. Full item details are omitted because the user satisfaction scale follows previously published results.

DATA ANALYSIS AND RESULTS

Hypothesis 1 concerns the gap between user expectation and their perception of delivery. A positive gap exists when a user's importance exceeds their perception of delivery. An Analysis of Variance (ANOVA) with two groups is used to test Hypothesis 1. The subjects are divided into two groups according to whether a user's importance/perception gap is positive or negative. Table 6 provides the results of this analysis. Results indicate that there are significant differences ($p = 0.002$) in the mean satisfaction levels of the two groups. The 30 users with a positive gap had a higher mean satisfaction level (4.01) than did the 78 users with a negative gap (mean = 3.57). Therefore, there is strong support for Hypothesis 1; users with positive gaps are more satisfied than users with negative gaps.

Hypothesis 2 is concerned with the gap between user expectations and those of the IS staff. A similar analysis was performed to test Hypothesis 2. The two groups for the ANOVA were determined according to whether a user had a positive or negative gap. Again, the dependent variable is user satisfaction. Sixty-three of the user subjects had unrealistically high importance ratings, while forty-five were unrealistically low. As the results in Table 7 indicate, the null hypothesis of equal satisfaction means for these two groups can be rejected ($p = 0.003$). Users with unrealistically high importance exhibited a higher level of satisfaction (mean = 3.91) than those who had unrealistically low importance (mean = 3.54).

Now we get the unique pull of conflicting directions. One direction suggests that user expectations of importance be deflated to allow them to be exceeded in

Table 6: ANOVA for user expectation to user perception gap (H1).

	User Expectation Exceeds Perception of Delivery	User Perception Exceeds Original Expectations	P-value
User Information Satisfaction	3.57 (n = 78)	4.01 (n = 30)	.0019*

Note: * indicates significant at p-value < .01 level.

Table 7: ANOVA analysis for unrealistic expectations (H2).

	High Expectations	Low Expectations	P-value
User Information Satisfaction (UIS)	3.91 (n = 63)	3.54 (n = 45)	.0031*

Note: * indicates significant at p-value < .01 level.

Table 8: ANOVA analysis for combined gap effects.

	User Expectation Exceeds Perception of Delivery	User Perception Exceeds Original Expectations	P-value
High Expectations	3.79 (n = 28)	4.12 (n = 17)	.0012*
Low Expectations	3.45 (n = 50)	3.86 (n = 13)	

Note: * indicates significant at p-value < .01 level.

performance; the other suggests they be inflated to improve final perception of performance. These contradictions are explored in a further two-way ANOVA to examine more complex interactions between the two types of gaps. Combining two levels for the two types of gaps into four groups, an ANOVA was used to investigate whether there are any significant differences among the groups. The result of this analysis is shown in Table 8. As can be seen, the hypothesis of equal satisfaction can be rejected (p = 0.001). From this we argue that satisfaction is highest when prior user importance is exceeded by IS staff. However, failure to meet high importance results in the largest drop in satisfaction, arguing for seeking realism in delivering to a standard.

CONCLUSION

Researchers and practitioners have touted the importance of interpersonal skills in IS projects. In contrast, a recent empirical study of CIOs raised questions about the link between interpersonal skills and system success (Byrd & Turner, 2001). However, should the CIOs in Byrd and Turner's study have inflated (or deflated) expectations, then a typical analysis can show a relationship in an unexpected direction. The research reported in this paper addresses the question of the relationship between IS staff's interpersonal skills and system success as measured by user satisfaction. Three aspects of this research are particularly relevant when attempting to understand the lack of support for interpersonal skills found by Byrd and Turner. First, this research considered the perceptions of further IS stakeholders—IS users. Second, a scale capturing more of the aspects of interpersonal skills is employed. Third, both skill expectations and perceived skill proficiency were included.

First, the gap between users' communication skill expectations as measured by importance and their perceptions of skills exhibited by IS staff was investigated (Hypothesis 1). The analysis indicates that users experiencing positive gaps report higher satisfaction than those with negative gaps. Prior research on satisfaction in other fields also finds this to be the case (Rice et al., 1989). The result suggests that success depends, in part, on whether the IS staff is able to live up to the expectations of the users. Information systems staff must understand the importance users place on certain skills and strive to meet those levels of competency. Activities that lead to an understanding of the user views should be conducted so that the probability of successful systems delivery can be maximized. Users should be involved with the

setting of standards for composing project teams. In some instances users should assist in setting the minimum hiring for certain skills for IS personnel. Hiring and training of IS personnel to standards should be a priority. One missing aspect of this narrow analysis is the determinants in how users perceive the skills present in the IS staff. Is interaction quality the prime determinant, or does the system product play a role? Future work may wish to address this question to help focus resources more precisely on the product that leads to perception.

Yet, the complete picture does not emerge from Hypothesis 1, where one could conclude that managing expectations to a lower level will result in higher statements of success. Hypothesis 2 indicates that users whose expectations exceed those of the IS staff exhibit higher satisfaction. This finding suggests that it may be useful to take actions resulting in the users placing more importance on certain skills. Actions to modify prior understanding of importance are crucial. Here, the users and IS staff must come to an understanding of what skills are required to deliver an information system. Education of the users at some basic level of systems would seem ideal, but costly. One of the more crucial questions opened by this work for further study is whether organizational practices and environments could close this gap.

The seemingly contradictory advice resulting from Hypotheses 1 and 2 must lead to a compromise point. Practitioners should consider the combined effect of these two indications to mean that expectations should be both realistic and achieved. This advice goes along with years of collected wisdom stating that determining realistic requirements is crucial to the delivery of a successful system or service (Boehm, 1989; Charette, 1989). Practices aimed at achieving common goals and understanding may prove as valuable in the final success as determination of business requirements for the system (Jiang, Klein, Chen, & Lin, 2002; Vancouver & Schmitt, 1991; Vance and Colella, 1990). This drive for a common understanding for both expectations and delivered goods serves to increase the amount of consonance in a system or project, where consonance is an initial agreement of objectives and traits among stakeholders (Klein et al., 2002). Achieving this common understanding is shown to be an indicator of success (Ginzberg, 1981; Klein & Jiang, 2001; Linberg, 1999).

Researchers need to be aware that there is more complexity involved in the perception of success than just the amount of an indicator that is delivered. There will often be a comparative process at work. This complexity leads to difficulties in modeling and analysis because linearity is likely compromised. Interactions occur that are not simple multiples of computed metrics. In this dataset we were able to demonstrate that higher skills lead to higher evaluation of success. However, the relation is tempered by both an expected level derived from a standard of comparison and a perception of delivered amount. Realism is crucial in those values set as standards, as are realistic perceptions of delivery. [Received: January 2003. Accepted: July 2003.]

REFERENCES

Barki, H., & Hartwick, J. (1994). Measuring user participation, user involvement, and user attitude. *MIS Quarterly, 18*(1), 59–82.

Baroudi, J. J., & Orlikowski, W. J. (1988). A short-form measure of user information satisfaction: A psychometric evaluation and notes on use. *Journal of Management Information Systems, 4*(4), 44–59.

Beath, C. M., & Orlikowski, W. J. (1994). The contradictory structure of systems development methodologies: Deconstructing the IS-User relationship in information engineering. *Information Systems Research, 5*(4), 350–377.

Bhattacherjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly, 25*(3), 351–370.

Boehm, B. W. (1989). *Software risk management*. Washington, DC: IEEE Computer Society Press.

Byrd, T. A., & Turner, D. E. (2001). An exploratory analysis of the value of the skills of IT personnel: Their relationship to IS infrastructure and competitive advantage. *Decision Sciences, 32*(1), 21–54.

Charette, R. N. (1989). *Software engineering risk analysis and management*. New York: McGraw-Hill.

Cheney, P. H., & Lyons, N. R. (1980). Information systems skills requirements: A survey. *MIS Quarterly, 4*(1), 35–43.

Cohen, J. B., & Goldberg, M. E. (1970). The dissonance model in post-decision product evaluation. *Journal of Marketing Research, 7*(3), 315–321.

DeLone, W. H., & McLean, E. (1992). Information system success: The quest for the dependent variable. *Information Systems Research, 3*(1), 60–95.

DeSanctis, G. (1983). Expectancy theory as an explanation of voluntary use of a Decision Support System. *Psychological Reports, 52*(1), 247–260.

Doll, W. J., & Ahmed, M. U. (1983). Managing user expectations. *Journal of Systems Management, 34*(6), 6–11.

Engle, J. F., Blackwell, R. D., & Miniard, P. W. (1990). *Consumer behavior*. Chicago: Dryden Press.

Festinger, L. A. (1957). *Theory of cognitive dissonance*. Evanston, IL: Row and Peterson.

Ginzberg, M. J. (1981). Early diagnosis of MIS implementation failure: Promising results and unanswered questions. *Management Science, 77*(4), 459–478.

Green, G. I. (1989). Perceived importance of systems analysts' job skills, roles, and non-salary incentives. *MIS Quarterly, 13*(2), 115–133.

Ives, B., & Olson, M. (1984). User involvement and MIS success: A review of research. *Management Sciences, 30*(5), 586–603.

Ives, B., Olson, M. H., & Baroudi, J. J. (1983). The measurement of user information satisfaction. *Communications of the ACM, 26*(10), 785–793.

Jiang, J. J., & Klein, G. (2000). Supervisor support and career anchor impact on the career satisfaction of the entry-level information systems professional. *Journal of Management Information Systems, 16*(3), 219–240.

Jiang, J. J., Klein, G., Chen, H. G., & Lin, L. (2002). Reducing user-related risks during and prior to system development. *International Journal of Project Management, 20*(3), 507–515.

Jiang, J. J., Sobol, M. G., & Klein, G. (2000). Performance ratings and importance of performance measures for IS staff: The different perceptions of IS users and IS staff. *IEEE Transactions on Engineering Management, 47*(4), 424–434.

Klein, G., & Jiang, J. J. (2001). Seeking consonance in information systems. *Journal of Systems and Software, 56*(2), 195–202.

Klein, G., Jiang, J. J., & Sobol, M. G. (2002). Consonance in information systems. In C. S. Galbraith (Ed.), *Strategies and organizations in transition*. Englewood Cliffs, NJ: Prentice Hall, 191–209.

Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New York: Guilford Press.

Lee, D. M. S., Trauth, E. M., & Farwell, D. (1995). Critical skills and knowledge requirements of IS professionals: A joint academic/industry investigation. *MIS Quarterly, 19*(3), 313–340.

Locke, E. A. (1969). What is job satisfaction? *Organizational Behavior and Human Performance, 4*(November), 309–336.

Locke, E. A. (1976). The nature and causes of job satisfaction. In M. Dunnett (Ed.), *Handbook of industrial and organization psychology*. Chicago: Rand-McNally, 1297–1350.

Linberg, K. R. (1999). Software developer perceptions about software project failure: A case study. *Journal of Systems and Software, 49*(2/3), 177–192.

McKeen, J. D., Guimaraes, T., & Wetherbe, J. C. (1994). The relationship between user participation and user satisfaction: An investigation of four contingency factors. *MIS Quarterly, 18*(3), 427–451.

Nelson, A. C., & Joshi, K. (1995). Application of a matrix approach to estimate project skill requirements. *Information and Management, 29*, 165–172.

Nelson, R. R. (1991). Educational needs as perceived by IS and end-user personnel: A survey of knowledge and skill requirements. *MIS Quarterly, 15*(4), 502–525.

Nelson, R. R., & Cheney, P. H. (1987). Training end users: An exploratory study. *MIS Quarterly, 11*(4), 546–559.

Nidumolu, S. (1995). The effect of coordination and uncertainty on software project performance: Residual performance risk as an intervening variable. *Information System Research, 6*(3), 191–219.

Nunnally, J. C. (1978). *Psychometric theory*. New York: McGraw-Hill.

Oliver, R. L. (1993). Cognitive, affective, and attribute bases of the satisfaction response. *Journal of Consumer Research, 20*(4), 418–430.

Olney, R. J., & Bednar, A. S. (1989). Identifying essential oral presentation skills for today's business curriculum. *Journal of Education for Business, 64*(4), 161–164.

Quible, Z. K. (1991). Writing competencies needed by business employees. *Delta Pi Epsilon Journal, 33*(1), 35–51.

Rice, R. W., McFarlin, D. B., & Bennett, D. E. (1989). Standards of comparison and job satisfaction. *Journal of Applied Psychology, 74*(4), 591–598.

Robey, D., & Markus, M. L. (1984). Rituals in information system design. *MIS Quarterly, 8*(1), 5–15.

Ross, R. H., & Kraft, F. B. (1983). Creating low consumer product expectations. *Journal of Business Research, 11*(1), 1–9.

Rushinek, A., & Rushinek, S. F. (1986). What makes users happy? *Communications of the ACM, 29*(7), 594–598.

Snyder, M., & Stukas, A. A., Jr. (1999). Interpersonal processes: The interplay of cognitive, motivational, and behavioral activities in social interaction. *Annual Review of Psychology, 50*, 273–303.

Szajna, B., & Scamell, R. W. (1993). The effects of information system user expectations on their performance and perception. *MIS Quarterly, 17*(4), 493–514.

Todd, P. A., McKeen, J. D., & Gallupe, R. B. (1995). The evolution of IS job skills: A content analysis of IS job advertisements from 1970 to 1990. *MIS Quarterly, 19*(1), 1–27.

Trauth, E., Farwell, D. W., & Lee, D. (1993). The IS expectation gap: Industry expectations versus academic preparation. *MIS Quarterly, 13*(3), 293–307.

Vance, R. J., & Colella, A. (1990). Effects of two types of feedback on goal acceptance and personal goals. *Journal of Applied Psychology, 75*, 68–76.

Vancouver, J. B., & Schmitt, N. W. (1991). An exploratory examination of person-organization fit: Organizational goal congruence. *Personal Psychology, 44*(2), 333–352.

Wade, M. R., & Parent, M. (2001–2002). Relationships between job skills and performance. *Journal of Management Information Systems, 18*(3), 71–96.

Willmington, S. C. (1989). Oral communication for a career in business. *Bulletin of the Association for Business Communication, 52*(2), 8–12.

Zmud, R. (1980). Management of large-scale development projects. *MIS Quarterly, 4*(2), 45–55.

James Jiang is professor of management information systems at the University of Central Florida. He also holds the K. D. Lee Professor at the National Central University (Taiwan). He obtained his PhD in information systems at the University of Cincinnati. His research interests include IS project management, IS professional management, and IS service quality management. He has published over one hundred referred articles that have appeared in journals such as *IEEE System, Man, & Cybernetics, Decision Support Systems, IEEE Engineering Management, Decision Sciences, Journal of Management Information Systems, Communication of ACM, IEEE Professional Communication, Journal of AIS,* and *MIS Quarterly.*

Gary Klein is the Couger Professor of Information Systems at the University of Colorado in Colorado Springs. He obtained his PhD in management science from Purdue University. Before that time he served as director of the Information Systems Department for a regional financial institution. His research interests include project management, system development, and mathematical modeling with over one hundred academic publications in these areas. He is a member of the Institute of Electrical and Electronic Engineers, the Association for Computing Machinery, the Society of Competitive Intelligence Professionals, the Decision Science Institute, and the Project Management Institute.

Paul Cheney received his PhD in management information systems from the University of Minnesota in 1977. He has taught at Texas Tech University, Iowa State University, the University of Georgia, and most recently, at the University of South Florida. He was previously tenured at Texas Tech, Georgia and South Florida. His research has been primarily in the area of managing information technology resources and he has published forty articles and one textbook in the field of MIS. His articles have appeared in, among others, the *MIS Quarterly, Academy of Management Journal, Journal of Management Information Systems, Information Systems Research,* and *Decision Sciences.* He has supervised fourteen PhD dissertations and served on over forty PhD committees. In addition, he has received numerous grants from private and public organizations. One of these was a $2 million dollar grant from IBM in 1985 to support graduate MIS education. A similar grant was awarded from Solomon Brothers-Smith Barney in 1993 for $1.8 million dollars. This grant created an Eminent Scholar Chair in Distributed Technology at the University of South Florida.

Craig Van Slyke is an assistant professor of management information systems at the University of Central Florida, where he teaches courses in database and electronic commerce. He holds a PhD in Information Systems from the University of South Florida. Dr. Van Slyke also spent many years in the information technology industry in a number of capacities. He has published in a number of journals including the *Communications of the ACM* and *Database.* He is also the coauthor (with France Belanger) of the book, *Electronic Business Technologies: Supporting the Net-Enhanced Organization.*