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The importance of communication skills: Perceptions of IS professionals, IS managers, and users

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THE IMPORTANCE OF COMMUNICATION SKILLS: PERCEPTIONS OF IS PROFESSIONALS, IS MANAGERS, AND USERS

by

Ruth A. Spurlock Miller, B.S., M.Ed.

A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
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We hereby recommend that the dissertation prepared under our supervision by Ruth S. Miller entitled The Importance of Communication Skills: Perceptions of IS Professionals, IS Managers, and Users be accepted in partial fulfillment of the requirements for the Degree of **Doctor of Business Administration**

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ABSTRACT

Information systems (IS) research has shown that communication skills tend to be more important than technical skills to IS staff in project development activities. Yet, research findings indicate that IS staff are lacking in the communication skills they need to interact successfully with users and managers during systems development. Thus, the two purposes of this research were (1) to determine whether IS staff, IS managers, and IS users differ in their perceptions of important communication skills that IS staff need and (2) if differences do exist, to assess the impact of the differences on user satisfaction with IS product and service and on IS manager's job performance evaluations of IS staff.

Variables used in this study were written and oral communication skills, interpersonal skills, user satisfaction, and job performance. Confirmatory factor analysis was used to develop models of the constructs, to address validity and reliability issues, and to assess model fit of the variables. Paired-sample T-tests were used to determine whether significant differences in perceptions existed between IS staff and users and between IS staff and managers. Regression analysis was used to analyze the impact of differences on user satisfaction and job performance.

Results of the research indicated that significant differences in perceptions of importance of written, oral, and interpersonal communication skills existed between IS staff and users and between IS staff and managers. Also, the results indicated that the greater the difference in perceptions of IS staff and users with respect to written and oral communications, the lower that user satisfaction was and that the greater the difference in perceptions with respect to interpersonal skills, the lower that user satisfaction with user involvement was. Findings indicated that IS staff and managers differed significantly in their perceptions of importance of written, oral, and interpersonal communication skills and that the greater the difference, the lower job performance evaluations were.

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while I was working on this degree, and they deserve special appreciation for putting up with me. My brother, Johnny, and my sisters, Marie and Mary, along with their families, cheered for me and understood when I had school work to do, as did my in-laws, Ruby and A. L. Hilton. I love you all!

It saddens me that my dad and mom, Luther and Winona Spurlock, are not here to share this time with me. They were always so proud of all our accomplishments.

As this chapter in my life ends, I look forward to a challenging, rewarding future. Remember, "all things are possible through Christ who strengthens me" (Philippians 4:13).

CHAPTER I

INTRODUCTION

This study investigates the relationships of communication skills and interpersonal skills of information systems (IS) staff with (1) successful project development and (2) job performance ratings of the IS staff within a project environment.

The purpose of this chapter is to provide an explanation of the need for additional research on the influence of communication skills and interpersonal skills of IS staff in systems development and in job performance evaluation. Following this explanation are (1) statement of the problem, (2) delimitations, (3) limitations, (4) objectives of the study, (5) definitions of the variables, (6) possible contributions of the study to IS literature, and (7) summary. The plan for the rest of the study is then presented.

Need for Further Research

Industry experts indicate that a majority of information systems development efforts end in failure (*Computer Weekly*, February 18, 1999).

Also, many systems development projects are canceled prior to completion, or they are inadequately used and abandoned after completion (Ewusi-Mensah, 1997). Neither technology issues nor technical skills of IS staff appear to be the problem (Bikson and Gutek, 1984). A possible cause may be ineffective communication and interpersonal skills of IS staff as they interact with IS users and IS managers during project development.

Systems development projects are comprised of three distinct groups of stakeholders: IS users, IS staff, and IS managers. These three groups are defined as:

1. *IS user:* Employee who receives the services and products of IS staff through project development.
2. *IS staff:* Information systems professionals who provide systems analysis and project development for IS users.
3. *IS manager:* Manager of IS staff during project development.

Research indicates these groups perceive the needed skills for successful systems development differently (Jiang, 1999). Jiang found that IS staff have demanding jobs because these professionals have two differing sets of expectations to meet—those of the IS manager and those of the IS user.

The Relationship of the IS User and the IS Staff

In a systems development project environment, effective communication between IS staff and the IS user has been identified as a

necessary factor for user satisfaction with information systems development (Bostram, 1984; Cronan and Means, 1984; Edstrom, 1977; Guinan, 1988; Kaiser and King, 1982; Mintzberg, 1973; Salaway, 1987). Yet, because of their backgrounds, education, and functional orientations, IS staff and IS users may have different goals and expectations of the systems development process, which may lead to ineffective communication.

Specifically, research indicates that IS staff and IS users differ significantly in their perceptions of the relative importance of communication skills—written and oral—needed by the IS staff (Green, 1989). However, yet to be studied are (1) the specific dimensions that comprise written and oral communication skills; (2) whether a perceptual difference exists between IS staff and IS users with respect to those dimensions within a project development environment; and (3) if a difference exists, the effect of the difference on IS user satisfaction.

Similarly, researchers have found that interpersonal skills are critical to IS staff for successful project development (Hartog and Rouse, 1987). However, researchers need to be determine whether (1) a perceptual difference exists between IS staff and IS users with respect to a more comprehensive set of interpersonal skills within a project development environment and (2) if a difference does exist, its effect on IS user satisfaction.

The Relationship Between the IS Manager and the IS Staff

Researchers have explored some expectations that managers have of the IS staff's communication skills and have identified various skills and competencies that IS staff need. Listings of needed communication skills and interpersonal competency consistently appear within categories such as people skills, organizational skills, social skills, and behavioral skills (Green, 1989; Nelson, 1991). In their research, Todd, McKeen, and Gallupe (1995) found that both managers and IS staff realize the importance of written and oral communication and interpersonal skills to IS staff. Misic (1996) found that managers rate communication skills and interpersonal skills as importantly as technical skills for IS staff. Another study found that IS staff rate communication skill and interpersonal skill as the two most important skills that determine their current success and advancement potential within an organization (Khan and Kukalis, 1990). Such findings lead to the conclusion that both IS staff and their managers consider communication skill and interpersonal skill to be important to IS staffs.

Likewise, communication competency has been identified as a significant discriminator of a superior's rating of IS staff's job performance (Scudder and Guinan, 1989). The finding revealed that high-performing IS

staff members were also rated significantly higher by their supervisors on communication skills than were low-performing IS staffs.

Also, research in organizational behavior indicates that superiors' and subordinates' perceptions differ significantly (Smircich, 1981). In IS research, some perceptual differences between superiors and subordinates have been identified. For example, Jiang (1999) found that managers and IS staff used different criteria for selecting system development projects. These perceptual differences raise other questions that need to be answered. For example, do IS staff and their managers differ in their perceptions of the importance of written and oral communication skills and interpersonal skills? Does the effect of a perceptual difference between IS staff and their managers impact job performance ratings by IS managers?

Statement of the Problem

The communication skills and interpersonal skills of information systems professionals have long been identified as being critical to project development. A difference in the perceptions of IS staff members and IS users regarding important written and oral communication skills and interpersonal skills needed by IS staff might lead to lower user satisfaction. Also, a difference in perceptions between IS staff members and their managers regarding important communication skills and interpersonal skills might lead to lower IS staff job performance ratings by

IS managers. Thus, these relationships need to be investigated empirically. This study seeks to fulfill this need. It seeks (1) to determine whether a difference exists in IS staff and IS users' perceptions and, if the difference exists, its relationship to IS user satisfaction and (2) to determine whether a difference exists in IS staffs' and IS managers' perceptions and, if a difference exists, its relationship to IS staffs' job performance ratings.

Delimitations

Certain delimitations should be recognized so that the results of the study may be better understood.

1. Each observation was conducted at the project level. That is, each observation required the responses of an IS staff person, an IS manager, and an IS user. Thus, variables of this study were observed for a particular project on which the three participants worked together.
2. No attempt was made to involve all participants who might have participated in a particular project development.

Limitations

The following limitations were inherent in this evaluative study:

1. Since projects might have been previously completed, some project development participants may have been unable to

accurately recall impressions of their experiences with other participants during system development.

2. Selection bias may have occurred since one participant per observation was initially contacted and was asked to solicit others to participate in the study.
3. The sample was drawn primarily from the southeastern United States, which makes the conclusions less generalizable.

Objectives of the Study

This study had two objectives. First, it examined the relationship of differences in expectations of communication skills and interpersonal skills of IS staff with successful project development. Second, the study examined the relationship of communication skills and interpersonal skills of IS staff to managers' job performance ratings of IS staff within a project environment.

The specific questions this study attempted to answer were as follows:

1. Does a difference in the perceptions of IS staff and IS users with regard to the importance of written and oral communication skills and interpersonal skills have a significant relationship to IS users' satisfaction?

2. Does a difference in the perceptions of IS staff and their managers with regard to the importance of written and oral communication skills and interpersonal skills have a significant relationship to IS managers' job performance ratings of IS staff during project development?

Definition of the Variables

The variables used in this study included written communication skills, oral communication skills, interpersonal skills, IS user satisfaction, and job performance of IS staff.

Written Communication Skills

Written communication skills were defined as the set of knowledge and techniques of writing that IS professionals applied to documents that they prepared for IS users and IS managers during project development. Written communication was measured using dimensions proposed by Quible (1991). These 36 dimensions are listed in Table 1.1. Research by Adkins (1982), Lemly (1983), and Stine and Skarzenski (1979) suggested that it is beneficial to consider written communication skills along these dimensions.

TABLE 1.1

DIMENSIONS OF WRITTEN COMMUNICATION

1. Write coherently	19. Use effective syntax
2. Spell words correctly	20. Have effective revising skill
3. Use grammar correctly	21. Have effective editing skill
4. Write decisively	22. Be knowledgeable of writing process
5. Sell ideas well in writing	23. Know appropriate business letter content
6. Use words correctly	24. Use effective planning procedures
7. Construct effective sentences	25. Use transition effectively
8. Write concisely	26. Demonstrate unity in writing
9. Use effective arrangement of ideas	27. Paraphrase effectively
10. Use punctuation correctly	28. Show courtesy toward reader
11. Have good proofreading skills	29. Perform effective audience analysis
12. Adapt material to the reader	30. Use correct letter format
13. Write concretely	31. Prepare effective graphic aids
14. Focus on reader rather than writer	32. Write extemporaneously
15. Organize material well	33. Know psychological aspects of writing
16. Avoid redundancies in writing	34. Use ideas subordination effectively
17. Write under pressure	35. Avoid use of jargon
18. Construct effective paragraphs	36. Write effective thesis statements

Oral Communication Skills

Oral communication skills were defined as the set of knowledge and techniques of oral communication that IS professionals used while discussing aspects of the system with IS users and IS managers. Oral

communication was measured using six dimensions that were identified by a review of relevant literature (Peterson, 1997; Olney, 1989; Willmington, 1989) and by using the opinions of experts in the field of communication. These dimensions are listed in Table 1.2.

TABLE 1.2

DIMENSIONS OF ORAL COMMUNICATION

1. Have effective oral communication skill
2. Ask appropriate questions
3. Use a clear, distinct, pleasant voice
4. Use correct grammar
5. Organize ideas
6. Have good presentation skills

Interpersonal Skills

Interpersonal skills were defined as the set of knowledge and techniques of interaction that IS professionals used while working with IS users and IS managers during systems development. Interpersonal skills were measured along nine dimensions used by Lee, Trauth, and Farwell (1995) in their study of critical skills and knowledge of IS staff. These researchers developed their survey instrument through a comprehensive review of recommendations of the Curriculum Committee of the Association for Computing Machinery. These dimensions are listed in Table 1.3.

TABLE 1.3

DIMENSIONS OF INTERPERSONAL SKILL

1. Ability to work cooperatively in a one-on-one and project team environment
2. Ability to plan and execute work in a collaborative environment
3. Ability to deal with ambiguity
4. Ability to work closely with customers and maintain product user/client relationships
5. Ability to accomplish assignments
6. Ability to teach others
7. Ability to develop and deliver effective, informative, persuasive presentations
8. Ability to be self-directed and proactive
9. Ability to be sensitive to the organization's culture

User Satisfaction

User satisfaction was defined as the user's level of satisfaction with the service and product provided by the IS professional during systems development. Project development success has been approached from many perspectives. One of the most popular approaches used by IS researchers has been to employ an IS user satisfaction scale to measure IS effectiveness. Among the most commonly used scales to measure IS user satisfaction include those developed by Bailey and Pearson (1983), Baroudi and Orlikowski (1988), Ives, Olson, and Baroudi (1983), and Jenkins and Ricketts (1985). Baroudi and Orlikowski's (1988) instrument consisting of semantic differential polar adjective pairs to measure 13 attributes of user satisfaction was used in this study. Their instrument was used for two reasons: The validity and reliability of the measures have been

established, and the dimensions used in their instrument align along two factors that commonly define user satisfaction—IS product and IS service. (The development of the instrument and previous tests of validity and reliability of the measures are described in Chapter 3). The 13 attributes are listed in Table 1.4.

Job Performance

Job performance was defined as the level of satisfaction with the IS professional's functioning during project development. The items that comprised the job performance scale were adopted from research by Igbaria and Baroudi (1995) and from Greenhaus, et al., (1990). Igbaria adapted Greenhaus' scale to make the items relevant to IS staff. The scale used to measure job performance in this study consisted of 23 items: 21 from Igbaria's study that define two IS factors (task and relationship) and 2 from Greenhaus' study that Igbaria did not use. The two items from the Greenhaus scale were included to provide a more comprehensive scale. The items are shown in Table 1.5.

Possible Contributions of the Study

This study attempted to make three main contributions to IS research. First, this study attempted to identify specific written and oral communication skills and interpersonal skills needed by IS staff for project success. Second, this research extended previous IS skills research by

TABLE 1.4

DIMENSIONS OF USER SATISFACTION

1. *Relationship with the IS staff:* The manner and methods of interaction, conduct, and association between the user and the IS staff.
   Dissonant vs harmonious
   Bad vs good

2. *Processing of requests for changes to existing systems:* The manner, method, and required time with which the IS staff responds to user requests for changes in existing computer-based information systems or services.
   Fast vs slow [R]
   Untimely vs timely

3. *Degree of IS training provided to users:* The amount of specialized instruction and practice that is afforded to the user to increase the user's proficiency in using the computer capability that is unavailable.
   Complete vs incomplete [R]
   Low vs high

4. *Users' understanding of system:* The degree of comprehension that a user possesses about the computer-based information systems or services that are provided.
   Insufficient vs sufficient
   Complete vs incomplete [R]

5. *Users' feelings of participation:* The degree of involvement and commitment which the user shares with the IS staff and others toward the functioning of the computer-based information systems and services.
   Positive vs negative [R]
   Insufficient vs sufficient

6. *Attitude of the IS staff:* The willingness and commitment of the IS staff to subjugate external, professional goals in favor of organizationally directed goals and tasks.
   Cooperative vs belligerent [R]
   Negative vs positive

TABLE 1.4 (continued)

7. *Reliability of output information:* The consistency and dependability of the output information
   High vs low [R]
   Superior vs inferior [R]

8. *Relevancy of output information to intended function:* The degree of congruence between what the user wants or requires and what is provided by the information products and services.
   Useful vs useless
   Relevant vs irrelevant

9. *Accuracy of output information:* The correctness of the output information.
   Inaccurate vs accurate
   Low vs high

10. *Precision of output information:* The variability of the output information from that which it purports to measure.
    Low vs high
    Definite vs uncertain [R]

11. *Communication with IS staff:* The manner and methods of information exchange between the user and the IS staff.
    Dissonant vs harmonious
    Destructive vs productive

12. *Time required for new systems development:* The elapsed time between the user's request for new applications and the design, development, and/or implementation of the application systems by the IS staff.
    Unreasonable vs reasonable
    Acceptable vs unacceptable [R]

13. *Completeness of the output information:* The comprehensiveness of the output information content.
    Sufficient vs insufficient [R]
    Adequate vs inadequate [R]

Measured on a scale of 1 to 5 with higher scores reflecting greater user satisfaction with project development. [R] = Reverse scored

TABLE 1.5

DIMENSIONS OF JOB PERFORMANCE

1. Cooperation	13. Punctuality
2. Loyalty to organization	14. Attitude
3. Honesty	15. Productivity
4. Initiative	16. Judgment
5. Commitment to job	17. Creativity
6. Quality of work	18. Planning
7. Loyalty to supervisor	19. Ability
8. Interpersonal relationships	20. Promotability
9. Communication skills	21. Job knowledge
10. Dependability	22. Commitment to organization
11. Accuracy	23. Attendance
12. Responsibility	

empirically assessing the relationship of written and oral communication skills and interpersonal skills to user satisfaction. Third, this research attempted to assess the impact of a perceptual difference between IS staff and managers about the importance of written and oral communication skills and interpersonal skills on IS staff's job performance ratings.

Summary

Since many IS project development efforts result in systems that are not used or are little used and because neither technology or technical skills of IS staff seem to be the problem, a possible cause may be ineffective communication and interpersonal skills of IS staff during project development. Therefore, this study sought to answer the following questions:

Do the perceptions of IS staff and IS users differ with respect to the importance of specific communication needed by IS staff during project development If their perceptions are different, what impact does the difference have on IS user satisfaction?

Likewise, do the perceptions of IS staff and IS managers differ with respect to the importance of specific communication needed by IS staff during project development? If their perceptions are different, what relationship does the difference have with IS managers' performance evaluation of IS staff?

Plan of the Study

Chapter I provides an introduction to this dissertation by presenting the problem to be investigated, describing the need for additional IS communication skills research, defining the purpose of the study along with a statement of the problem, identifying delimitations and limitations, outlining the research objectives, and describing possible contributions to IS literature. Chapter II presents a review of the literature relating to communication skills research, project development success, IS user satisfaction, job performance, the proposed relationships among the variables hypotheses, and the hypotheses. Chapter III describes the sampling plan, operational definition of the research variables, and statistical methodology used in the study. Results are presented in

Chapter IV. Chapter V contains a summary of the study and its conclusions and recommendations for future research.

CHAPTER II

LITERATURE REVIEW

The literature that is relevant to this study provided a theoretical base for this dissertation. To understand the nature of communication and how others have measured its aspects and to help understand the variables of this study, it is necessary to examine the evolution of communication models, communication skills research, role of communication in user satisfaction with an information system, measures of user satisfaction, measures of IS staff performance, achievement of consonance in IS development, and discrepancy theory. These areas of research established the basis for examining the relationships among the variables that were studied.

Evolution of Communication Models

Several theoretical models to describe the communication process exist. Over the last fifty years, one model, in particular, has greatly influenced communication in business research. That model is the information transfer model. Other models that have evolved since the

information transfer model are the social constructionist model, the transactional communication model, and the open systems communication model.

The Information Transfer Model

In *The Mathematical Theory of Communication*, first published in 1949, Shannon and Weaver (1963) extended earlier communication theory. Their treatise was from an engineering perspective, and in their introduction, they stated:

> The fundamental problem of communication is that of reproducing at the one point exactly or approximately a message selected at another point. Frequently the messages have *meaning*; that is, they refer to or are correlated according to some system with certain physical or conceptual entities. These semantic aspects of communication are irrelevant to the engineering problem (Shannon and Weaver, 1963:3).

Although Shannon and Weaver stressed that their mathematical model of communication was not intended to derive semantically the meaning of messages, many business researchers used the model as the basis for other communication models. Axley (1984) noted that if one viewed communication as a transfer of information, meaning was directed along a figurative pipeline between sender and receiver. Therefore, the message was the pipeline, or container.

Similarly, Bowden (1993) indicated that if messages act as if they were containers, then meaning could be put into and extracted from

messages. Thus, the meaning of the message was in the text itself; and if the meaning of a document was not easily understood, then the message—or container—was poorly formed. Poorly-formed documents resulted from problems, such as confusing structure, incorrect grammar, poor word choice, poor transition, etc.

The Social Constructionist Model

Another group of researchers, called social constructionists, studied the way in which language shapes reality in an organization. These researchers believed that communication was more complicated than a receiver simply extracting meaning by interpreting the sender's message. Social constructionists hypothesized that language in the form of written and oral communication was more complex than it seemed (Bakhtin, 1981; Fish, 1989; Giddens, 1984; Gergen, 1991). They emphasized that the context of language and the communicator's internal and external reference points shaped the meaning of a message. As a result, the message sent (intended) might not be the message received (interpreted) because a receiver's ethnicity, culture, gender, and background knowledge would differ from the sender's.

A forerunner to social constructionism, S. I. Hayakawa, had similar views. His concept of the semantic environment encompasses ethnicity, culture, and gender effects in communication. In his book, *Language in*

Thought and Action, Hayakawa (1972:16-17) used the example of a fictional character, Mr. Mits, to define the term semantic environment and to illustrate its role in creating conflict:

> Whether he realizes it or not, Mr. Mits is affected every day of his life not only by the words he hears and uses, but also by his unconscious assumptions about language. If for example, he likes the name Albert and would like to christen his child by that name but superstitiously avoids doing so because he once knew an Albert who committed suicide, he is operating, whether he realizes it or not, under certain assumptions about the relationship of language to reality. Such unconscious assumptions determine the effect the words have on him—which in turn determines the way he acts, whether wisely or foolishly. Words—the way he uses them and the way he takes them when spoken by others—largely shape his beliefs, his prejudices, his ideals, his aspirations. They constitute the moral and intellectual atmosphere in which he lives—in short, his semantic environment.

The passage illustrates how Hayakawa believed that an individual's unconscious assumption about words had an effect on the way one interacts with others through communication.

The Transactional Communication Model

The transactional communication model stressed "the simultaneous and mutually influential nature of the communication event" (Tubbs, 1994:8). That is, communicators were interdependent and the result of their communication was examined in terms of the context of the event and the communication mode, as depicted in Figure 2.1, a representation of the model.

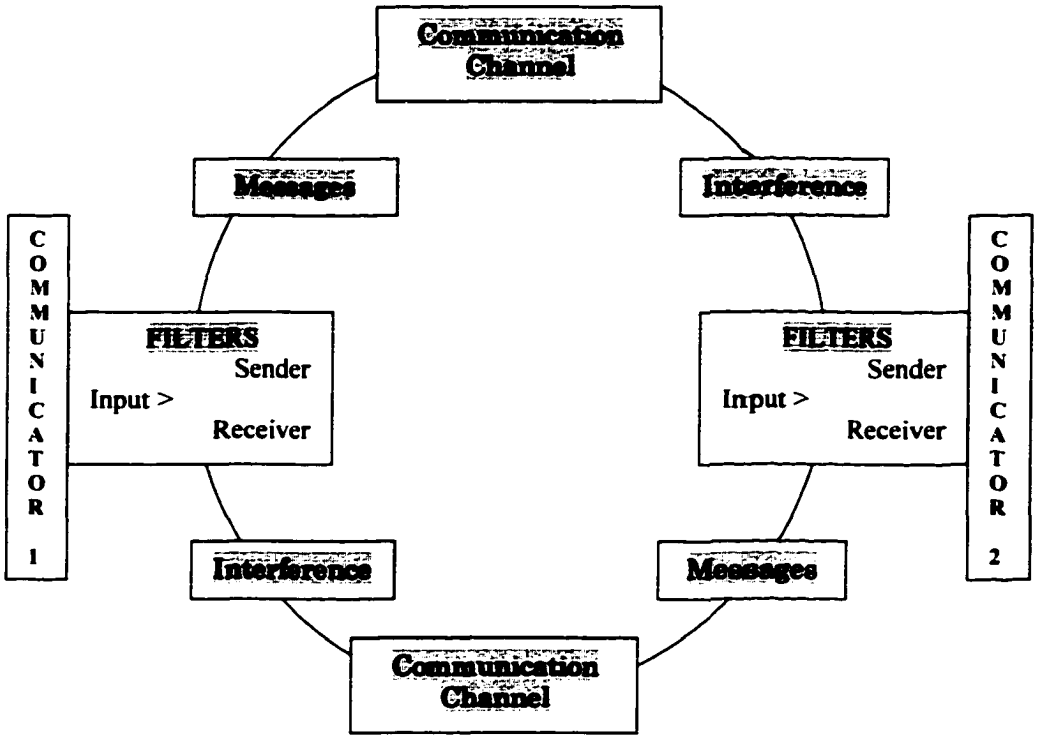

Figure 2.1
The Transactional Communication Model

Source: Tubbs, Stewart L. and Sylvia Moss. 1994. *Human Communication*, Seventh edition. New York: McGraw-Hill, Inc.

The model includes references to filters and interference, which support both the social constructionist view and the information transfer approach. Supporting the social constructionist viewpoint are the *filters* (used by both the sender and receiver). These are internal and external reference points that individuals developed from their culture, ethnicity, and gender. Supporting the information transfer approach are the

interferences. Interferences could be caused by the form of the communication itself—including poor sentence structure, poor transition, incorrect grammar, and inappropriate word usage—making it more difficult to access meaning from the document. As the structure of the communication model changed from the simple, mechanistic information transfer model to a model that is more complex in nature (like the transactional model), it is easier to see how "complex organizational interactions shape the nature of on-the-job" communications (Suchan and Dulek, 1998:93).

The Open Systems Communication Model

Suchan and Dulek (1998) suggested that perspectives of organizational theory must be applied to the study of organizational communication. They believed that one particular aspect of organizational theory—open systems—is necessary to understand better the complexity of communication in business environments. They indicated that open systems theory provided a vehicle for researchers to focus on the contextual aspect of organizational communication. A systems approach provided a broader, richer framework for studying communication by focusing both on an organization's internal and external environments that created constraints such as time and stakeholder power.

Suchan and Dulek divided an organization into four subsystems based on management theory—task, control, structure, and technology. Traditional job roles—executive, manager, staff, and specialist—were superimposed over the subsystems, and environmental influences existed on the fringes of the subsystems, as depicted in Figure 2.2.

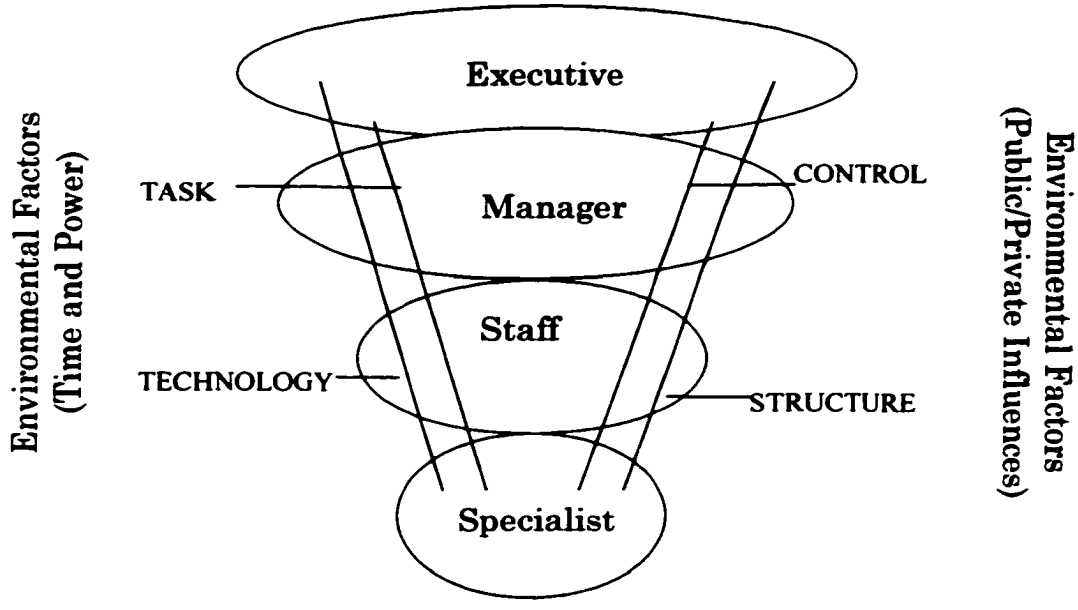

Figure 2.2
The Open Systems Communication Model

Source: Suchan, Jim and Ron Dulek. 1998. From Text to Context: An Open Systems Approach to Research in Written Business Communication. *The Journal of Business Communication*, 35(1), 87-110.

According to their theory, communication context and complexity shift with changes in the subsystems (e.g., the level of task uncertainty, the degree of job formalization, the level of employee empowerment, and the communication technology media). Likewise, environmental factors (such as time constraints, actual or implied power, and audience) can affect the nature of the communication. Therefore, they hypothesized that organizational communication cannot be viewed in a "singular, isolated text approach" (e.g., letter, memo, or report); instead, it must be viewed based on "shifting organizational contexts" (1998:106).

Communication Skills Research

The opinions of executives indicate that communicating effectively in business is a critical skill for overall job success (Joyce, 1991; Locker, 1995). According to Harcourt, Krizan, and Merrier (1995:7):

> The higher the responsibility level to which individuals progress in an organization, the more time they spend communicating. Upper-level executives in many business or nonprofit organizations will spend up to 95 percent of their working time communicating—speaking, listening, writing, and reading. While some persons may spend as little as 10 percent of their work time communicating, it is estimated that an average of 60 percent of employee time is spent in some form of communication.

Thus, researchers and business professionals realized the importance of communication skills to organizational success, promotion, and job performance (Aranoff, 1980; Eckert and Allen, 1986; Harper, 1987).

Managers have indicated that both written and oral communication skills and interpersonal skills are critical factors for entry-level employment, on-the-job success, and professional advancement. In a sample of 164 prospective employers from 31 states, Jiang (1994) found that, out of 13 skills, managers ranked oral communication as the second-highest valued skill of new hires, interpersonal skills as the fourth-highest valued skill, and written communication as the seventh-highest valued skill.

When researching communication skills in information systems, Misic (1996) found that systems analysts and programmers rated written and oral communication skills as important as technical skills. From this study that included responses from 107 organizations, Misic concluded that IS staff, unlike those of ten years before, needed to be more technology-independent and needed to employ better written and oral communication and interpersonal skills when interacting with IS users during project development:

> Since in the past there have been frequent occasions where "technical" analysts may have become preoccupied with technology at the price of user satisfaction, the new breed [of IS staff] that approaches system problems from a more implementation- and technology-independent perspective may be much more effective at developing systems that users need and with which users are satisfied (Misic, 1996:39).

Written Communication Skills

Research findings indicate that written communication skills are critical to all business professionals regardless of functional area. Several studies categorized written communication skill by type of document, such as letter, memoranda, or report. According to Kirtz and Reep (1990), businesspeople spend a substantial part of their day on writing tasks. They found that, on the average, managers spent almost half of their time writing (49.4 percent) and that technical personnel spend about 40.7 percent of their day writing. In the survey of 118 participants in ten writing seminars, managers indicated that they write primarily letters, memoranda, and short reports; technical personnel indicated that they most frequently write memoranda, short reports, and instructions or procedures. Both managers and technical personnel reported that writing was very important or critical to their job performance and that writing effectiveness had an effect on their promotability.

Recent survey findings indicated that job candidates with strong writing skills are highly sought but difficult to find (*The Internal Auditor*, 1998). In the survey of executives with the nation's 1,000 largest companies, the OfficeTeam (a well-known employment group) researchers found that 29 percent of the executives ranked writing skills, along with leadership skill, as the scarcest attribute of job candidates. The finding of the dearth in writing skills of employees supported the finding by Junge,

Daniels, and Karmos (1984). They found that the greatest discrepancy between communication skill importance and communication skill performance occurred with writing.

In a study to determine the most needed writing skills, Waner (1995) asked 38 business professionals in a metropolitan area to rank communication competencies in order of importance. From highest to lowest, the five most important competencies were (1) writes well (concisely, clearly, correctly, completely); (2) maintains appropriate level of confidentiality; (3) organizes information into effective sentences and paragraphs; (4) edits and revises documents conscientiously; and (5) writes naturally and on reader's level. The highest rated competency had a mean = 6.13, and the lowest rated had a mean of 5.45 on a scale from unimportant (1) to extremely important (7).

In a study of 221 international companies, Cassady and Wasson (1994) found that employers indicated the following major writing deficiencies among their personnel: mechanics (spelling, grammar, punctuation, proofreading, and format), content (sentence structure, organization, composition/wordiness, and paragraph structure); and style and tone (word choice, tone/psychology, and lack of "You" approach).

Quible developed a 36-item scale to assess perceived importance of written communication skills needed by employees. He based his scale on previous research in communication that identified skills that graduates

perceived to be "most important" (Storms, 1983); that reflected significant differences in perceptions of importance by businesspeople, teachers, and students (Adkins, 1982); that indicated strong agreement of importance by both working students and their faculty (Lemley, 1983); and that indicated those skills that executives perceived to be most important for university graduates to have (Stine and Skarzenski, 1979). Quible's results indicated that all 36 skill items had weighted averages (of perceived importance) less than two, indicating that each skill was at least quite important to business employees.

Roebuck, Sightler, and Brush (1995) found that employee perceptions of the importance of written communication skills for current job performance and for job advancement differed by company type. They surveyed 610 employees from the operative to the executive level in companies that ranged in size from small, family-run businesses to Fortune 500 firms all located in the southeastern United States. They found that employees in high technology, communication, engineering, and manufacturing organizations perceived written communication skills to be more important for current job success and advancement than did employees of service, government, healthcare, education, and retail companies.

Oral Communication Skills

The findings of non-IS domain studies indicated that oral communication skills are critical to all business professionals regardless of functional area. Krajewski and Wood (1993) identified four oral communication skills that graduates need—listening skills, speaking skills, collaborative skills, and verbal skills.

In a 1975 study investigating important applicant qualifications for entry-level jobs, oral communication ranked low in importance. Yet in a follow-up study in 1989, oral communication was ranked as the top qualifier (Buckley, Peach, and Weitzel, 1989). These findings lead to the assumption that oral communication skills have become more important as the economy has moved toward technology-enhanced, service- and information-oriented businesses.

In 1997, Maes, Weldy, and Icenogle conducted two studies. The first study confirmed the importance of oral communication in hiring decisions. In this study, the researchers examined the characteristics or competencies that managers look for in entry-level employees. Using a list of 13 competencies or characteristics developed from a pilot test, the researchers asked 354 managers to rank the 10 competencies or characteristics that they felt were most important in hiring decisions. The results indicated that oral communication was the most important skill

that managers sought in new hires—65 managers ranked it number one and 231 ranked it in the top five.

In their follow-up study, Maes, Weldy, and Icenogle measured oral communication skill importance and frequency of use for entry-level employees. The researchers surveyed 150 respondents from their first study; 58 usable responses were received. These researchers used a 13-item scale they adapted from Shockley-Zalabak, Staley, and Morley (1988). Their scale included these skills: following instructions, listening skills, conversational skills, giving feedback, communicating with the public, skills in meetings, presentation skills, handling customer complaints, conflict resolution skills, negotiation skills, taking customer order, teaching/instructing skills, and interviewing skills. In the study, managers reported the five most important oral communication skills needed by entry-level employees to be [(very unimportant) 1 to (very important) 5]: following instructions (mean = 4.66), listening skills (mean = 4.60), conversational skills (mean = 4.47), giving feedback (mean = 4.00), and communicating with the public (mean = 3.98). Usage frequencies were found to be highly correlated with skill importance, verifying that important oral communication skills needed by entry-level employees are also the most frequently used skills.

Green (1989) found that the need to be effective communicators did not diminish over time. In the study, he asked experienced IS staff whose

companies were selected from *Fortune 500* companies, 50 state governments, and the 100 largest U.S. cities to rate selected behavioral skills. (He found that the mean current employment tenure of the 872 IS staff members that participated was 10.21 years.) The results showed that IS staff members' perceived oral communication to be essential in face-to-face and group settings. (The mean rating was 5.98 on a scale from (1) very unimportant to (7) very important).

Interpersonal Skills

Michael B. Coyle (1993:2) said the following:

> Aimed at both the new employee and the experienced ones, quality interpersonal communication skills provide a meaningful response to the demand for a more interdependent and productive American labor force. These skills are the keys to cooperation among our people in meeting world competition challenges now and in the 21st century.

The field of interpersonal communication research is so vast that Stamp (1999) developed a comprehensive, general framework to promote better understanding of the interpersonal skill components. His framework is so complex that it includes 17 categories of interpersonal research with links among the categories. His framework demonstrates the complexity of human behavior as people attempt to relate to each other. A useful definition of interpersonal skill was provided by Barnlund (1968:10): interpersonal behavior occurs in "relatively informal social

situations in which persons in face-to-face encounters maintain a focused interaction through the reciprocal exchange of verbal and nonverbal cues." This definition incorporated all the behavioral traits that affect interpretation of messages composed of verbal and nonverbal prompts.

Bennis, et al. (1968) described four types of interpersonal communication as (1) to express feelings; (2) to confirm social realities; (3) to change and influence; and (4) to work and create. All four types described activities involved with IS project development. For example, project development team members work together to create a new system. Through their interaction, they provide input and expertise; and they attempt to exert influence to shape the new system based on needs and wants. As they attempt to shape the proposed system through personal influence, their behavior emits feelings that result from the way in which they view their role in the project development effort.

Messmer (1999) found that business practitioners expect employees in accounting, finance, and information systems to have good interpersonal skills. The survey of 1,400 chief financial officers indicated that, because innovations in technology allow employees to communicate more rapidly, more often, and with greater numbers of people, interpersonal skills will be showcased; and employees who are lacking those skills will reveal their shortcomings to wider audiences. Yet, practitioner journals indicate that

IS staff often do not possess good interpersonal skills (Bridges, 1994; Field, 1996; Gibson, 1997; Horowitz, 1996; Raths, 1999; York, 1998).

In their survey of 50 IS executives in Fortune 500 companies, Hartog and Rouse (1987) found a growing demand for IS staff to have interpersonal communication skills. One IS executive said, "I look for communication skills even at the college trainee level. We've sent four MIS managers through . . . executive writing and interpersonal relations courses" (Hartog and Rouse, 1987:68). The researchers concluded that IS professionals' ability to adapt to changing business environments and to embrace a greater support role to IS users were critical to their job success and career development.

Misic and Graf (1993) identified several interpersonal environments of systems analysts: working with IS users, working with IS personnel or peers, and working with groups or project teams. To assess the changing work environment of systems analysts, the researchers surveyed systems analysts by contacting MIS managers listed in the *1991 Directory of Top Computer Executives*. The researchers used the self-selection survey method by asking managers to identify a systems analyst in their department to complete the survey. The 115 systems analysts who participated in the study indicated that the most frequently performed interpersonal activities with each group of people were the following:

Group 1: IS users—determining new system requirements, defining the scope of the system, analyzing the existing system, assessing the impact of the new system on the company, interviewing, and developing cost/benefit analyses.

Group 2: IS personnel or peers—participating in traditional system development activities, such as defining the scope of the system, defining new system requirements, developing system development standards and guidelines, reviewing IS plans and scope, debugging the system, and assessing the impact of new systems on the company.

Group 3: Groups or project teams—The same type of activities as the IS personnel or peer groups.

Other research has also indicated that IS staff and IS managers recognize the need for effective interpersonal skills. In performing a content analysis of IS job advertisements from 1970 to 1990, Todd, McKeen, and Gallupe (1995) found that the greatest demand in business knowledge for programmers was in the interpersonal/social skills. Their content analysis indicated that interpersonal skill was not mentioned in 1970 IS job advertisements but was the most frequently mentioned skill in 1990 advertisements.

The Role of Communication in User Satisfaction with an Information System

In the past, IS developers determined basic information needs of the proposed system. Then they developed the most efficient, effective system possible, often communicating little with the people who would be using the system. Frequently, the result was an information system that was unused, little used, or ineffectively used. But such uneconomical approaches to systems development cannot survive in today's dynamic, globally competitive environment (Lee, et al., 1995). IS staff can no longer function alone within the isolation of their departmental walls. Management and social interaction theories are good resources in looking at the interaction process that occurs among participants in IS development. Some of these theories are described here.

Stakeholder theory. By applying Freeman's (1984) stakeholder approach to strategic management, one would conclude that IS project development activities must include all groups and individuals who can affect a project and must allow for managerial behavior to direct those groups or individuals. Such a conclusion is supported by IS research. Mintzberg (1973:163) viewed the roles of IS users and IS staff in this way: "Users have the information and the understanding of the dynamics of the environment, [and IS staff] have the time and the inclination to do the systematic analysis that complex strategic decisions require." Researchers

have found that IS users often participate to varying degrees in phases of system development, necessitating interaction with IS staff (McKeen, Guimaraes, and Wetherbe, 1994; Olson and Ives, 1980). Research has shown that effective communication assists creative, cooperative efforts in systems development (Bostrom, 1984; Cronan and Means, 1984; Guinan, 1988; Kaiser and King, 1982; Salaway, 1987).

Edstrom (1977) concluded that effective communication among project development members was significantly related to system success for various phases of system development. In his examination of 16 system development projects, Edstrom studied the influence of key people (user, functional manager, IS staff, and IS manager) during system development phases on perceived success of the system. Using a 7-point scale of perceived conflict (none to very great) for each person in each development phase, he derived an indicator of ineffective communication. By relating ineffective communication to a measure of perceived system success, Edstrom concluded that user influence was very important in two phases: determining the scope of the project and helping with systems analysis.

Other researchers have concluded that communication between IS users and system developers is important for deriving system requirements (Verrijn-Stuart and Annzehnofer, 1988) and for helping IS users to have realistic expectations of a system (Szajna and Scamell, 1993).

Guinan (1988) concluded that effective communication supports the collaborative process in system development. This type of communication promoted user participation and conflict resolution (Robey and Farrow, 1982).

In a survey of 86 IS project managers, Jiang and Klein (1999) studied the project risk variables that were most influential to satisfaction with the IS development project. They concluded that effective communication between IS users and project development staff was one of four critical factors of project success. Such findings led to the conclusion that, for each system development project, the IS staff needed appropriate communication skills to interact successfully with IS users and IS managers to enhance user satisfaction.

Agency Theory. According to agency theory, IS users are viewed as principals who contract with IS staff to develop information systems (Jensen and Meckling, 1976; Fama and Jensen, 1983). The IS users are dependent on the actions of the IS staff (the agents). According to Pratt and Zeckhauser (1985:5), "Because agents control organizational resources and are likely to know more about the tasks that they perform [than] the principal, an information [imbalance] exists that gives an advantage to the agents." In other words, because system development is a complex field which requires specialization that is not well known to or understood by IS

users, IS staff might attempt to influence the outcome of the project development with little regard for the user's specific desires.

An example would be the following: IS staff had a backlog of proposed projects. To decrease the backlog, the IS staff shortened the development time of an information system by constructing a system that was less user-friendly than IS users desired or needed. In such a situation, the IS staff (the agents) pursued their own goals to the detriment of the IS users (the principals). This situation might cause conflict between IS developers and IS users that would result in a breakdown in communication and, ultimately, dissatisfaction of the users.

Goal Theory. According to Locke (1968), the goal-setting theory of motivation is based on the principle that people have needs that are expressed as specific outcomes or goals they hope to accomplish. It assumes that humans are purposeful in their behavior (Locke and Latham, 1990) and that goals affect individuals' energies toward completing some action (Farmer, et al., 1970). For example, Daft (1994) found that when individuals worked together on a team, such as project development, conflict occurred simply because team members were pursuing different goals.

Asymmetry of Power. According to Suchan and Dulek's (1998) open systems model of communication in business, internal and external environmental factors impact the effectiveness of the communication

process. One such environmental factor is the power to influence others. Power results from perceived expertise based on one's position in the firm (such as the CEO), or power results from credibility afforded by a person's specialty.

Because of the complex, specialized knowledge of IS staff, it can be concluded that the IS staff might exert significant influence over other IS project development team members, especially IS users. DeBrabander and Thiers (1984) referred to this concept as asymmetry of power. Their theory is built on Thompson's (1962) theory of side-payments and punishment. In other words, the user (the less powerful party) may submit to the IS staff (the more powerful party) because the user may fear, for example, that the IS staff or IS manager will not be willing to develop other applications unless the user acquiesces. This theory is supported by Edstrom's (1977) finding that influence (or power) of the IS staff resulted in resistance of IS users and was counterproductive in determining IS users' information needs.

DeBrabander and Thiers suggested that power asymmetry results from a semantic difference between IS users and IS staff. The researchers said that semantic differences occurred because the specialized background of IS staff was different from the background of IS users. They said that IS staff tend to think in terms of the overall properties of

tasks and operations while managers and users are more concerned with operating characteristics of the system

Social perception theory. The social perception theory encompasses the concepts of the semantic environment described by the social constructionist, S. I. Hayakawa (1972), and the semantic differences described by DeBrabander and Thiers (1984). Social perception theory involves the perceptions of other people and perceptions of importance. According to the social perception theory, individuals develop a cognitive framework (or schema) of the external world through their experiences (Srull and Wyer, 1988) of noticing, encoding, storing, and retrieving information about others (Baron and Byrne, 1991; Ross and Fletcher, 1985; Schiffman, 1990). According to Jiang, et al. (2000), social perception research indicates that different work environments and/or individual differences may influence people's perceptions and that there may be a difference in perceptions of people who do not have similar schemas.

To study the potential for perceptual differences between people from different reference groups (such as IS staff, IS users, and IS managers), researchers have differentiated job characteristics by skills necessary for completing tasks. In an early study of perceptual differences, Gingras and McLean (1982) found a significant difference between analysts' and IS users' perceptions with respect to their profiles of IS users in large companies.

Green (1989) concluded that systems analysts and IS users have perceptual differences of the importance of skills that systems analysts use in performing their jobs. Green asked systems analysts and IS users to rate the importance of 21 skills that systems analysts use in performing their jobs. (See Table 2.1.) Green compiled the list from a review of related literature. He received 872 completed questionnaires out of 1,047 mailed—an 83 percent response rate. Of the 872, 471 were from systems analysts and 401 were from IS users. He found significant perceptual differences between IS users and IS staff with respect to the importance of diplomacy, directing, assertiveness, programming, speaking, sales, politics, and nonverbal communication.

TABLE 2.1

SKILLS USED BY SYSTEMS ANALYSTS
IN PERFORMING THEIR JOBS
Green (1989)

Assertiveness	Cooperation
Diplomacy	Sales
Directing	Management
Empathy	Politics
Interviewing	Functional application knowledge
Leadership	Sensitivity
Listening	Training
Patience	Organizational communication
Programming	Analysis and design
Speaking	Non-verbal communication
Writing	

In a study including 275 IS staff and IS users, Nelson (1991) asked IS users and IS staff to rate the perceived usefulness of 30 knowledge/skill items to the successful performance of their jobs. The respondents also rated their own perceived skill level for each item. The 30 items comprised six factors: (1) organizational knowledge (such as goals and critical success factors), (2) organizational skills (such as interpersonal skill and project management), (3) work unit knowledge (such as objectives or links to other departments), (4) general IS knowledge (such as IS policies and fit of IS to the organization), (5) technical skills (such as programming and use of software packages), and (6) IS products (specific applications, such as a word processing program or an operating system).

Nelson calculated a perceptual difference measure (perceived skill importance minus perceived skill proficiency). A deficiency existed when the perceived skill importance was greater than the perceived skill proficiency. Using analysis of variance (ANOVA), he found significant differences in the means of the difference measures for IS staff—IS staff had the highest mean deficiencies in general IS knowledge and in organizational knowledge. That is, IS staff rated general IS knowledge and organizational knowledge higher in importance to their jobs than their perceived proficiency in those areas. The three most deficient areas of IS users were all IS-related rather than organizationally related. Thus, Nelson recommended that companies take steps to improve the

organizational knowledge of IS personnel, improve the technical knowledge of IS users, and educate IS staff and IS users to make them more sensitive to each other's challenges. Nelson recommended that further research include the use of cross ratings, such that IS staff and IS users would indicate their perceptions of the knowledge/skills needed by the other group in performing their jobs.

Consequently, studies have pointed to the critical nature of communication skills for IS staff in systems development and to the potential for differences in perceptions of IS project development members. Thus, the following hypotheses related to potential differences in perceptions of IS staff and IS users with respect to written and oral communication skills and interpersonal skills were tested:

H_1: A difference in perceptions of the importance of written communication skills that IS staff should exhibit in project development exists between IS staff and IS users.

H_2: A difference in perceptions of the importance of oral communication skills that IS staff should exhibit in project development exists between IS staff and IS users.

H_3: A difference in perceptions of the importance of interpersonal skills that IS staff should exhibit in project development exists between IS staff and IS users.

Similarly, the following hypotheses related to potential differences in perceptions of IS staff and IS managers with respect to written and oral communication skills and interpersonal skills were tested:

H_4: A difference in perceptions of the importance of written communication skills that IS staff should exhibit in project development exists between IS managers and IS staff.

H_5: A difference in perceptions of the importance of oral communication skills that IS staff should exhibit in project development exists between IS managers and IS staff.

H_6: A difference in perceptions of the importance of interpersonal skills that IS staff should exhibit in project development exists between IS managers and IS staff.

Measurement of IS User Satisfaction

Early research linking user satisfaction with system success used a variety of variables and measures of satisfaction. Evans (1976) suggested that a lower limit exists to satisfaction; and if the end user's satisfaction falls too low, the user will stop using the system. Using empirical evidence, Swanson and Swanson (1974) found a high, direct correlation between IS users' appreciation of and their use of a system. Powers and Dickson (1973) concluded that user satisfaction was the most critical success factor in determining success and failure of computer systems.

Bailey and Pearson (1983) hypothesized that use of an information system was directly linked to the user's satisfaction with the services of the IS personnel. Along with Bailey and Pearson, several researchers have developed user satisfaction measuring instruments. Although the

instruments vary in scope, their main emphasis is on the IS product and its related services (Saarinen, 1996).

Bailey and Pearson (1983) developed one of the most frequently applied user satisfaction instruments. Through a review of 22 studies of the computer-user interface and discussion with 3 IS professionals and 32 manager users, they developed a 39-item semantic differential scale to measure user satisfaction. Each item consisted of four bipolar adjective pairs ranging from a negative to a positive feeling based on the user's perceptions. Figure 2.3 illustrates the part of the semantic differential scale they used for measuring the reaction of IS users to the item "Relationship with the IS staff." The results of tests for content validity and predictive or external validity indicated the instrument was acceptable. The methodology used to develop the list and the result of critical incident analysis of the items suggested that the user satisfaction measure was complete and sound. The average reliability coefficient of the 39 items was 0.93 and the lowest was 0.75. Thirty-two items had reliability coefficients greater than the minimum recommended of 0.70 (Chronbach, 1976). Although no statistical measure of construct validity was available at that time, they claimed that sufficient intuitive evidence supported construct validity.

To strengthen Bailey and Pearson's 39-item user satisfaction instrument, Ives, Olson, and Baroudi (1983) undertook a study with the

Relationship with the IS Staff: The manner and methods of interaction, conduct, and association between the user and the IS staff

Harmonious	|___|	___|	___|	___|	___|	___|	___|	Dissonant
Good	|___|	___|	___|	___|	___|	___|	___|	Bad
Cooperative	|___|	___|	___|	___|	___|	___|	___|	Uncooperative
Candid	|___|	___|	___|	___|	___|	___|	___|	Deceitful
	extremely	quite	slightly	neither or equally	slightly	quite	extremely	

Figure 2.3
Illustration of User Information Satisfaction Form

goals of (1) replicating Bailey and Pearson's validity findings of their instrument, (2) reinforcing the validity of the instrument through additional tests, (3) reducing the number of items while maintaining acceptable levels of reliability and retaining existing scale structure, and (4) developing a reliable short form instrument that used only a single indicator of user satisfaction. Using Bailey and Pearson's instrument, Ives, Olsen, and Baroudi surveyed 800 managers. A total of 280 managers completed the user satisfaction instrument, a response rate of 35 percent. Ives, et al. (1983) performed statistical tests of reliability, content validity, predictive validity, and construct validity. To measure interitem reliability of the instrument, they used Chronbach's alpha. All 39 individual scale items had acceptable reliability scores, ranging

between 0.82 and 0.97, with 30 being greater than 0.90. Statistical evidence also supported content validity: (1) the internal consistency of the interitem correlations was found to be positive and significant at the 0.001 level and (2) for each respondent, each of the 39 scales was correlated against an independent measure of user satisfaction different from Bailey and Pearson's scale. All correlations were significant at the 0.001 level. To measure predictive validity, they correlated the score from their independent user satisfaction measure with the overall score obtained from Bailey and Pearson's 39-item instrument. The correlation of 0.55 was found to be significant at the 0.001 level. This finding was consistent with Pearson's and was indicative of predictive validity for the questionnaire. Ives, et al. (1983) demonstrated construct validity in two ways: through examination of the correlations between total scores and item scores and through factor analysis since it allowed for the examination of the underlying structure of the overall measure (Kerlinger, 1973).

In an effort to improve the quality of the instrument and to reduce completion time, Ives, et al. (1983) proceeded to develop a short form of the instrument. First, the scales that demonstrated undesirable psychometric properties were dropped; second, only the scales with factor loadings of 0.50 or better were retained; and third, each remaining scale used only two bipolar adjective pairs instead of four. The result of these processes was a

final short form that consisted of 13 items. The short-form instrument was subjected to the same tests of reliability, content validity, and construct validity described previously. All tests indicated that the short form adequately measured Bailey and Pearson's original concept of user satisfaction while retaining acceptable reliability and validity measures.

The short-form user satisfaction instrument has also been used to study the relationship between user satisfaction and user-developer communication. In a study of contingency factors that mediate the relationship between user participation and user satisfaction, McKeen, Guimaraes, and Wetherbe (1994) studied the relationship between user-developer communication and user satisfaction. They used the 13-item scale developed by Ives, Olson, and Baroudi (1983) to measure user satisfaction; and they used the 12-item scale developed by Monge, et al. (1983) and modified by Guinan (1988) to measure communication quality. At the 0.05 level of significance, McKeen, et al. (1994) found a significant positive correlation between user-developer communication and user satisfaction. Thus, they concluded the user-developer communication and user satisfaction with a system were directly related.

Measurement of IS Staff Job Performance

According to Bartol and Martin (1982), studies of job performance measurement of IS staff were slow to evolve and scattered. In a

comprehensive review of literature on managing IS staff, Bartol and Martin indicated that few studies focused on the predictors of IS job performance. They speculated that the reason for the lack of research might be the difficulty in measuring job performance of IS staff. They suggested that IS job performance be measured along a number of different dimensions rather than an overall, global judgment.

Bartol and Martin cited two studies that used IS staff as subjects to develop better job performance appraisal methods. Both studies involved behaviorally anchored rating scales which were developed using critical incidents (both good and bad occurrences on the job). The critical incidents were then grouped to develop different on-the-job performance dimensions. In one of these studies, Arvey and Hoyle (1974) developed 12 behavioral dimensions for appraising IS staff. Of the 12 dimensions, several were communication oriented: maintaining customer relations, providing supervision and leadership, and maintaining communication.

An early exploratory study of performance evaluation of IS staff was done by Vitalari (1985). The purposes of his study included (1) determining knowledge or skills that the systems analyst actually used, (2) determining the relative importance of the knowledge or skills in systems analysis problem solving, (3) determining the focus, importance, and frequency of use of types of knowledge among high-rated and low-rated systems analysts, and (4) determining whether the use of particular

types of knowledge affected analyst performance. Vitalari classified 18 practicing systems analysts, each with a minimum of three years of experience, as high-rated or low-rated based on multiple ratings by their supervisors. He used a two-sample median test to investigate the existence of differences between the high-rated and low-rated analyst groups. His findings indicated that IS managers rated IS staff higher when they were more concerned with user involvement and degree of user involvement than managers rated those IS staff who were not concerned with user involvement. He concluded that high-rated developers realized the need for effective developer-user interaction in the systems development process and that low-rated ones did not.

Scudder and Guinan (1989) investigated communication competencies as discriminators of superiors' rating of IS staff job performance. Supervisors were asked to rate their IS staffs' communication competency using an instrument developed by Monge, et al. (1983) that included seven encoding items (ability of the IS staff to express himself or herself clearly) and five decoding items (the focus on skills such as listening and attentiveness). Also included were two job-specific competency scales developed by Arvey and Hoyle (1974)—the first scale, maintaining communication, contained two questions about the IS staffs' written and verbal communication skills; and the second scale was a maintaining user relations dimension which contained six

situation-specific and task-specific items. Forty-eight IS professionals participated in the study; 22 were rated as high performers by their superiors, and 26 were rated as low performers by their superiors. The researchers used a multivariate model with a discriminant analysis procedure that included follow-up univariate tests to test their hypotheses. A classification analysis using the discriminant function showed that 85.6 percent of the IS professionals were correctly classified as low-rated or high-rated performers. The researchers concluded that communication competencies were significant discriminators for superiors' perceptions of IS staffs' performance.

Igbaria and Baroudi (1995) measured IS job performance using a 21 item scale that they adopted from previous research (Greenhaus, et al., 1990) with modifications to make them relevant for IS employees. A factor analysis with varimax rotation produced two factors with eigenvalues greater than 1 that accounted for 69.6 percent of the total variance. Factor 1, named "Task," included the items ability, job knowledge, productivity, creativity, quality of work, initiative, judgment, planning, accuracy, and responsibility. Factor 2, named "Relationship," included the items commitment to the organization, commitment to the job, cooperation, honesty, interpersonal relationships, attitude, loyalty to organization, loyalty to supervisor, dependability, communication skills, and punctuality. Factor 1 was related more to the job task, while Factor 2 was

related more to the relationships of IS employees to other employees. However, because both factors were highly correlated, ($r = .70$, $p \leq .001$), they submitted the correlation matrix of both factors to factor analysis and derived one global performance factor that explained 85 percent of the variance. So all 21 items were averaged to produce a total job performance scale, with an internal reliability coefficient alpha = .96.

In a similar study, Igbaria, et al. (1995) investigated race differences in job performance and career success using the same 21-item scale to measure job performance. Like the previous study, factor analysis of the measures with the sample data produced two factors that accounted for 65.9 percent of the variance. They averaged the responses of the 12-item factor to get the relationship component of job performance, with an internal reliability coefficient alpha = .94. Then they averaged the other 11 items of Factor 2 to produce the task component of job performance, with an internal reliability coefficient alpha = .95. As before, they averaged all 21 items to produce a total job performance measure (alpha = .97).

Achievement of Consonance in Information Systems Development

According to consonance theory, agreement among the stakeholders involved in system development is a prerequisite to system success Jiang, et al. (2000) propose that many failures of IS projects are due to

differences in expectations of stakeholders prior to the development process. (For a complete discussion of consonance theory, the reader should see other studies by Jiang, et al.) Agreement about goals, measures, and deliverables must be attained. Measures of success are often built around the various stakeholders, including IS staff, IS users, and IS managers. For IS users, success is frequently measured in terms of user satisfaction. If IS users and IS staff have different perceptions of the importance of communication skills to IS staff in systems development, then user satisfaction may be adversely affected. (See Figure 2.4 for an illustration of this concept.)

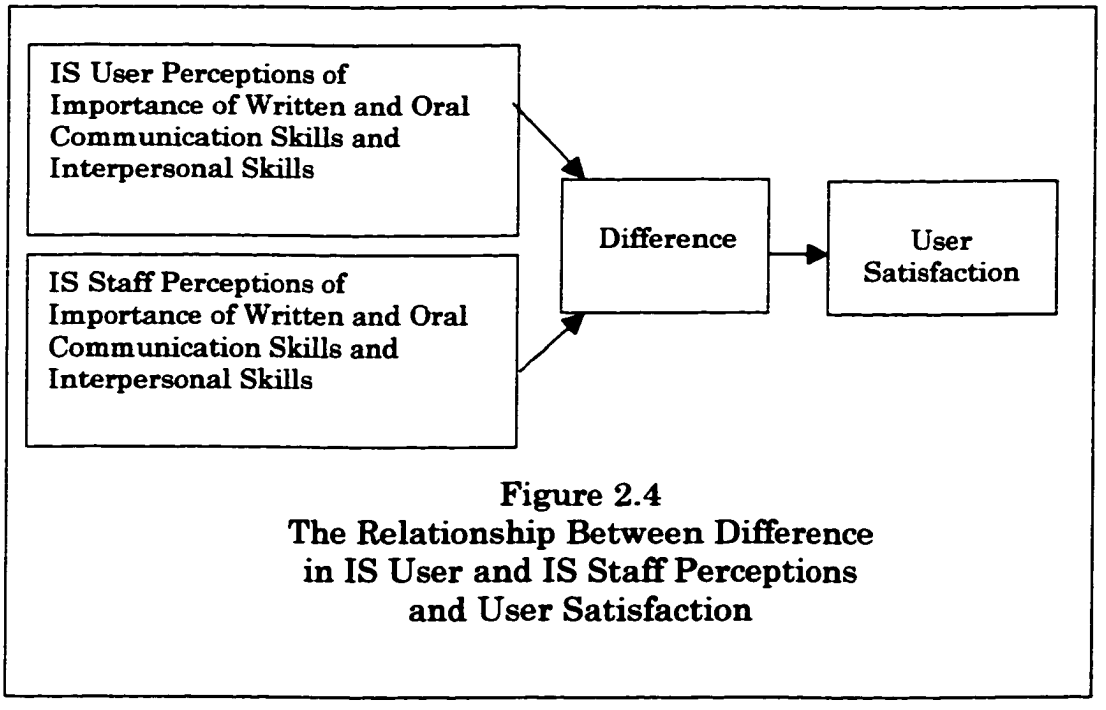

Figure 2.4
The Relationship Between Difference in IS User and IS Staff Perceptions and User Satisfaction

Thus, the following hypotheses were tested:

H_7: The greater the difference in the perceived importance of written communication skills to IS staff in project development between IS users and IS staff, the lower IS user satisfaction will be.

H_8: The greater the difference in the perceived importance of oral communication skills to IS staff in project development between IS users and IS staff, the lower IS user satisfaction will be.

H_9: The greater the difference in the perceived importance of interpersonal skills to IS staff in project development between IS users and IS staff, the lower IS user satisfaction will be.

For IS staff, success may be measured in terms of job performance (Jiang, et al., 2000; Igbaria and Baroudi, 1995). If IS staff and managers differ in perceptions of the importance of communication skills, the job performance evaluation of the IS staff member by the manager may be adversely affected. (See Figure 2.5 for an illustration of this concept.)

Thus, the following hypotheses were tested:

H_{10}: The greater the difference between IS managers and IS staff of the perceived importance of written communication skills to IS staff in project development, the lower the job performance rating of IS staff will be.

H_{11}: The greater the difference between IS managers and IS staff of the perceived importance of oral communication skills to IS staff in project development, the lower the job performance rating of IS staff will be.

H_{12}: The greater the difference between IS managers and IS staff of the perceived importance of interpersonal skills to IS staff in project development, the lower the job performance rating of IS staff will be.

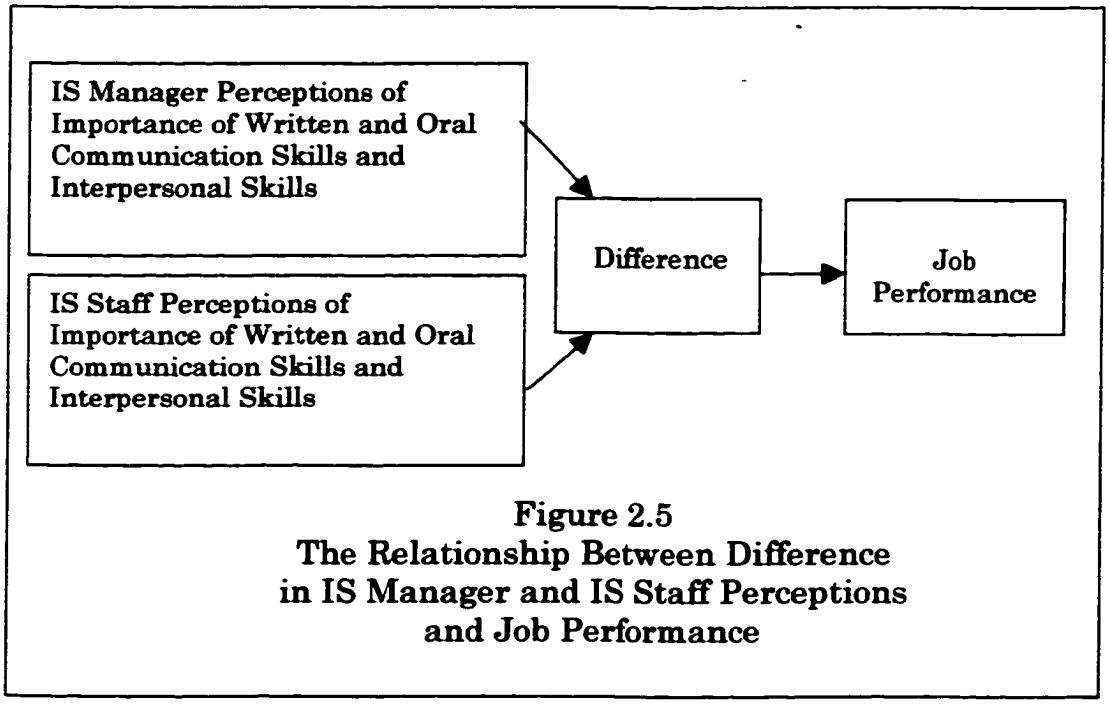

Figure 2.5
The Relationship Between Difference in IS Manager and IS Staff Perceptions and Job Performance

Discrepancy Theory: Testing for the Effect of Perceptual Differences

Edwin A. Locke (1969) described discrepancy theory and expounded on it in a study that explored job satisfaction (1976). Locke argued that every emotional response reflects a dual value judgment: the discrepancy between what the individual wants and what he perceives himself as getting. Discrepancy theory recognizes the lack of consideration for individual differences.

Jiang, et al. (1999) indicated that discrepancy theory supported the view that job satisfaction was related to the extent to which job outcomes matched those desired by the individual. The closer the match—that is,

the more an employee received what their desires dictated—the higher job satisfaction would be. The key to discrepancy theory is the perceived "difference" between aspects of the job one has and one's wants (desires). Large gaps result in less satisfaction; small gaps result in more satisfaction (Locke, 1976). The psychological comparison process between what one wants and what he gets (has) can result in both positive and negative discrepancies. With "want" as the anchor, positive discrepancies occur when the "want" is greater than the "have"; negative discrepancies occur when the "have" is greater than the "want."

In a study of the impact of career anchor discrepancy on career decisions of IS professionals, Jiang, et al. (1999) used the recommended moderated regression analysis to operationalize and analyze the discrepancy concept (Berger-Gross, 1982; Berger-Gross and Kraut, 1984; Cronbach and Furby, 1970). Because this method did not use difference scores, the researchers could test a hypothesis relevant to discrepancy theory while avoiding the difficulties associated with calculated difference scores (Chronbach and Furby, 1970; Wall and Payne, 1973). Jiang, et al. treated the have and want variables as independent variables, and they treated the facet scores (such as job security) as dependent variables. The researchers indicated that discrepancy theory would predict that the regression coefficient would be negative for the wanted amount and positive for the have amount. Such a result would indicated that higher

wanted amounts result in a lower level of the dependent variable. On the other hand, discrepancy theory would predict that the regression coefficient would be positive for the want amount. Such a result would indicate that higher have amounts resulted in higher satisfaction, if the actual wanted amount were constant. The moderated regression results supported the discrepancy effect, as Jiang, et al. (1999) had hypothesized.

Summary

This chapter has presented a review of the literature that provides a theoretical base for this dissertation. The evolution of communication models—from the viewpoint of communication as simply information transfer to the open systems model that emphasizes organizational and environmental influences on communication—indicates a growing awareness of the interdependence of communicators and their mutual influence on the quality of communication. The literature shows that the environment in which IS staff function is evolving also—from one that was particularly isolated with respect to IS users in the organization to one in which IS staff and IS users closely interact. Researchers have explored barriers to effective communication. Yet, research indicates that the proportion of IS projects that succeed is low. Research has shown that IS staff possess the technical skills required in systems development. Theories such as stakeholder theory, agency theory, goal theory,

asymmetry of power, and social perception theory provide a framework for exploring the relationship among IS project development members. To varying degrees, researchers have applied these theories to examining IS success. So, why does the IS project development success rate continue to be low? An examination of the perceptions of IS users, IS staff, and IS managers of the written, oral, and interpersonal communication skills needed by IS professionals in project development may provide help to answer that question.

CHAPTER III

SAMPLE AND METHODOLOGY

The purpose of this chapter is to present the research methodology used to investigate the relationships described in Chapter I. This chapter is divided into the following sections: (1) sampling and data collection procedures, including sampling process and sample demographics; (2) development of the research models, including refinement of research instruments, constructs, assessment of validity and reliability of research variables, model fit, and external validity; and (3) statistical methodology for testing the hypotheses, including paired-sample t-tests and multiple regression analysis.

Sampling and Data Collection Procedures

For this study, project communication between IS staff and IS users and between IS staff and IS managers was of interest. Therefore, for each observation, three people who had worked on a system development project together—a member of the IS staff, an IS user, and the IS manager—were asked to complete the survey instruments.

Sampling Process

Initial contact with participants was made in one of two ways: (1) by contacting the IS director of a company or (2) by contacting one of the three potential survey participants. When initial contact was with the IS director, the purpose of the study and the survey instruments were explained to the IS director. Those IS directors who agreed to participate were asked to distribute survey instruments to an IS staff member, an IS user, and the IS manager. Seven of 28 IS directors who were contacted directly agreed for their companies to participate in the study. Twenty-nine observations were obtained through contact with the IS directors. When initial contact was made with one of the three potential survey participants, the individual contacted was asked to participate in the survey. The individual was also asked to distribute the surveys to the two other people needed for the observation. Seventy-nine observations were obtained through individual contact, with the following breakdown by source: IS users, 55; IS staff, 14; and IS manager, 10. Along with the 29 observations acquired through IS directors, a total of 108 observations were used in the study.

Respondents were assured that their answers would be kept confidential; self-addressed return envelopes for participants were provided upon request. A business card or phone number was requested for each individual who participated. Participants were drawn primarily

from Louisiana, Arkansas, and Texas. Collectively, respondents consisted of IS managers, including department managers and project leaders; IS staff, including systems analysts and programmers; and IS users. The data were collected from August 1998 to March 2000.

Sample Demographics

Demographic data requested included years of work experience, age, gender, and education. Analysis of the sample indicated that 72 percent of the IS manager respondents were male. Seventy percent had undergraduate or graduate university degrees; and approximately 67 percent had less than 20 years of work experience. The average IS manager respondent was a 40-year old college graduate with 14 years of work experience. Forty-five percent of the IS user respondents were male, and 52 percent were female (3 percent did not report gender). The average IS user respondent was a 39-year old-university graduate with 11 years of work experience. IS staff respondents were similar in gender, age, and education to IS manager respondents. Sixty-nine percent of IS staff respondents were males who had less work experience than the IS manager and IS user groups. Fifty-eight percent of the IS staff respondents had less than ten years of work experience, and 91 percent had less than 20 years of work experience. Of the three responding groups, IS staff members were the youngest—29 percent were below age

30, and 77 percent were below age 40. The average IS staff respondent was a college-educated male, aged 34, who had worked 9 years in his field. Work experience, age, gender, and education demographic characteristics of the sample respondents are shown in Table 3.1 of Appendix B.

To ensure that there was no systematic bias between the dependent variables and the independent variables, the sample observations were randomly split in half—Groups 1 and 2—and the dependent variables were regressed against the independent variables. First, the observations of IS managers were randomly split in half; then IS managers' job performance ratings of IS staff members (dependent variable) were regressed against IS managers' importance ratings of written, oral, and interpersonal communication skills (independent variables). As shown in Tables 3.2 through 3.3 in Appendix B, the F values of 1.20 (Pr > F = 0.3204) and 2.26 (Pr > F = .0936) for Groups 1 and 2, respectively, were insignificant at alpha = 0.05, which indicated there was no systematic bias between IS managers' job performance ratings of IS staff and IS managers' importance ratings of written, oral, and interpersonal communication skills. Next, the observations of IS users were randomly split in half—Groups 1 and 2—then IS users' satisfaction ratings of the IS product and service were regressed against IS users' importance ratings of written, oral, and interpersonal communication skills (independent variables). As shown in Table 3.4 and Table 3.5 of Appendix B, the F values of 0.19

(Pr > F = 0.9054) and 1.98 (Pr > F = 0.1297) for Groups 1 and 2, respectively, were insignificant at alpha = 0.05, which indicated there was no systematic bias between IS users' satisfaction ratings of IS product and service and IS users' importance ratings of written, oral, and interpersonal communication skills. Since systematic bias between the independent and dependent variables was not indicated, the observations were combined into one sample for further testing.

Development of the Research Models

Each research instrument used to collect the data consisted of two sections: (1) a demographic data section that sought information on work experience, age, gender, and educational level of the respondents and (2) scales that measured the five constructs for this study. Variables to measure the constructs were selected based on a careful review of the literature and on opinions of experts in communication and in information systems. The items used to measure the variables were combined into instruments; the instruments were refined; data were collected; and validity, reliability, and model fit of the research variables were assessed.

Refinement of Research Instruments

Slight changes were made in the wording of items of previous studies to make them appropriate for the study. Two communications experts provided feedback on the items that comprised the written, oral,

and interpersonal communication skill variables, and three IS experts provided feedback on the user satisfaction and job performance items. When the instrument was completed, one company participated in a pilot study. Comments and questions of those participants led to changes in some wording of instructions. Also, the original set of written communication items was replaced with a longer, more comprehensive list. The longer list was deemed more appropriate to describe the writing skill construct since previous research had not measured in depth the writing skill competencies needed by IS staff during systems development. (See the instruments in Appendix A.)

All respondents—IS managers, IS staff members, and IS users—indicated their perceptions of the importance of written, oral, and interpersonal communication skills of IS staff during systems development. In addition, IS managers rated the job performance of IS staff members during systems development, and IS users rated their satisfaction with the product and service of IS staff members during systems development.

The Constructs

A construct is an idea that can be defined conceptually; yet it cannot be measured directly (Hair, et al., 1992). A construct, or factor, is an underlying dimension, sometimes called a latent variable, that is

presumed to be measured by an observed variable, which is sometimes called an indicator variable (Kline, 1998). For example, the presumption was that written communication skills was comprised of at least one factor, such as "writing mechanics," that included some or all of the 36 items used to measure written communication skills. For the measurement of written, oral, and interpersonal communication skills that were perceived to be important to IS staff in systems development, respondents rated each item using a Likert-type five-point scale ranging from unimportant (1) to very important (5).

Written communication skills. The perceived importance of written communication skills to IS staff in project development was measured by the 36-item scale developed by Quible (1991). (See Table 1.1 in Chapter 1 for this scale.) Quible indicated that he had established content validity and internal reliability for the instrument. To establish content validity, he asked six of his colleagues on the first draft of the instrument, ten employees on the second draft, and three professors of business communication on the final draft to critique the instrument. He used the test-retest procedure to establish reliability. He found a 0.89 reliability index on the consistency of each person's responses, which he indicated was considered to be effective.

Oral communication skills. The perceived importance of oral communication skills to IS staff in project development was measured

using six items derived from the opinions of experts in communication and from prior research (Maes, Weldy, and Icenogle, 1997; Olney and Bednar, 1989; Willmington, 1989). (See Table 1.2 in Chapter 1 for this scale.)

Interpersonal skills. The perceived importance of interpersonal skills to IS staff in the development of projects was measured by nine items from the Interpersonal and Management Knowledge/Skills construct developed by Lee, Trauth, and Farwell (1995). Their construct contained eleven items based on a comprehensive review of recommendations developed by the Curriculum Committee of the Association for Computing Machinery. (See Table 1.3 in Chapter 1 for this scale.) Using their data, Lee, et al. (1995) reported an internal consistency reliability coefficient of 0.91 on the instrument. Two of the eleven items were omitted in this study. One of the items, "Ability to plan, organize and lead projects" was felt to be more managerial than interpersonal; and the second item, "Ability to plan, organize and write clear, concise, effective memos, reports, and documentation" was covered by the written communication skills variable.

User Satisfaction. User satisfaction was measured using the 13-item instrument developed by Ives, et al. (1983). They reduced the 39-item instrument of Bailey and Pearson (1983) into a 13-item scale that they found to have the same psychometric properties as the longer instrument. The instrument has been shown to measure IS user satisfaction of both

product and service provided by the IS staff. Each item of the scale consisted of two pair of polar adjectives that reflected some attributes of IS product and service quality. (See Table 1.4 in Chapter 1 for this scale.) Using a Likert-type five-point scale from unsatisfied (1) to very satisfied (5) for each pair of polar adjectives, IS user respondents were asked to indicate their feelings of satisfaction with the product and services provided by the IS staff. The items were coded such that higher scores reflected greater satisfaction of the IS user with the respective project development. Some items used reverse scores.

Job performance. The job performance rating of the IS staff by the manager was measured using a 23-item scale. The 23-item scale included 21 items adapted to IS employees by Igbaria and Baroudi (1995) from the 23-item scale developed by Greenhaus, et al. (1990), and two items from Greenhaus' scale that Igbaria and Baroudi did not use. Igbaria and Baroudi reported that the 21 items were highly correlated; thus, they averaged the items to produce an overall job performance measure with a reported internal reliability coefficient alpha = .96. The two items from the Greenhaus scale were included to provide a more comprehensive scale. (See Table 1.5 in Chapter 1 for this scale.) Using a Likert-type five-point scale from extremely dissatisfied (1) to extremely satisfied (5), IS manager respondents were asked to rate the IS staff's performance.

Assessment of Validity, Reliability, and Model Fit of the Research Variables

A confirmatory factor analysis (CFA) was conducted for each observed variable to examine the underlying patterns or relationships of the scales of the observed variables to determine whether the information contained in each variable could be summarized into a smaller set of factors, or constructs (Hair, et al., 1992). The specific CFA procedure used in this study was SAS's Covariance Analysis of Linear Structural Equations (CALIS), which can be used for latent variable modeling. The correlations, or factor loadings, between observed variables and the factors were analyzed. The criteria used to identify and interpret item inclusion in the resulting factors were that a given item should load 0.50 or higher on a specific factor and have a loading no higher than 0.35 on other factors (Igbaria and Baroudi, 1995). Items not meeting these criteria were deleted from further analysis.

CFA was used also to assess the convergent and discriminant validity of the variables (Campbell and Fiske, 1959). Convergent validity refers to the homogeneity of the items that comprise a factor, and discriminant validity refers to the uniqueness (or heterogeneity) of the factors measured by different sets of observed variables (Kline, 1998). The process of determining convergent validity and discriminant validity involves evaluating the measures against each other rather than against

an external criterion (Kline, 1998). One of the important advantages offered by CFA is the opportunity to examine the validity and reliability of the construct once it has been established that each scale uniquely measures its associated dimension. Convergent validity, or the homogeneity of the items within each factor, was assessed by computing internal consistency reliability scores using the formula recommended by Cronbach (1951). Values of Cronbach's alpha for measuring internal consistency reliability range from 0 to 1.0; higher alpha values indicate higher reliability among the indicators (Hair, et al., 1992). Also, if the t-tests for all items used to measure a construct are significant, there is empirical evidence that the indicators are effectively measuring the same construct (Anderson and Gerbing, 1988).

Discriminant validity is empirically demonstrated when correlations among factors used to measure different constructs are not excessively high (Kline, 1998). According to Barki and Harwick (1994), discriminant validity is demonstrated when items used to measure a construct load more highly on one factor than on other factors. (Thus, items are selected only if they load higher on one factor than on others, providing evidence of discriminant validity.) Also, if a confidence interval test does not include 1.0, there is empirical evidence that a scale is capturing a construct that is significantly unique from the other constructs, demonstrating discriminant validity.

Once convergent and discriminant validity of the research variables were established, the overall model fit of each variable to the data was assessed. Kline (1998) recommended that a minimal set of model measurement fit indices should include the following statistics: a generalized likelihood ratio for predicting covariance, such as chi-square/degrees of freedom and its significance level; an index that shows the proportion in improvement of the overall fit of the researcher's model compared to the null model, such as Normed Fit Index (NFI); an index that describes the overall proportion of explained variance, such as the Bentler Comparative Fit Index (CFI) (Bentler, 1989); an index that adjusts the proportion of explained variance for model complexity, such as the Bentler-Bonett Non-Normed Fit Index (NNFI) (Bentler-Bonett, 1980); and an index based on the standardized residuals, such as the Root Mean Square Residual (RMR) (Joreskog and Sorbom, 1996a). Kline (1998) indicated that the chi-square statistic is sensitive to sample size and that dividing chi-square by degrees of freedom (number of observations minus number of parameters) reduces the sensitivity of chi-square to sample size. He indicated that a chi-square/degrees of freedom less than 3 is desirable; Wheaton, et al. (1977) suggested a more liberal limit of 5. The NFI value shows the proportion that the researcher's model improves the null model. Typically, the null model is an independence model—a model in which the observed variables are presumed to be uncorrelated. According to Kline

(1998), an NFI of .80 indicates that the overall fit of the researcher's model is 80 percent better than the null model estimated with the sample data. The Bentler CFI is interpreted in the same way, but it may be less affected by sample size. Kline indicated that favorable values of NFI, CFI, and NNFI are greater than 0.90; and Root Mean Square Residual (RMR) should be less than 0.10. For each variable in this study, the fit indices were calculated in CALIS and are reported here.

Written Communication Skills. Confirmatory factor analysis of the 36 written communication skill items with the data collected in this study revealed a primary component (single factor) solution comprised of 18 items. Items that did not have at least a .50 loading were omitted from further analysis. Individual t-tests indicated that factor loadings of all the items were significant at the .0001 level of significance. The composite reliability, or internal consistency reliability, score measured by Cronbach's alpha, of the 18 items was .95, which exceeds the recommended minimum level of .70 (Nunnally and Bernstein, 1994). Therefore, there was empirical evidence of convergent validity. Overall, the result of the CFA on the written communication skills variable indicated a good fit between model and data (with chi-square/degrees of freedom = 3.62; RMR = .05, CFI = .95; NNFI = .92; NFI = .89). Both CFI and NNFI were above the recommended minimum of .90, and NFI = .89 was very close to .90. RMR of .05 is small (i.e., less than .10), as recommended by Kline

(1998), and chi-square/degrees of freedom = 3.62 is smaller than the limit of 5 (Wheaton, et al., 1977). (See Table 3.1 for the CFA results.)

The 18 items revealed in the primary factor solution were compared to the composite weighted averages of the 36 writing competencies that business employees perceived to be important in Quible's study (1991). The comparison showed that 11 of the 18 items retained in this study were among the top-ranked 20 most important writing competencies in Quible's study. In Quible's study, the top-ranked 20 items had average ratings between *very important* (highest rating) and *quite important* (second highest rating). The current findings were compared also to a study that used Quible's 36 writing competencies and that sampled graduates of a university in the southeastern United States (Patrick and Carr, 1993). Of the 259 respondents in that study, 70 were Computer Information Systems alumni who were either MIS managers, programmers, or systems analysts; 108 respondents in the current study were programmers or systems analysts. Nine of the 18 written communication skill factor items revealed in the current study matched items ranked in the top 15 writing competencies of that study. Thus, the CFA procedure and comparison with other studies indicated that the 18-item, single-factor structure was acceptable for describing the variable written communication skills.

Oral Communication Skills and Interpersonal Skills. *A priori* in this study, oral communication and interpersonal skills were presumed to

TABLE 3.1

WRITTEN COMMUNICATION SKILLS
CONFIRMATORY FACTOR ANALYSIS

Item	Loading	T-value	Cronbach Alpha .95
Write coherently	.79	10.74*	
Use grammar correctly	.86	11.44*	
Write decisively	.88	11.68*	
Construct effective sentences	.86	11.52*	
Write concisely	.84	11.26*	
Write concretely	.83	11.19*	
Use punctuation correctly	.87	28.76*	
Have good proofreading skills	.89	31.21*	
Focus on reader rather than writer	.70	15.99*	
Organize material well	.75	18.09*	
Have effective revising skill	.86	25.96*	
Perform effective audience analysis	.78	12.38*	
Use correct letter format	.82	13.14*	
Write extemporaneously	.85	13.60*	
Know psychological aspects of writing	.89	14.25*	
Use ideas subordination effectively	.87	13.99*	
Avoid use of jargon	.72	11.50*	
Write effective thesis statements	.72	11.39*	
Root Mean Square Residual (RMR):	.05		
Comparative Fit Index (CFI):	.95		
Bonett Non-normed Fit Index (NNFI):	.92		
Normed Fit Index (NFI):	.89		
Chi-square/d.f. ratio:	3.62		

* significant at $p < .0001$

be two different and distinct variables. Yet, some researchers have used a single definition of either oral or interpersonal communication to include both. For example, Leitheiser (1992) defined interpersonal skill categories to include listening, working with others, working alone, persuading, presenting, responding to emotions, and training. Thus, the two skill categories were combined initially for tests of structure. CFA results indicated that all six of the oral communication skill items had a minimum .50 loading on a single factor and no higher than a .35 loading on another factor. T-tests showed that all six oral communication items were significant at the .0001 level of significant. The internal reliability coefficient of the oral communication construct was .82, higher than the recommended minimum of .70 for testing homogeneity of items. Thus, there was evidence of convergent validity; and it was concluded that the six oral communication items were measuring the same construct. (See Table 3.2 for CFA results on oral communication skills.) The items in the oral communication construct compare favorably with the most prevalent communication inadequacies of job applicants identified by personnel interviewers (Peterson, 1997), including topic relevance; response organization; and response clarity, grammar, and feedback.

CFA results indicated that two of the nine interpersonal skill items should be dropped from further analysis because they did not have at least a .50 loading on a factor. Each remaining item had a minimum .50 loading

TABLE 3.2

ORAL COMMUNICATION AND INTERPERSONAL SKILLS
CONFIRMATORY FACTOR ANALYSIS

Item	Loading	T-value	Cronbach Alpha
Oral Communication Skills			**.82**
Have effective oral communication skill	.64	10.82*	
Ask appropriate questions	.50	7.29*	
Use a clear, distinct, pleasant voice	.76	13.59*	
Use correct grammar	.78	14.04*	
Organize ideas	.67	11.49*	
Have good presentation skills	.77	13.78*	
Interpersonal Skills			**.83**
Ability to plan and execute work in a collaborative environment	.66	10.97*	
Ability to deal with ambiguity	.71	12.06*	
Ability to work closely with customers and maintain productive user/client relationships	.51	7.60*	
Ability to accomplish assignments	.67	11.28*	
Ability to teach others	.65	10.90*	
Ability to be self-directed and proactive	.68	11.51*	
Ability to be sensitive to organization's culture/politics	.64	10.68*	
Root Mean Square Residual (RMR):	.04		
Comparative Fit Index (CFI):	.91		
Bollen Non-normed Fit Index (NNFI):	.91		
Normed Fit Index (NFI):	.86		
Chi-square/d.f. ratio:	2.75		

* significant at $p < .0001$

on a single factor different from the oral communication skill items, and each had no higher than a .35 loading on another factor. All seven t-tests were significant at the .0001 level of significance. The internal reliability coefficient of the interpersonal skill items was .82, higher than the recommended minimum of .70 for testing homogeneity of items. Therefore, there was evidence of convergent validity; and it was concluded that the seven interpersonal skill items were measuring the same construct. No confidence interval test included 1.0; therefore, the oral communication skills scale seems to identify a construct that is unique from the interpersonal skills construct.

Overall, the result of the CFA on the oral communication skills and interpersonal skills variables indicated a good fit between model and data. chi-square/d.f. = 2.75 was less than 5 ; RMR = .04 was less than .10; CFI = .91 and NNFI = .91 were greater than .90; and NFI = .86 was slightly less than .90). (See Table 3.2 for CFA results on interpersonal skills.) Also, the interpersonal skills overall internal reliability coefficient of .83 compared favorably with the .89 reliability coefficient of the interpersonal construct of Lee, et al. (1995). The series of tests applied to the CFA results provided support for the validity and reliability of the oral communication skills and interpersonal skills constructs.

User Satisfaction. Confirmatory factor analysis of the 13 IS user satisfaction items with the data collected in this study indicated a three-

factor model comprised of 12 of the original items. The item "Degree of training provided by IS staff" was deleted from further analysis since it did not meet the requirement that it should load .50 or higher on a specific factor and have a loading no higher than .35 on other factors (Igbaria and Baroudi, 1995). The three factors were described as follows: Factor 1, named "IS Staff Service," contained three items; Factor 2, "User Involvement," contained four items; and Factor 3, "Information Product Quality," contained five items. The t-tests for all items within factors were significant at $P < .0001$. The internal reliability scores of .78 for the factor "IS Staff Service," .82 for the factor "User Involvement," and .85 for the factor "Information Product Quality" were higher than the minimum level of .70. Thus, there was evidence of convergent validity. No confidence interval test included 1.0; therefore, each scale seems to identify a construct that is unique from the other constructs, which was empirical evidence of discriminant validity. The CFA results indicated a model that was similar to that of Ives, et al. (1983). The information product quality factor was identical. In this study, the items "processing of requests for changes to existing systems" (factor loading of .87) and "time required for new systems development" (factor loading of .76) switched factors from IS staff service to user involvement, revealing that the two items had heavier factor loadings than in the Ives, et al. study. The result of the CFA analysis indicated a good fit between model and data. RMR = .07 was less

than .10; CFI = .91 and NNFI = .92 were greater than .90, and NFI = .87 was slightly less than .90. Chi square/d.f. = 2.65 was less than 5. (See Table 3.3 for the CFA results.)

Job Performance. Confirmatory factor analysis of the original 23 job performance items using the data collected in this study indicated a primary component (single factor) model comprised of 16 of the original items. Items that did not have at least a .50 loading on a factor were omitted from further analysis. Individual t-tests indicated that factor loadings of all the items were significant at the .0001 level of significance. The composite reliability, or internal consistency reliability score measured by Cronbach's alpha, of the 13 items was .96, which exceeds the recommended minimum level of at least .70. Therefore, there was evidence of convergent validity. Overall, the result of the CFA analysis indicated a good fit between model and data: RMR = .04 was less than .10; CFI = .90 and NNFI = .90 were at least .90; NFI = .87 was slightly less than .90; and Chi square/d.f. = 3.54 was less than 5. (See Table 3.4 for a listing of the factor items, t-values, and Cronbach's alpha values.)

TABLE 3.3

USER SATISFACTION
CONFIRMATORY FACTOR ANALYSIS

Item	Loading	T-value	Cronbach Alpha
IS STAFF SERVICE (2ND-Order)	.87		.78
Relationship with IS professional	.77	11.05*	
Attitude of IS professional	.63	8.41*	
Communication with IS professional	.90	13.52*	
USER INVOLVEMENT (2nd-Order)	.80		.82
Processing of requests for changes to existing systems	.66	11.17*	
Users' understanding of systems	.64	11.07*	
Users' feeling of participation	.75	10.54*	
Time required for new systems development	.76	10.86*	
INFORMATION PRODUCT QUALITY (2ND-Order)	.96		.85
Reliability of output information	.78	11.34*	
Relevance of output information	.81	12.19*	
Accuracy of output information	.68	9.41*	
Precision of output information	.66	9.16*	
Completeness of output information	.83	12.58*	
Root Mean Square Residual (RMR):	.07		
Comparative Fit Index (CFI):	.91		
Bollen Non-normed Fit Index (NNFI):	.92		
Normed Fit Index (NFI):	.87		
Chi-square/d.f. ratio:	2.65		

* significant at $p < .0001$

TABLE 3.4

JOB PERFORMANCE
CONFIRMATORY FACTOR ANALYSIS

Item	Loading	T-value	Cronbach Alpha .96
Cooperation	.70	10.35*	
Loyalty to organization	.65	9.39*	
Quality of work	.88	14.70*	
Interpersonal relationship	.78	12.11*	
Accuracy	.85	13.92*	
Responsibility	.85	13.92*	
Punctuality	.80	12.56*	
Attitude	.83	13.35*	
Productivity	.89	14.82*	
Judgment	.88	14.54*	
Planning	.81	12.82*	
Ability	.85	13.79*	
Promotability	.87	14.43*	
Job knowledge	.82	13.09*	
Commitment to organization	.82	12.98*	
Attendance	.73	11.14*	
Root Mean Square Residual (RMR):	.04		
Comparative Fit Index (CFI):	.90		
Bollen Non-normed Fit Index (NNFI):	.90		
Normed Fit Index (NFI):	.87		
Chi-square/d.f. ratio:	3.54		

* significant at $p < .0001$

External Validity Issues

The external validity of the findings is weakened if the sample itself is systematically biased—for example, if the responses were obtained largely from satisfied or unsatisfied IS users. Ghiselli, et al. (1981) indicated that systematic bias in a variable is unlikely when its mean and median are similar, skewness is less than 2, and kurtosis is less than 5. As shown in Table 3.6 of Appendix B, the means, medians, standard deviation, skewness and kurtosis were calculated for each variable. For example, for the variable *user satisfaction* the mean (3.72) and median (3.73) were similar. Skewness was –.31 (i.e., less than 2) and kurtosis was –.12 (i.e., less than 5). Since Ghiselli's requirements were met, user satisfaction bias was unlikely. For each other variable, examination of the mean and median, skewness, and kurtosis indicated that Ghiselli's requirements were met also; thus, systematic bias in any of the variables seemed unlikely.

Additional threats to external validity could occur if the sample showed other systematic biases in the measured variables in terms ofdemographics. To test for such bias, multiple regression was conducted by regressing IS managers' job performance ratings of IS staff (dependent variable) against IS managers' work experience, age, gender, and education level. As shown in Table 3.7 of Appendix B, at the .05 level of significance results did not indicate a significant relationship between job

performance and the managers' set of demographic variables (F Value = 1.80; Pr > F = 0.1376). As shown in Table 3.8 of Appendix B, similar results held for user satisfaction regressed against IS users' work experience, age, gender, and education level (F value = 0.46; Pr > F = 0.7653). Similar results held for managers' and users' written, oral, and interpersonal communication skills regressed against the demographic variables of managers and users (Tables 3.9 – 3.10, respectively, of Appendix B). However, gender bias was indicated in the ratings of interpersonal skill importance by IS staff (F = 3.041, Pr > F = .0207), as shown in Table 3.11 of Appendix B. Female IS staff members (mean = 4.48) rated interpersonal skills more importantly than male IS staff members (mean = 4.20) in project development. Based on previous research, this bias is not surprising (Graham, et al., 1991; Hall, 1978; Woolfolk, 1979).

Statistical Methodology for Testing the Hypotheses

Paired-sample t-tests were used to determine if significant differences in perceptions existed, and multiple regression analysis was used to assess the impact of differences. Prior to testing for significant differences in perceptions and using multiple regression analysis, the data was analyzed to determine its fitness for use with each procedure.

Paired-Sample T-Tests

Because IS managers, IS staff members, and IS users were matched by project, the paired-sample t-test was appropriate for comparing responses. The procedure computes the differences between values of the two variables for each case and tests whether the mean differs from zero. Thus, for each IS manager, IS staff member, and IS user, the means of the responses on items identified through confirmatory factor analysis were calculated to measure the three variables—written communication skills, oral communication skills, and interpersonal skills. Then each IS manager was matched with the appropriate IS staff member, and a difference score was calculated for each of the three variables. Similarly, each IS user was matched with the appropriate IS staff member, and a difference score was calculated for each of the three variables.

To use the paired-sample t-test, the data must come from normal probability distributions, mean differences must be normally distributed, and variance of each variable can be equal or unequal. To assess normality, the means and medians were compared, and skewness and kurtosis were examined. For example, when IS managers and IS staff were paired for the oral communication skills difference score, the mean and median differences were both .67, skewness was .90 (less than 2), and kurtosis was .51 (less than 5). As shown in Table 3.12 of Appendix B, analysis of all three variables suggested no major deviations from

normality. Thus, the variables were deemed appropriate for further testing, and t-tests were used to determine if the mean difference scores were significantly different from zero.

Regression Analysis

Researchers have recommended using linear regression to analyze the effect of perceptual differences (Berger-Gross, 1982; Cronbach and Furby, 1970). Regression analysis is the statistical methodology to predict values of one or more response (dependent) variables from a set of predictor (independent) variable values. It can also be used to assess the effects of the predictor variables on the response variables (Johnson and Wichern, 1988).

The classical multiple linear regression model states that Y is composed of a mean, which depends linearly on the X_i's and random error ε, which accounts for measurement error and the effects of other variables not considered in the model. The values of the predictor variables recorded from the experiment or set by the investigator are treated as fixed. The error (and hence the response) is viewed as a random variable which has behavior characterized by a set of distributional assumptions (Johnson and Wichern, 1988).

When $X_1, X_2, \ldots, X_r$ are the predictor variables thought to be related to the response variable Y, the linear regression model takes the form

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_r X_r + \varepsilon$$

or

[Response] = [mean (depending on $X_1, X_2, \ldots X_r$)] + [error].

Assumptions regarding the errors are

1. the mean of errors for each observation, Y_i, over many replications is zero [$\Sigma(\varepsilon_j) = 0$];
2. errors associated with one observation, Y_i, are not correlated with errors associated with any other observation, Y_j [$Cov(\varepsilon_j), (\varepsilon_k) = 0, j \neq k$; and
3. the variance of errors at all values of X is constant [$Var(\varepsilon_j) = \sigma^2$ (constant)] (Johnson and Wichern 1988; Pedhazur 1982).

The regression analysis procedure used did not involve differences scores calculated by subtracting one score (e.g., IS staff's perceptions) from another (e.g., IS manager's perceptions). Instead, mean perceived importance ratings of the two groups (e.g., IS users and IS staff) were entered as independent variables, and the characteristic of interest (e.g., user satisfaction) was entered as the dependent variable. Therefore, a hypothesis test relevant to differences was performed without encountering the documented difficulties related to calculated difference scores (Cronbach and Furby, 1970; Wall and Payne, 1973).

Summary

The processes of sampling and data collection were described in this chapter. Demographics, including age, gender, education, and work experience, of the respondents were detailed. Development of the

research models was explained, including selecting the five variables of interest—written, oral, and interpersonal skills, user satisfaction, and job performance; refining the survey instruments; deriving the constructs using confirmatory factory analysis; assessing the validity and reliability of the research variables; and assessing model fit of the research variables using selected model fit indices. External validity issues to test for systematic bias in the data were addressed. Statistical methodology for testing the hypotheses were described, including paired-sample t-tests to detect significant differences in perceptions and multiple linear regression to assess the effect of differences on user satisfaction and job performance.

CHAPTER IV

RESULTS OF ANALYSES

Chapter IV contains the findings of this study. Testing the hypotheses of this study included (1) determining if significant differences in perceptions of importance of written, oral, and interpersonal communication skills existed between IS users and IS staff and between IS managers and IS staff, and (2) if any differences did exist, assessing the impact of the differences on the dependent variables—user satisfaction and job performance.

Tests for Differences in Perceptions of IS Users and IS Staff

The following hypotheses related to potential differences in perceptions of IS staff and IS users with respect to written and oral communication skills and interpersonal skills were tested:

H_1: A difference in perceptions of the importance of written communication skills that IS staff should exhibit in project development exists between IS users and IS staff.

H_2: A difference in perceptions of the importance of oral communication skills that IS staff should exhibit in

project development exists between IS staff and IS users.

H_3: A difference in perceptions of the importance of interpersonal skills that IS staff should exhibit in project development exists between IS users and IS staff.

As described in Chapter III, mean difference scores were computed for each variable (written, oral, and interpersonal skills), and paired sample t-tests were performed to determine whether the mean difference scores of the three variables were significantly different from zero. Mean difference scores and t-statistics are shown in Table 4.1. The mean difference scores were as follows: written communication skills (mean = .77), oral communication skills (mean = .60), and interpersonal skills (mean = .50). The corresponding t-statistics were as follows: written communication skills (t=11.93), oral communication skills (t=10.89), and interpersonal skills (t=10.07). In all three cases, the results were significant at $P < .0001$ level, which indicated that the mean difference scores were significantly different from zero. Thus, there was support for H_1, H_2, and H_3. Therefore, the sample evidence indicated that significant differences in perceptions existed between IS staff and IS users with respect to the importance of written, oral, and interpersonal communication skills that IS staff need during systems development.

TABLE 4.1

DESCRIPTIVE ANALYSIS OF MATCHED PAIR DIFFERENCES

IS User vs. IS Staff	Mean	Std. Dev.	Median	Skewness	Kurtosis	Mean=0 T-test
Writing skill	.77	.60	.61	.86	.02	11.93*
Oral communication skill	.60	.52	.50	1.03	1.02	10.89*
Interpersonal skill	.50	.46	.29	1.50	2.70	10.07*

IS Manager vs. IS Staff	Mean	Std. Dev.	Median	Skewness	Kurtosis	Mean=0 T-test
Writing skill	.89	.59	.89	.39	-.39	14.01*
Oral communication skill	.67	.52	.67	.90	.51	11.97*
Interpersonal skill	.56	.47	.48	1.02	.50	11.07*

*Significant at $P < .0001$ level

Tests for Differences in Perceptions of IS Managers and IS Staff

The following hypotheses related to potential differences in perceptions of IS staff and IS managers with respect to written and oral communication skills and interpersonal skills were tested:

H_4: A difference in perceptions of the importance of written communication skills that IS staff should exhibit in project development exists between IS managers and IS staff.

H_5: A difference in perceptions of the importance of oral communication skills that IS staff should exhibit in project development exists between IS managers and IS staff.

H_6: A difference in perceptions of the importance of interpersonal skills that IS staff should exhibit in project development exists between IS managers and IS staff.

As described in Chapter III, mean difference scores were calculated for each variable (written, oral, and interpersonal skills), and paired sample t-tests were performed to determine whether the mean difference scores were significantly different from zero. Mean difference scores and t-statistics are shown in Table 4.1. The mean difference scores were as follows: writing skills (mean = .89), oral skills (mean = .67), and interpersonal skills (mean = .56). The corresponding t-statistics were as follows: written skills (t=14.01), oral skills (t=11.97), and interpersonal skills (t=11.07). In all three cases, the results were significant at the $P < .0001$ level, which indicated that the mean difference scores were significantly different from zero. Thus, there was support for H_4, H_5, and H_6. The evidence indicated that significant differences in perceptions existed between IS staff and IS managers with respect to importance of written, oral, and interpersonal communication skills that IS staff need during systems development.

Tests for Impact of Differences Between IS Users and IS Staff on User Satisfaction

The following hypotheses were conducted to assess the impact of perceptual differences between IS users and IS staff on user satisfaction:

H_7: **The greater the difference in the perceived importance of written communication skills to IS staff in project development between IS users and IS staff, the lower IS user satisfaction will be.**

H_8: **The greater the difference in the perceived importance of oral communication skills to IS staff in project development between IS users and IS staff, the lower IS user satisfaction will be.**

H_9: **The greater the difference in the perceived importance of interpersonal skills to IS staff in project development between IS users and IS staff, the lower IS user satisfaction will be.**

To test H_7 using regression analysis, both perspectives (IS staff and IS user) of importance of written communication skills were entered as independent variables, and user satisfaction was entered as the dependent variable. As described in Chapter II, the discrepancy theory testing procedure, which uses regression analysis to assess the impact of differences, predicts that the signs of the regression coefficients of the independent variables will be opposite (Locke, 1976). Thus, if the level of user satisfaction were related to differences in perceptions, then the regression coefficient of one group was expected to be positive, and the regression coefficient of the other group was expected to be negative. The results of regression analysis are shown in Table 4.2. When user satisfaction was regressed against written communication skills importance ratings of IS user and IS staff, the coefficients of the two independent variables were +.27 (IS User) and –.18 (IS Staff). Since the

TABLE 4.2

REGRESSION ANALYSIS RESULTS:
IS USERS AND IS STAFF

Dependent Variable	Independent Variable	Coefficient
User Satisfaction	Writing Skills (IS User)	+(.27)
	Writing Skills (IS Staff)	–(.18)
	Oral Skills (IS User)	+(.38)
	Oral Skills (IS Staff)	–(.28)
	Interpersonal Skills (IS User)	+(.36)
	Interpersonal Skills (IS Staff)	+(.11)
User Satisfaction:		
IS Staff Service	Interpersonal Skills (IS User)	+(.35)
	Interpersonal Skills (IS Staff)	+(.24)
User Involvement	Interpersonal Skills (IS User)	+(.39)
	Interpersonal Skills (IS Staff)	–(.17)
Information Product Quality	Interpersonal Skills (IS User)	+(.42)
	Interpersonal Skills (IS Staff)	+(.21)

signs of the coefficients were opposite, there was support for H_7. Thus, sample evidence indicated that the greater the gap between IS staff and IS users in perceptions of importance of written communication skills to IS staff in project development, the lower user satisfaction would be.

When H_8 was tested, oral communication skill perceptions of importance and interpersonal skills perceptions of importance for the two groups were entered as independent variables with user satisfaction as the

dependent variable. As shown in Table 4.2, the signs on the coefficients of the oral communication skill importance variables were +.38 (IS User) and −.28 (IS staff). Since the signs of the coefficients were opposite, there was support for H_8. Thus, sample evidence indicated that the greater the gap between IS staff and IS users in perceptions of importance of oral communication skills to IS staff in project development, the lower user satisfaction would be.

When H_9 was tested, user satisfaction was regressed against perceptions of interpersonal skills importance of the IS staff and IS users, the signs on the coefficients, +.36 (IS User) and +.11 (IS Staff), were not opposite. (See Table 4.2). A detailed analysis of the relationship of interpersonal skills importance ratings to user satisfaction was done by separating user satisfaction into its three factors—IS Staff Service, User Involvement, and Information Product Quality—and regressing each factor against IS users' and IS staff's interpersonal skills ratings. The coefficients for the IS Staff Service factor were +.35 (IS user) and +.24 (IS staff); the coefficients for the Information Product Quality factor were +.42 (IS user) and +.21 (IS staff). The only opposite pair of signs occurred with the User Involvement factor; the coefficients were +.39 (IS user) and −.17 (IS staff). Thus, H_9 was not supported. Thus, sample evidence did not indicate that the greater the gap between IS users and IS staff in perceptions of importance of interpersonal skills to IS staff in project

development, the lower user satisfaction would be. However, the detailed analysis of the relationship between interpersonal skills and user involvement indicated that the greater the gap in perceptions between users and IS staff, the lower that users' satisfaction with involvement in the project would be.

Tests for Impact of Differences Between IS Managers and IS Staff on Job Performance

The following hypotheses were conducted to assess the impact of perceptual differences between IS managers and IS staff on job performance evaluations of IS staff by IS managers:

H_{10}: The greater the difference between IS managers and IS staff of the perceived importance of written communication skills to IS staff in project development, the lower the job performance rating of IS staff will be.

H_{11}: The greater the difference between IS managers and IS staff of the perceived importance of oral communication skills to IS staff in project development, the lower the job performance rating of IS staff will be.

H_{12}: The greater the difference between IS managers and IS staff of the perceived importance of interpersonal skills to IS staff in project development, the lower the job performance rating of IS staff will be.

Again, multiple regression was used for these tests. The results are shown in Table 4.3. To test H_{10}, both perspectives (IS manager and IS staff) of importance of written communication skills were entered as

TABLE 4.3

REGRESSION ANALYSIS RESULTS:
IS MANAGERS AND IS STAFF

Dependent Variable	Independent Variable	Coefficient
Job Performance	Writing Skills (IS Manager)	+(.09)
	Writing Skills (IS Staff)	–(.18)
	Oral Skills (IS Manager)	+(.14)
	Oral Skills (IS Staff)	–(.25)
	Interpersonal Skills (IS Manager)	+(.22)
	Interpersonal Skills (IS Staff)	–(.11)

the independent variables, and job performance was entered as the dependent variable. If job performance ratings were related to differences in perceptions, then the ratings of one group were expected to have a positive coefficient and the ratings of the other group to have a negative coefficient. The signs on the coefficients were IS manager +(.09) and IS staff –(.18). Therefore, there was support for H_{10}. Thus, sample evidence indicated that the greater the gap between IS staff and IS managers in perceptions of importance of written communication skills to IS staff in project development, the lower IS managers' performance evaluations of IS staff would be.

Likewise, when both perspectives (IS staff and IS manager) of importance of oral communication skills were entered as the independent variables and job performance was entered as the dependent variable to

test H_{11}, the signs on the regression coefficients were opposite: +.14 (IS Manager) and −.25 (IS staff). Thus, there was support for H_{11}. Therefore, sample evidence indicated that the greater the gap between IS staff and IS managers in perceptions of importance of oral communication skills to IS staff in project development, the lower IS managers' performance evaluations of IS staff would be.

Again, using regression analysis to test H_{12}, both perspectives (IS staff and IS manager) of importance of interpersonal skills were entered as the independent variables; and job performance was entered as the dependent variable. Results showed that the signs on the coefficients of the interpersonal skill importance variables were +.22 (IS Manager) and −.11 (IS Staff). (See Table 4.3.) Since the regression coefficient signs were opposite, there was support for H_{12}. Therefore, sample evidence indicated that the greater the gap between IS staff and IS managers in perceptions of importance of interpersonal skills to IS staff in project development, the lower IS managers' performance evaluations of IS staff would be.

Summary

Tests of the hypotheses indicated that significant differences in perceptions of importance between IS staff and IS users existed with respect to importance of written, oral, and interpersonal communication skills to IS staff in project development. Also, tests of the hypotheses

indicated that the greater the difference in perceptions of importance between IS staff and IS users with respect to written and oral communication skills, the lower the level of user satisfaction will be. However, sample evidence did not support the hypothesis that the greater the difference between IS staff and IS users in perceptions of importance of interpersonal skills, the lower user satisfaction would be.

Tests of the hypotheses indicated that significant differences in perceptions of importance between IS staff and IS managers existed with respect to importance of written, oral, and interpersonal communication skills to IS staff in project development. Also, tests of the hypotheses indicated that the greater the difference in perceptions of importance between IS staff and IS managers with respect to written, oral, and interpersonal skills, the lower managers' job performance evaluations of IS staff would be.

CHAPTER V

SUMMARY, RECOMMENDATIONS, AND FUTURE RESEARCH

This chapter provides a summary of the research results—including data collection, model construction, validity issues, and findings. The results are followed by a section on the implications of these results to IS development and recommendations. The chapter concludes with a section on suggestions for future research.

Summary of Research Procedures And Results

Project communication between IS staff and IS users and between IS staff and IS managers was the focus of this study. Therefore, for each observation, three people who had worked on a systems development project together—a member of the IS staff, an IS user, and the IS manager—were asked to complete the survey instruments.

Data Collection

Initial contact with prospective participants was made in one of two ways—by contacting the IS director of a company or by contacting one of

the prospective survey participants. Of the 28 IS directors who were contacted, 7 agreed for their companies to participate, ultimately generating 29 observations. Seventy-nine observations were obtained through individual contact with IS staff, IS users, and IS managers. As a result, a total of 108 survey instruments were used in the study. Participants were primarily from Louisiana, Arkansas, and Texas. They consisted of IS managers, including department managers and project leaders; IS staff, including systems analysts and programmers; and IS users. The data were collected between August 1998 and March 2000.

Model Construction

Data collection involved gathering the participants' perceptions of importance of specific written, oral, and interpersonal communication skills to IS staff members in systems development; user satisfaction with the IS product and service; job performance evaluations of IS staff members by IS managers; and demographic data. Using the SAS Covariance Analysis of Linear Structural Equations procedure for confirmatory factor analysis, initial analyses of the data were performed to identify variable factors, evaluate validity and reliability of the variables, and confirm model fit of the research variables.

For each variable, factor solutions were determined; items that failed to load satisfactorily on any factor were deleted. Confirmatory factor

analysis results of the 36 written communication skill items with the data collected in this study revealed a primary component (single factor) solution comprised of 18 items; oral communication skills, a single factor solution comprised of all 6 items; interpersonal skills, a single factor solution comprised of 7 of the 9 items; user satisfaction, a three-factor solution comprised of 12 of the original 13 items; and job performance, a single factor solution comprised of 16 of the original 23 items. Next, examination of the factors of each variable indicated that they met the criteria for convergent validity (homogeneity of items within each factor) and discriminant validity (distinction between factors). Then, the overall model fit of each variable to the data was assessed using a set of model measurement fit indices. Overall, for each variable, examination of the indices indicated a good fit between the model and the data.

Validity Issues

External validity was then examined. Each variable was examined for systematic bias of responses by examining the mean and median, skewness, and kurtosis (Ghiselli, et al., 1981). Results indicated that systematic bias in none of the variables seemed likely. Also, multiple regression was used to assess possible systematic bias due to demographic characteristics of the respondents. The only bias detected was in ratings of interpersonal skill importance by IS staff. Female IS staff members rated

interpersonal skills to be more important than male IS staff members in project development. Based on previous research, this bias is not surprising (Graham, et al, 1991; Hall, 1978; Woolfolk, 1979).

Findings

Paired-sample t-tests were used to determine if significant differences in perceptions existed between IS staff and IS users with respect to the importance of written, oral, and interpersonal skills that IS staff need during systems development. To use the paired-sample t-test, certain assumptions had to be met: Mean differences must be normally distributed, and error variances must be equal. First, mean differences were calculated (shown in Table 3.16), and the normality and error variances of the differences were examined. Analysis of the differences indicated that there were no major deviations from normality and that the error variances were equal. Thus, the data was deemed appropriate for hypothesis testing. A t-statistic was calculated for each mean difference, and the t-statistic was compared with a critical value to determine whether the mean difference was significantly different from zero. In all three cases, the results were significant at $P < .0001$, which indicated that the mean differences were significantly different from zero. Thus, sample evidence indicated that significant differences in perceptions of importance

of written, oral, and interpersonal communication skills existed between IS staff members and IS users.

Paired-sample t-tests were used also to determine whether significant differences in perceptions existed between IS staff and IS managers with respect to importance of written, oral, and interpersonal skills that IS staff need during systems development. Mean differences were calculated and were examined to determine whether they came from normally distributed populations and had equal error variances. No significant deviations from normality were found, and error variances appeared to be equal. Therefore, paired-sample t-tests were deemed acceptable for hypothesis testing. Paired-sample t-tests indicated that all three mean differences were significantly different from zero at $P < .0001$ level. Hence, sample evidence indicated that significant differences in perceptions of importance of written, oral, and interpersonal communication skills needed by IS staff also existed between IS staff members and IS managers.

Next, hypothesis tests were conducted to assess the impact of perceptual differences between IS staff and IS users on user satisfaction with the IS product and service. Following the discrepancy theory testing procedure, multiple regression was used. For each hypothesis test of the appropriate communication skill (written, oral, and interpersonal), both perspectives (IS staff and IS user) of importance of the skill were entered

as independent variables, and user satisfaction was entered as the dependent variable. If the level of user satisfaction were related to differences in perceptions, the sign of the regression coefficient of one group was expected to be positive, and the sign of the regression coefficient of the other group was expected to be negative (Locke, 1976). Examination of the regression results showed that the signs of the coefficients of the two groups were opposite for written and for oral communication skills. Thus, hypothesis testing indicated that the greater the difference in perceptions of importance of written communication skills between IS staff and IS users, the lower user satisfaction will be; and the greater the difference in perceptions of importance of oral communication skills, the lower user satisfaction will be. However, for interpersonal skills, when all three factors were averaged and the average was entered as the dependent variable along with both perspectives (IS staff and IS users) as the independent variables, the signs on the coefficients of the two groups were the same. But when the specific factors of user satisfaction (IS staff service, user involvement, and information product quality) were entered as dependent variables, the signs on the coefficients of IS user and IS staff were opposite for the user involvement factor. Thus, evidence indicated that the greater the difference between IS staff and IS users in perceived importance of interpersonal skills, the lower the level of the user's satisfaction with his or her involvement.

Next, since significant differences in perceptions between IS staff and IS managers were detected, multiple regression analysis was used to asses the impact of differences on managers' job performance evaluations of IS staff. Again, following the discrepancy testing procedure, multiple regression was used. For each communication skill (written, oral, and interpersonal), both perspectives (IS staff and IS manager) of importance of the skill was entered as the independent variables, and job performance was entered as the dependent variable. For each skill, opposite signs on the coefficients of the independent variables (the two perspectives) occurred. Thus, sample evidence indicated that the greater the difference between IS staff and IS managers in perceptions of importance of written, oral, and interpersonal communication skills to IS staff, the lower that managers' job performance ratings of IS staff members will be.

Recommendations for IS Development

The findings of this study have important implications for IS development. The desires, concerns, goals, and expectations of all three of these stakeholder groups—IS users, IS managers, and IS staff—cannot be disregarded or minimized. Desires, concerns, and goals of IS users, IS staff, and IS managers are reflected in their importance ratings of selected measures. Measures of project success are frequently constructed around the three stakeholder groups. Users are the client base, or the market, for

additional systems and services of IS staff. The market-oriented measure of success that links users and IS staff performance frequently is user satisfaction. IS managers represent the company, often espousing profit-seeking and cost-containment motives. Satisfaction by IS managers with IS staff members is often measured in terms of job performance evaluations.

In this study, findings of significant perceptual differences between IS staff and IS users and between IS staff and IS managers of importance of specific written, oral, and interpersonal communication skills implies that the groups had different expectations, which could create confusion and disharmony. Those differences manifested themselves in the users' level of satisfaction with the IS product and service and in the managers' job performance evaluations of IS staff.

As a result of the findings from this study, the following recommendations are made:

1. Once an IS project has been defined, but prior to project membership selection, prospective team members—users, managers, and IS staff—could be tested about their perceptions of written, oral, and interpersonal communication skills important to that project. This process would aid in creating a team whose members have similar communication requirements and expectations.

2. Since project development team members have different goals, opportunities should be provided early on for members to discuss and to understand their common goals and to make efforts to resolve those goals that conflict, as well as to agree on the superordinate goal(s) of the project.

3. Because communication is so important to project success and because communication needs vary, a communications management plan (Schwalbe, 2000) should be developed to answer these questions: To what acronyms and definitions will teams members be exposed? What media—oral, written, electronic mail, or all forms—will be used to communicate status reports? What physical layout will the reports follow? Who will receive particular status reports and in what form? What is the process for approving key project documentation?

Suggestions for Future Research

The research conducted in this study extended previous research by including a member from each of three stakeholder groups—IS users, IS staff, and IS managers—to evaluate perceptual differences with respect to communication needs (expectations) in project development. Additional studies could take a similar approach but include all team members, providing 360-degree feedback. By doing so, more useful evaluatory feedback might be obtained.

In this study, only IS managers evaluated job performance of IS staff members. Future studies might include IS users' job performance evaluations of their staff members, providing additional rater feedback. Analysis of the differences in users' and managers' perceptions of importance of written, oral, and interpersonal communication skills would provide better insight about the group dynamics of project communication.

Since this research suggests that a communications management plan would be useful, other research might investigate the extent of effort made to "manage" communication during systems development. Such a study would provide information on the actual scrutiny that project managers give to the communication effort.

APPENDIX A

QUESTIONNAIRES

SURVEY OF THE INFORMATION SYSTEMS PROFESSIONAL

COMPANY _____
PROJECT _____
NAME OF INFO. SYSTEMS PROFESSIONAL _____

To the Information Systems Professional:

Your participation in this study will help to promote successful IS development through better communication and understanding of the IS development process. Specifically, the researchers will determine if IS professionals, IS managers, and users differ in their perceptions of communication skills needed by IS staff; and if differences exist, the effect of differences on user satisfaction with IS product and service and on the manager's job performance evaluation of IS staff.

You will be indicating your perceptions based on the project named above.

What you should know:

- There are no "correct" or "incorrect" answers.
- Please answer questions based on your immediate perceptions.
- You should answer each question honestly.
- Responses will remain anonymous and confidential.
- You may refuse to answer any question.

By completing and returning this survey, I am indicating that I read and understand the purposes of the study. I have voluntarily participated in the study; and when the study is finished, I know that results will be freely available to me upon request.

RESEARCHER CONTACT:
The researchers listed below may be reached to answer questions about the research:

Ms. Ruth Miller (318) 396-0186
Dr. Thomas Means (318) 257-3293

SECTION A. The following will be used to measure interaction between the information systems professional and others. Please circle the number that indicates the extent to which you agree or disagree with each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. The job I do requires me to work closely with people that use the systems on which I work (including their supervisors)	1	2	3	4	5
2. The job can be done adequately without talking or checking with the users of the system on which I work (or their supervisors)	1	2	3	4	5
3. The job requires a lot of cooperative work with people who use the system on which I work	1	2	3	4	5

The following items will be used to measure variety in the tasks performed in the job. Please circle the number that indicates the extent to which your job involves each type of task.

	No Extent	Little Extent	Some Extent	Great Extent	Very Great Extent
4. New systems initiation	1	2	3	4	5
5. New system definition	1	2	3	4	5
6. New system proposal	1	2	3	4	5
7. New system specification	1	2	3	4	5
8. New system development	1	2	3	4	5
9. New system installation	1	2	3	4	5
10. New system evaluation	1	2	3	4	5
11. Maintenance of an existing system	1	2	3	4	5
12. Enhancements of an existing system	1	2	3	4	5
13. Production support	1	2	3	4	5
14. Customer support	1	2	3	4	5
15. Program design	1	2	3	4	5
16. Program coding	1	2	3	4	5
17. Program testing	1	2	3	4	5
18. Determining system requirements	1	2	3	4	5
19. System design	1	2	3	4	5
20. System testing	1	2	3	4	5
21. Evaluating an operational program/system	1	2	3	4	5
22. Evaluating system feasibility	1	2	3	4	5

Please circle the number indicating the percent of time you spent in each activity during the period indicated.

	% LAST WEEK					% LAST MONTH				
	10-20	21-40	41-60	61-80	81-100	10-20	21-40	41-60	61-80	81-100
23. New systems development	1	2	3	4	5	1	2	3	4	5
24. Maintenance or enhancements of existing systems	1	2	3	4	5	1	2	3	4	5
25. Production support	1	2	3	4	5	1	2	3	4	5
26. Customer support	1	2	3	4	5	1	2	3	4	5
27. Programming activities	1	2	3	4	5	1	2	3	4	5
28. Analysis activities	1	2	3	4	5	1	2	3	4	5
29. System testing	1	2	3	4	5	1	2	3	4	5

SECTION B. The following items will be used (1) to measure your perception of the importance of each knowledge/skill identified for your job and (2) to measure your satisfaction with your skill level. Please circle the value that indicates the extent of your agreement about the importance of each skill in your job and your satisfaction with your skill level.

	IMPORTANCE IN MY JOB					SATISFACTION WITH MY SKILL LEVEL				
TECHNICAL SPECIALTIES	Unimportant				Very Important	Unsatisfied				Very Satisfied
30. COBOL, or other 3d generation language	1	2	3	4	5	1	2	3	4	5
31. Telecommunications	1	2	3	4	5	1	2	3	4	5
32. Network	1	2	3	4	5	1	2	3	4	5
33. Operating systems: Mainframes	1	2	3	4	5	1	2	3	4	5
34. Operating systems: Minis	1	2	3	4	5	1	2	3	4	5
35. 4th generation languages	1	2	3	4	5	1	2	3	4	5
36. Systems integration	1	2	3	4	5	1	2	3	4	5
37. Operating systems: Micros	1	2	3	4	5	1	2	3	4	5
38. Systems analysis/structured analysis	1	2	3	4	5	1	2	3	4	5
39. Systems life cycle management	1	2	3	4	5	1	2	3	4	5
40. Relational database	1	2	3	4	5	1	2	3	4	5
41. Distributed processing	1	2	3	4	5	1	2	3	4	5
42. A specific programming language	1	2	3	4	5	1	2	3	4	5
43. Data management (e.g., data modeling)	1	2	3	4	5	1	2	3	4	5
44. Structured programming/CASE methods or tools	1	2	3	4	5	1	2	3	4	5
45. Decision support systems	1	2	3	4	5	1	2	3	4	5
46. Assembly language	1	2	3	4	5	1	2	3	4	5
47. Expert systems/AI	1	2	3	4	5	1	2	3	4	5
TECHNOLOGY MANAGEMENT										
48. Ability to learn new technologies	1	2	3	4	5	1	2	3	4	5
49. Ability to focus on technology as a means, not an end	1	2	3	4	5	1	2	3	4	5
50. Ability to understand technological trends	1	2	3	4	5	1	2	3	4	5
BUSINESS FUNCTIONS										
51. Ability to learn about business functions	1	2	3	4	5	1	2	3	4	5
52. Ability to interpret business problems & develop appropriate technical solutions	1	2	3	4	5	1	2	3	4	5
53. Ability to understand the business environment	1	2	3	4	5	1	2	3	4	5
54. Knowledge of business functions	1	2	3	4	5	1	2	3	4	5
INTERPERSONAL/MANAGEMENT SKILLS										
55. Ability to work cooperatively in a one-on-one and project team environment	1	2	3	4	5	1	2	3	4	5
56. Ability to plan and execute work in a collaborative environment	1	2	3	4	5	1	2	3	4	5
57. Ability to deal with ambiguity	1	2	3	4	5	1	2	3	4	5
58. Ability to work closely with customers & maintain productive user/client relationships	1	2	3	4	5	1	2	3	4	5
59. Ability to accomplish assignments	1	2	3	4	5	1	2	3	4	5
60. Ability to teach others	1	2	3	4	5	1	2	3	4	5
61. Ability to develop and deliver effective, informative, & persuasive presentations	1	2	3	4	5	1	2	3	4	5
62. Ability to be self-directed and proactive	1	2	3	4	5	1	2	3	4	5
63. Ability to be sensitive to the organization's culture/politics	1	2	3	4	5	1	2	3	4	5

SECTION C. The following items will be used (1) to measure your perception of the importance of each written and oral communication skill in your job and (2) to measure your satisfaction with your skill level. Please circle the value that indicates the extent of your agreement about the importance of each skill and your satisfaction with your skill level.

	IMPORTANCE IN MY JOB					SATISFACTION WITH MY SKILL LEVEL				
WRITTEN COMMUNICATION	Unimportant				Very Important	Unsatisfied				Very Satisfied
64. Write coherently	1	2	3	4	5	1	2	3	4	5
65. Spell words correctly	1	2	3	4	5	1	2	3	4	5
66. Use grammar correctly	1	2	3	4	5	1	2	3	4	5
67. Write decisively	1	2	3	4	5	1	2	3	4	5
68. Sell ideas well in writing	1	2	3	4	5	1	2	3	4	5
69. Use words correctly	1	2	3	4	5	1	2	3	4	5
70. Construct effective sentences	1	2	3	4	5	1	2	3	4	5
71. Write concisely	1	2	3	4	5	1	2	3	4	5
72. Use effective arrangement of ideas	1	2	3	4	5	1	2	3	4	5
73. Use punctuation correctly	1	2	3	4	5	1	2	3	4	5
74. Have good proofreading skills	1	2	3	4	5	1	2	3	4	5
75. Adapt material to the reader	1	2	3	4	5	1	2	3	4	5
76. Write concretely	1	2	3	4	5	1	2	3	4	5
77. Focus on reader rather than writer	1	2	3	4	5	1	2	3	4	5
78. Organize material well	1	2	3	4	5	1	2	3	4	5
79. Avoid redundancies in writing	1	2	3	4	5	1	2	3	4	5
80. Write under pressure	1	2	3	4	5	1	2	3	4	5
81. Construct effective paragraphs	1	2	3	4	5	1	2	3	4	5
82. Use effective syntax	1	2	3	4	5	1	2	3	4	5
83. Have effective revising skill	1	2	3	4	5	1	2	3	4	5
84. Have effective editing skills	1	2	3	4	5	1	2	3	4	5
85. Be knowledgeable of writing process	1	2	3	4	5	1	2	3	4	5
86. Know appropriate business letter content	1	2	3	4	5	1	2	3	4	5
87. Use effective planning procedures	1	2	3	4	5	1	2	3	4	5
88. Use transition effectively	1	2	3	4	5	1	2	3	4	5
89. Is aware of unity in writing	1	2	3	4	5	1	2	3	4	5
90. Paraphrase effectively	1	2	3	4	5	1	2	3	4	5
91. Show courtesy toward reader	1	2	3	4	5	1	2	3	4	5
92. Perform effective audience analysis	1	2	3	4	5	1	2	3	4	5
93. Use correct letter format	1	2	3	4	5	1	2	3	4	5
94. Prepare effective graphic aids	1	2	3	4	5	1	2	3	4	5
95. Write extemporaneously	1	2	3	4	5	1	2	3	4	5
96. Know psychological aspects of writing	1	2	3	4	5	1	2	3	4	5
97. Use ideas subordination effectively	1	2	3	4	5	1	2	3	4	5
98. Avoid use of jargon	1	2	3	4	5	1	2	3	4	5
99. Write effective thesis statements	1	2	3	4	5	1	2	3	4	5
ORAL COMMUNICATION										
100. Have effective oral communication skill	1	2	3	4	5	1	2	3	4	5
101. Ask appropriate questions	1	2	3	4	5	1	2	3	4	5
102. Use a clear, distinct, pleasant voice	1	2	3	4	5	1	2	3	4	5
103. Use correct grammar	1	2	3	4	5	1	2	3	4	5
104. Organize ideas	1	2	3	4	5	1	2	3	4	5
105. Have good presentation skills	1	2	3	4	5	1	2	3	4	5

SECTION D. The following items are used to measure the extent of your organizational and career satisfaction. With respect to your feelings about the organization for which you now work, please circle the value that indicates the extent of your agreement with each statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
106. I am willing to put in a great deal of effort beyond that normally expected in order to help this organization be successful	1	2	3	4	5
107. I talk up the organization to my friends as a great organization to work for	1	2	3	4	5
108. I feel very little loyalty to this organization	1	2	3	4	5
109. I would accept almost any type of job assignment in order to keep working for this organization	1	2	3	4	5
110. I find that my values and the organization's values are very similar	1	2	3	4	5
111. I am proud to tell others that I am part of this organization.	1	2	3	4	5
112. I could just as well be working for a different organization as long as the type of work was similar	1	2	3	4	5
113. This organization really inspires the very best in me in the way of job performance	1	2	3	4	5
114. It would take very little change in my present circumstances o cause me to leave this organization	1	2	3	4	5
115. I am extremely glad that I chose this organization to work for over others I was considering at the time I joined	1	2	3	4	5
116. There is not much to be gained by sticking with this organization indefinitely	1	2	3	4	5
117. Often, I find it difficult to agree with this organization's policies on important matters relating to its employees	1	2	3	4	5
118. I really care about the fate of this organization	1	2	3	4	5
119. For me this is the best of all possible organizations for which to work	1	2	3	4	5
120. Deciding to work for this organization was a definite mistake on my part	1	2	3	4	5
121. I think a lot about leaving this organization	1	2	3	4	5
122. I am actively searching for an acceptable alternative to this organization	1	2	3	4	5
123. An acceptable alternative to this organization exists	1	2	3	4	5
124. When I can, I will leave the organization	1	2	3	4	5
125. I am satisfied with the success I have achieved in my career	1	2	3	4	5
126. I am satisfied with the progress I have made toward meeting my overall career goals.	1	2	3	4	5
127. I am satisfied with the progress I have made toward meeting my goals for income	1	2	3	4	5
128. I am satisfied with the progress I have made toward meeting my goals for advancement	1	2	3	4	5
129. I am satisfied with the progress I have made toward meeting my goals for the development of new skills	1	2	3	4	5

SECTION E. The following items will be used to measure your perception of what the user thinks in regard to the products and services that you provide to the user. Please circle the value that best describes what you think the user's agreement level is with each item.

130. Relationship with IS professional	Dissonant	1	2	3	4	5	Harmonious
	Bad	1	2	3	4	5	Good
131. Processing of requests for changes to existing systems	Fast	1	2	3	4	5	Slow
	Untimely	1	2	3	4	5	Timely
132. Degree of IS training provided to users	Complete	1	2	3	4	5	Incomplete
	Low	1	2	3	4	5	High
133. Users' understanding of systems	Insufficient	1	2	3	4	5	Sufficient
	Complete	1	2	3	4	5	Incomplete
134. Users' feelings of participation	Positive	1	2	3	4	5	Negative
	Insufficient	1	2	3	4	5	Sufficient
135. Attitude of the IS professional.	Cooperative	1	2	3	4	5	Belligerent
	Negative	1	2	3	4	5	Positive
136. Reliability of output information	High	1	2	3	4	5	Low
	Superior	1	2	3	4	5	Inferior
137. Relevancy of output information (to intended function)	Useful	1	2	3	4	5	Useless
	Relevant	1	2	3	4	5	Irrelevant
138. Accuracy of output information	Inaccurate	1	2	3	4	5	Accurate
	Low	1	2	3	4	5	High
139. Precision of output information	Low	1	2	3	4	5	High
	Definite	1	2	3	4	5	Uncertain
140. Communication with IS professional	Dissonant	1	2	3	4	5	Harmonious
	Destructive	1	2	3	4	5	Productive
141. Time required for new systems development	Unreasonable	1	2	3	4	5	Reasonable
	Acceptable	1	2	3	4	5	Unacceptable
142. Completeness of the output information	Sufficient	1	2	3	4	5	Insufficient
	Adequate	1	2	3	4	5	Inadequate

SECTION F. Please use the following scale to indicate the degree to which you are satisfied or dissatisfied with these aspects of your job. Circle the value that indicates the extent of your agreement with each statement.

	Extremely Dissatisfied	Dissatisfied	Neutral	Satisfied	Extremely Satisfied
143. The amount of job security I have	1	2	3	4	5
144. The amount of pay and fringe benefits that I receive	1	2	3	4	5
145. The amount of personal growth and development I get in doing my	1	2	3	4	5
146. The people I talk to and work with on my job	1	2	3	4	5
147. The degree of respect and fair treatment that I receive from my boss	1	2	3	4	5
148. The feeling of worthwhile accomplishment I get from doing my job	1	2	3	4	5
149. The chance to get to know other people while on the job	1	2	3	4	5
150. The amount of support and guidance I receive from my supervisor	1	2	3	4	5
151. The degree to which I am fairly paid for what I contribute to this organization	1	2	3	4	5
152. The amount of independent thought and action I can exercise in my job	1	2	3	4	5
153. How secure things look for me in the future in this organization	1	2	3	4	5
154. The chance to help other people while at work.	1	2	3	4	5
155. The amount of challenge in my job	1	2	3	4	5
156. The overall quality of the supervision I receive in my work	1	2	3	4	5

SECTION G. Please provide the following demographic information.

157. Current position/title_____

158. Years in current position: _____

159. Years at current company: _____

160. Years experience in your field: _____

161. Current salary: ☐ Below 25,000 ☐ 25,000 up to 35,000 ☐ 35,000 up to 45,000
☐ 45,000 up to 55,000 ☐ 55,000 up to 65,000 ☐ 65,000 and above

162. Age: _____

163. Gender: ☐ Male ☐ Female

164. Highest level of education:
☐ Masters or doctorate degree ☐ Undergraduate college degree ☐ Some college
☐ Vocational/technical school ☐ High school

165. If university degree, what college:
☐ Business ☐ Pure and Applied Sciences ☐ Liberal Arts ☐Other_____

SURVEY OF A MANAGER OF THE
INFORMATION SYSTEMS (IS) PROFESSIONAL

To the Manager of the Information Systems Professional:

COMPANY _____
NAME OF MANAGER_____
NAME OF INFO. SYSTEMS PROFESSIONAL_____
PROJECT _____

Your participation in this study will help to promote successful IS development through better communication and understanding of the IS development process. Specifically, the researchers will determine if IS professionals, IS managers, and users differ in their perceptions of communication skills needed by IS staff; and if differences exist, the effect of differences on user satisfaction with IS product and service and on the manager's job performance evaluation of IS staff.

You will be indicating your perceptions based on the project named above.

What you should know:

- There are no "correct" or "incorrect" answers.
- Please answer questions based on your immediate perceptions.
- You should answer each question honestly.
- Responses will remain anonymous and confidential.
- You may refuse to answer any question.

By completing and returning this survey, I am indicating that I read and understand the purposes of the study. I have voluntarily participated in the study; and when the study is finished, I know that results will be freely available to me upon request.

RESEARCHER CONTACT:
The researchers listed below may be reached to answer questions about the research:

Ms. Ruth Miller (318) 396-0186
Dr. Thomas Means (318) 257-3293

SECTION A. The following items will be used (1) to measure your perception of the importance of each knowledge/skill identified for the information systems (IS) professional and (2) to measure your satisfaction with each of the IS professional's skill. Please circle the value that indicates the extent of your agreement about the importance of each skill in the IS professional's job and your satisfaction with the IS professional's skill level.

	IMPORTANCE OF SKILL IN THE IS PROFESSIONAL'S JOB					SATISFACTION WITH IS PROFESSIONAL'S SKILL LEVEL				
TECHNICAL SPECIALTIES	Unimportant				Very Important	Unsatisfied				Very Satisfied
1. COBOL, or other 3d generation language	1	2	3	4	5	1	2	3	4	5
2. Telecommunications	1	2	3	4	5	1	2	3	4	5
3. Network	1	2	3	4	5	1	2	3	4	5
4. Operating systems: Mainframes	1	2	3	4	5	1	2	3	4	5
5. Operating systems: Minis	1	2	3	4	5	1	2	3	4	5
6. 4th generation languages	1	2	3	4	5	1	2	3	4	5
7. Systems integration	1	2	3	4	5	1	2	3	4	5
8. Operating systems: Micros	1	2	3	4	5	1	2	3	4	5
9. Systems analysis/structured analysis	1	2	3	4	5	1	2	3	4	5
10. Systems life cycle management	1	2	3	4	5	1	2	3	4	5
11. Relational database	1	2	3	4	5	1	2	3	4	5
12. Distributed processing	1	2	3	4	5	1	2	3	4	5
13. A specific programming language	1	2	3	4	5	1	2	3	4	5
14. Data management (e.g., data modeling)	1	2	3	4	5	1	2	3	4	5
15. Structured programming/CASE methods or tools	1	2	3	4	5	1	2	3	4	5
16. Decision support systems	1	2	3	4	5	1	2	3	4	5
17. Assembly language	1	2	3	4	5	1	2	3	4	5
18. Expert systems/AI	1	2	3	4	5	1	2	3	4	5
TECHNOLOGY MANAGEMENT										
19. Ability to learn new technologies	1	2	3	4	5	1	2	3	4	5
20. Ability to focus on technology as a means, not an end	1	2	3	4	5	1	2	3	4	5
21. Ability to understand technological trends	1	2	3	4	5	1	2	3	4	5
BUSINESS FUNCTIONS										
22. Ability to learn about business functions	1	2	3	4	5	1	2	3	4	5
23. Ability to interpret business problems & develop appropriate technical solutions	1	2	3	4	5	1	2	3	4	5
24. Ability to understand the business environment	1	2	3	4	5	1	2	3	4	5
25. Knowledge of business functions	1	2	3	4	5	1	2	3	4	5
INTERPERSONAL/MANAGEMENT SKILLS										
26. Ability to work cooperatively in a one-on-one and project team environment	1	2	3	4	5	1	2	3	4	5
27. Ability to plan and execute work in a collaborative environment	1	2	3	4	5	1	2	3	4	5
28. Ability to deal with ambiguity	1	2	3	4	5	1	2	3	4	5
29. Ability to work closely with customers & maintain productive user/client relationships	1	2	3	4	5	1	2	3	4	5
30. Ability to accomplish assignments	1	2	3	4	5	1	2	3	4	5
31. Ability to teach others	1	2	3	4	5	1	2	3	4	5
32. Ability to develop and deliver effective, informative, & persuasive presentations	1	2	3	4	5	1	2	3	4	5
33. Ability to be self-directed and proactive	1	2	3	4	5	1	2	3	4	5
34. Ability to be sensitive to the organization's culture/politics	1	2	3	4	5	1	2	3	4	5

SECTION B. The following items will be used (1) to measure your perception of the importance of each written and oral communication skill identified for the information systems (IS) professional and (2) to measure your satisfaction with each skill. Please circle the value that indicates the extent of your agreement about the importance of each skill in the IS professional's job and your satisfaction with the IS professional's skill level.

	IMPORTANCE OF SKILL IN THE IS PROFESSIONAL'S JOB					SATISFACTION WITH IS PROFESSIONAL'S SKILL LEVEL				
WRITTEN COMMUNICATION	Unimportant				Very Important	Unsatisfied				Very Satisfied
35. Write coherently	1	2	3	4	5	1	2	3	4	5
36. Spell words correctly	1	2	3	4	5	1	2	3	4	5
37. Use grammar correctly	1	2	3	4	5	1	2	3	4	5
38. Write decisively	1	2	3	4	5	1	2	3	4	5
39. Sell ideas well in writing	1	2	3	4	5	1	2	3	4	5
40. Use words correctly	1	2	3	4	5	1	2	3	4	5
41. Construct effective sentences	1	2	3	4	5	1	2	3	4	5
42. Write concisely	1	2	3	4	5	1	2	3	4	5
43. Use effective arrangement of ideas	1	2	3	4	5	1	2	3	4	5
44. Use punctuation correctly	1	2	3	4	5	1	2	3	4	5
45. Have good proofreading skills	1	2	3	4	5	1	2	3	4	5
46. Adapt material to the reader	1	2	3	4	5	1	2	3	4	5
47. Write concretely	1	2	3	4	5	1	2	3	4	5
48. Focus on reader rather than writer	1	2	3	4	5	1	2	3	4	5
49. Organize material well	1	2	3	4	5	1	2	3	4	5
50. Avoid redundancies in writing	1	2	3	4	5	1	2	3	4	5
51. Write under pressure	1	2	3	4	5	1	2	3	4	5
52. Construct effective paragraphs	1	2	3	4	5	1	2	3	4	5
53. Use effective syntax	1	2	3	4	5	1	2	3	4	5
54. Have effective revising skill	1	2	3	4	5	1	2	3	4	5
55. Have effective editing skills	1	2	3	4	5	1	2	3	4	5
56. Be knowledgeable of writing process	1	2	3	4	5	1	2	3	4	5
57. Know appropriate business letter content	1	2	3	4	5	1	2	3	4	5
58. Use effective planning procedures	1	2	3	4	5	1	2	3	4	5
59. Use transition effectively	1	2	3	4	5	1	2	3	4	5
60. Is aware of unity in writing	1	2	3	4	5	1	2	3	4	5
61. Paraphrase effectively	1	2	3	4	5	1	2	3	4	5
62. Show courtesy toward reader	1	2	3	4	5	1	2	3	4	5
63. Perform effective audience analysis	1	2	3	4	5	1	2	3	4	5
64. Use correct letter format	1	2	3	4	5	1	2	3	4	5
65. Prepare effective graphic aids	1	2	3	4	5	1	2	3	4	5
66. Write extemporaneously	1	2	3	4	5	1	2	3	4	5
67. Know psychological aspects of writing	1	2	3	4	5	1	2	3	4	5
68. Use ideas subordination effectively	1	2	3	4	5	1	2	3	4	5
69. Avoid use of jargon	1	2	3	4	5	1	2	3	4	5
70. Write effective thesis statements	1	2	3	4	5	1	2	3	4	5
ORAL COMMUNICATION										
71. Have effective oral communication skill	1	2	3	4	5	1	2	3	4	5
72. Ask appropriate questions	1	2	3	4	5	1	2	3	4	5
73. Use a clear, distinct, pleasant voice	1	2	3	4	5	1	2	3	4	5
74. Use correct grammar	1	2	3	4	5	1	2	3	4	5
75. Organize ideas	1	2	3	4	5	1	2	3	4	5
76. Have good presentation skills	1	2	3	4	5	1	2	3	4	5

SECTION C. The following items will be used to measure how you feel about certain aspects of the computer-based information products and services provided by the information systems (IS) professional. Please circle the value that best describes your agreement with each item.

77. Relationship with IS professional	Dissonant	1	2	3	4	5	Harmonious
	Bad	1	2	3	4	5	Good
78. Processing of requests for changes to existing systems	Fast	1	2	3	4	5	Slow
	Untimely	1	2	3	4	5	Timely
79. Degree of IS training provided to users	Complete	1	2	3	4	5	Incomplete
	Low	1	2	3	4	5	High
80. Users' understanding of systems	Insufficient	1	2	3	4	5	Sufficient
	Complete	1	2	3	4	5	Incomplete
81. Users' feelings of participation	Positive	1	2	3	4	5	Negative
	Insufficient	1	2	3	4	5	Sufficient
82. Attitude of the IS professional.	Cooperative	1	2	3	4	5	Belligerent
	Negative	1	2	3	4	5	Positive
83. Reliability of output information	High	1	2	3	4	5	Low
	Superior	1	2	3	4	5	Inferior
84. Relevancy of output information (to intended function)	Useful	1	2	3	4	5	Useless
	Relevant	1	2	3	4	5	Irrelevant
85. Accuracy of output information	Inaccurate	1	2	3	4	5	Accurate
	Low	1	2	3	4	5	High
86. Precision of output information	Low	1	2	3	4	5	High
	Definite	1	2	3	4	5	Uncertain
87. Communication with IS professional	Dissonant	1	2	3	4	5	Harmonious
	Destructive	1	2	3	4	5	Productive
88. Time required for new systems development	Unreasonable	1	2	3	4	5	Reasonable
	Acceptable	1	2	3	4	5	Unacceptable
89. Completeness of the output information	Sufficient	1	2	3	4	5	Insufficient
	Adequate	1	2	3	4	5	Inadequate

SECTION D. The following items will be used to measure job performance of the information systems professional. Please circle the number that indicates the extent to which the information systems professional exhibits each attribute.

	Very Unsatisfactorily	Mostly Unsatisfactorily	Neutral	Mostly Satisfactorily	Very Satisfactorily
90. Cooperation	1	2	3	4	5
91. Loyalty to organization	1	2	3	4	5
92. Honesty	1	2	3	4	5
93. Initiative	1	2	3	4	5
94. Commitment to job	1	2	3	4	5
95. Quality of work	1	2	3	4	5
96. Loyalty to supervisor	1	2	3	4	5
97. Interpersonal relationships	1	2	3	4	5
98. Communication skills	1	2	3	4	5
99. Dependability	1	2	3	4	5
100. Accuracy	1	2	3	4	5
101. Responsibility	1	2	3	4	5
102. Punctuality	1	2	3	4	5
103. Attitude	1	2	3	4	5
104. Productivity	1	2	3	4	5
105. Judgment	1	2	3	4	5
106. Creativity	1	2	3	4	5
107. Planning	1	2	3	4	5
108. Ability	1	2	3	4	5
109. Promotability	1	2	3	4	5
110. Job knowledge	1	2	3	4	5
111. Commitment to organization	1	2	3	4	5
112. Attendance	1	2	3	4	5
113. Overall job performance	1	2	3	4	5

SECTION E. Please provide the following demographic information.

114. Current position/title_____

115. Years in current position: _____

116. Years at current company: _____

117. Years experience in your field: _____

118. Current salary: ☐ Below 25,000 ☐ 25,000 up to 35,000 ☐ 35,000 up to 45,000
☐ 45,000 up to 55,000 ☐ 55,000 up to 65,000 ☐ 65,000 and above

119. Age: _____

120. Gender: ☐ Male ☐ Female

121. Highest level of education:
☐ Masters or doctorate degree ☐ Undergraduate college degree ☐ Some college
☐ Vocational/technical school ☐ High school

122. If university degree, what college:
☐ Business ☐ Pure and Applied Sciences ☐ Liberal Arts ☐Other_____

123. Have you ever been involved in decisions regarding hiring information systems professionals for this company?
☐ Yes ☐ No

124. Have you ever provided input for the evaluation of the performance of information systems professionals for this company? ☐ Yes ☐ No

125. Have you ever provided input for the evaluation of the information systems function in this company? ☐ Yes ☐ No

SURVEY OF A USER OF THE
INFORMATION SYSTEMS (IS) PROFESSIONAL'S SERVICES

To the User of the Services of the Information Systems Professional:

COMPANY _____
NAME OF USER _____
NAME OF INFO. SYSTEMS PROFESSIONAL _____
PROJECT _____

Your participation in this study will help to promote successful IS development through better communication and understanding of the IS development process. Specifically, the researchers will determine if IS professionals, IS managers, and users differ in their perceptions of communication skills needed by IS staff; and if differences exist, the effect of differences on user satisfaction with IS product and service and on the manager's job performance evaluation of IS staff.

You will be indicating your perceptions based on the project named above.

What you should know:

- There are no "correct" or "incorrect" answers.
- Please answer questions based on your immediate perceptions.
- You should answer each question honestly.
- Responses will remain anonymous and confidential.
- You may refuse to answer any question.

By completing and returning this survey, I am indicating that I read and understand the purposes of the study. I have voluntarily participated in the study; and when the study is finished, I know that results will be freely available to me upon request.

RESEARCHER CONTACT:
The researchers listed below may be reached to answer questions about the research:

Ms. Ruth Miller (318) 396-0186
Dr. Thomas Means (318) 257-3293

SECTION A. The following items will be used (1) to measure your perception of the importance of each knowledge/skill identified for the information systems (IS) professional and (2) to measure your satisfaction with each of the IS professional's skill. Please circle the value that indicates the extent of your agreement about the importance of each skill in the IS professional's job and your satisfaction with the IS professional's skill level.

	IMPORTANCE OF SKILL IN THE IS PROFESSIONAL'S JOB					SATISFACTION WITH IS PROFESSIONAL'S SKILL LEVEL				
TECHNICAL SPECIALTIES	Unimportant				Very Important	Unsatisfied				Very Satisfied
1. COBOL, or other 3d generation language	1	2	3	4	5	1	2	3	4	5
2. Telecommunications	1	2	3	4	5	1	2	3	4	5
3. Network	1	2	3	4	5	1	2	3	4	5
4. Operating systems: Mainframes	1	2	3	4	5	1	2	3	4	5
5. Operating systems: Minis	1	2	3	4	5	1	2	3	4	5
6. 4th generation languages	1	2	3	4	5	1	2	3	4	5
7. Systems integration	1	2	3	4	5	1	2	3	4	5
8. Operating systems: Micros	1	2	3	4	5	1	2	3	4	5
9. Systems analysis/structured analysis	1	2	3	4	5	1	2	3	4	5
10. Systems life cycle management	1	2	3	4	5	1	2	3	4	5
11. Relational database	1	2	3	4	5	1	2	3	4	5
12. Distributed processing	1	2	3	4	5	1	2	3	4	5
13. A specific programming language	1	2	3	4	5	1	2	3	4	5
14. Data management (e.g., data modeling)	1	2	3	4	5	1	2	3	4	5
15. Structured programming/CASE methods or tools	1	2	3	4	5	1	2	3	4	5
16. Decision support systems	1	2	3	4	5	1	2	3	4	5
17. Assembly language	1	2	3	4	5	1	2	3	4	5
18. Expert systems/AI	1	2	3	4	5	1	2	3	4	5
TECHNOLOGY MANAGEMENT										
19. Ability to learn new technologies	1	2	3	4	5	1	2	3	4	5
20. Ability to focus on technology as a means, not an end	1	2	3	4	5	1	2	3	4	5
21. Ability to understand technological trends	1	2	3	4	5	1	2	3	4	5
BUSINESS FUNCTIONS										
22. Ability to learn about business functions	1	2	3	4	5	1	2	3	4	5
23. Ability to interpret business problems & develop appropriate technical solutions	1	2	3	4	5	1	2	3	4	5
24. Ability to understand the business environment	1	2	3	4	5	1	2	3	4	5
25. Knowledge of business functions	1	2	3	4	5	1	2	3	4	5
INTERPERSONAL/MANAGEMENT SKILLS										
26. Ability to work cooperatively in a one-on-one and project team environment	1	2	3	4	5	1	2	3	4	5
27. Ability to plan and execute work in a collaborative environment	1	2	3	4	5	1	2	3	4	5
28. Ability to deal with ambiguity	1	2	3	4	5	1	2	3	4	5
29. Ability to work closely with customers & maintain productive user/client relationships	1	2	3	4	5	1	2	3	4	5
30. Ability to accomplish assignments	1	2	3	4	5	1	2	3	4	5
31. Ability to teach others	1	2	3	4	5	1	2	3	4	5
32. Ability to develop and deliver effective, informative, & persuasive presentations	1	2	3	4	5	1	2	3	4	5
33. Ability to be self-directed and proactive	1	2	3	4	5	1	2	3	4	5
34. Ability to be sensitive to the organization's culture/politics	1	2	3	4	5	1	2	3	4	5

SECTION B. The following items will be used (1) to measure your perception of the importance of each written and oral communication skill identified for the information systems (IS) professional and (2) to measure your satisfaction with each skill. Please circle the value that indicates the extent of your agreement about the importance of each skill in the IS professional's job and your satisfaction with the IS professional's skill level.

	IMPORTANCE OF SKILL IN THE IS PROFESSIONAL'S JOB					SATISFACTION WITH IS PROFESSIONAL'S SKILL LEVEL				
WRITTEN COMMUNICATION	Unimportant				Very Important	Unsatisfied				Very Satisfied
35. Write coherently	1	2	3	4	5	1	2	3	4	5
36. Spell words correctly	1	2	3	4	5	1	2	3	4	5
37. Use grammar correctly	1	2	3	4	5	1	2	3	4	5
38. Write decisively	1	2	3	4	5	1	2	3	4	5
39. Sell ideas well in writing	1	2	3	4	5	1	2	3	4	5
40. Use words correctly	1	2	3	4	5	1	2	3	4	5
41. Construct effective sentences	1	2	3	4	5	1	2	3	4	5
42. Write concisely	1	2	3	4	5	1	2	3	4	5
43. Use effective arrangement of ideas	1	2	3	4	5	1	2	3	4	5
44. Use punctuation correctly	1	2	3	4	5	1	2	3	4	5
45. Have good proofreading skills	1	2	3	4	5	1	2	3	4	5
46. Adapt material to the reader	1	2	3	4	5	1	2	3	4	5
47. Write concretely	1	2	3	4	5	1	2	3	4	5
48. Focus on reader rather than writer	1	2	3	4	5	1	2	3	4	5
49. Organize material well	1	2	3	4	5	1	2	3	4	5
50. Avoid redundancies in writing	1	2	3	4	5	1	2	3	4	5
51. Write under pressure	1	2	3	4	5	1	2	3	4	5
52. Construct effective paragraphs	1	2	3	4	5	1	2	3	4	5
53. Use effective syntax	1	2	3	4	5	1	2	3	4	5
54. Have effective revising skill	1	2	3	4	5	1	2	3	4	5
55. Have effective editing skills	1	2	3	4	5	1	2	3	4	5
56. Be knowledgeable of writing process	1	2	3	4	5	1	2	3	4	5
57. Know appropriate business letter content	1	2	3	4	5	1	2	3	4	5
58. Use effective planning procedures	1	2	3	4	5	1	2	3	4	5
59. Use transition effectively	1	2	3	4	5	1	2	3	4	5
60. Is aware of unity in writing	1	2	3	4	5	1	2	3	4	5
61. Paraphrase effectively	1	2	3	4	5	1	2	3	4	5
62. Show courtesy toward reader	1	2	3	4	5	1	2	3	4	5
63. Perform effective audience analysis	1	2	3	4	5	1	2	3	4	5
64. Use correct letter format	1	2	3	4	5	1	2	3	4	5
65. Prepare effective graphic aids	1	2	3	4	5	1	2	3	4	5
66. Write extemporaneously	1	2	3	4	5	1	2	3	4	5
67. Know psychological aspects of writing	1	2	3	4	5	1	2	3	4	5
68. Use ideas subordination effectively	1	2	3	4	5	1	2	3	4	5
69. Avoid use of jargon	1	2	3	4	5	1	2	3	4	5
70. Write effective thesis statements	1	2	3	4	5	1	2	3	4	5
ORAL COMMUNICATION										
71. Have effective oral communication skill	1	2	3	4	5	1	2	3	4	5
72. Ask appropriate questions	1	2	3	4	5	1	2	3	4	5
73. Use a clear, distinct, pleasant voice	1	2	3	4	5	1	2	3	4	5
74. Use correct grammar	1	2	3	4	5	1	2	3	4	5
75. Organize ideas	1	2	3	4	5	1	2	3	4	5
76. Have good presentation skills	1	2	3	4	5	1	2	3	4	5

SECTION C. The following items will be used to measure how you feel about certain aspects of the computer-based information products and services provided by the information systems (IS) professional. Please circle the value that best describes your agreement with each item.

77. Relationship with IS professional	Dissonant	1	2	3	4	5	Harmonious
	Bad	1	2	3	4	5	Good
78. Processing of requests for changes to existing systems	Fast	1	2	3	4	5	Slow
	Untimely	1	2	3	4	5	Timely
79. Degree of IS training provided to users	Complete	1	2	3	4	5	Incomplete
	Low	1	2	3	4	5	High
80. Users' understanding of systems.	Insufficient	1	2	3	4	5	Sufficient
	Complete	1	2	3	4	5	Incomplete
81. Users' feelings of participation	Positive	1	2	3	4	5	Negative
	Insufficient	1	2	3	4	5	Sufficient
82. Attitude of the IS professional	Cooperative	1	2	3	4	5	Belligerent
	Negative	1	2	3	4	5	Positive
83. Reliability of output information.	High	1	2	3	4	5	Low
	Superior	1	2	3	4	5	Inferior
84. Relevancy of output information (to intended function)	Useful	1	2	3	4	5	Useless
	Relevant	1	2	3	4	5	Irrelevant
85. Accuracy of output information	Inaccurate	1	2	3	4	5	Accurate
	Low	1	2	3	4	5	High
86. Precision of output information	Low	1	2	3	4	5	High
	Definite	1	2	3	4	5	Uncertain
87. Communication with IS professional	Dissonant	1	2	3	4	5	Harmonious
	Destructive	1	2	3	4	5	Productive
88. Time required for new systems development	Unreasonable	1	2	3	4	5	Reasonable
	Acceptable	1	2	3	4	5	Unacceptable
89. Completeness of the output information	Sufficient	1	2	3	4	5	Insufficient
	Adequate	1	2	3	4	5	Inadequate

SECTION D. The following items will be used to measure job performance of the information systems professional. Please circle the number that indicates the extent to which the information systems professional exhibits each attribute.

	Very Unsatisfactorily	Mostly Unsatisfactorily	Neutral	Mostly Satisfactorily	Very Satisfactorily
90. Cooperation	1	2	3	4	5
91. Loyalty to organization	1	2	3	4	5
92. Honesty	1	2	3	4	5
93. Initiative	1	2	3	4	5
94. Commitment to job	1	2	3	4	5
95. Quality of work	1	2	3	4	5
96. Loyalty to supervisor	1	2	3	4	5
97. Interpersonal relationships	1	2	3	4	5
98. Communication skills	1	2	3	4	5
99. Dependability	1	2	3	4	5
100. Accuracy	1	2	3	4	5
101. Responsibility	1	2	3	4	5
102. Punctuality	1	2	3	4	5
103. Attitude	1	2	3	4	5
104. Productivity	1	2	3	4	5
105. Judgment	1	2	3	4	5
106. Creativity	1	2	3	4	5
107. Planning	1	2	3	4	5
108. Ability	1	2	3	4	5
109. Promotability	1	2	3	4	5
110. Job knowledge	1	2	3	4	5
111. Commitment to organization	1	2	3	4	5
112. Attendance	1	2	3	4	5
113. Overall job performance	1	2	3	4	5

SECTION E. Please provide the following demographic information.

114. Current position/title_____

115. Years in current position: _____

116. Years at current company: _____

117. Years experience in your field: _____

118. Current salary: ☐ Below 25,000 ☐ 25,000 up to 35,000 ☐ 35,000 up to 45,000
☐ 45,000 up to 55,000 ☐ 55,000 up to 65,000 ☐ 65,000 and above

119. Age: _____

120. Gender: ☐ Male ☐ Female

121. Highest level of education:
☐ Masters or doctorate degree ☐ Undergraduate college degree ☐ Some college
☐ Vocational/technical school ☐ High school

122. If university degree, what college:
☐ Business ☐ Pure and Applied Sciences ☐ Liberal Arts ☐Other_____

123. Have you ever been involved in decisions regarding hiring information systems professionals for this company?
☐ Yes ☐ No

124. Have you ever provided input for the evaluation of the performance of information systems professionals for this company? ☐ Yes ☐ No

125. Have you ever provided input for the evaluation of the information systems function in this company? ☐ Yes ☐ No

APPENDIX B

TABLES

TABLE 3.1

DEMOGRAPHIC CHARACTERISTICS
OF SAMPLE RESPONDENTS

	IS MANAGER		IS STAFF		IS USER	
	n	%	n	%	n	%
Work Experience:						
< 10 years	39	36.1	63	58.3	51	46.3
≥10 and <20	33	30.6	35	32.4	36	47.2
≥20 and <30	28	25.9	6	5.5	14	4.6
≥30	5	4.6	2	1.9	5	0.0
No report	3	2.8	2	1.9	2	1.9
Total	108	100.0	108	100.0	108	100.0
Age:						
<30 years old	9	8.4	31	28.8	23	21.3
≥30 and <40	33	30.6	52	48.1	26	24.1
≥40 and <50	21	19.4	17	15.7	34	31.5
≥50	21	19.4	3	2.8	13	12.0
No report	24	22.2	5	4.6	12	11.1
Total	108	100.0	108	100.0	108	100.0
Gender:						
Male	72	66.7	75	69.4	49	45.4
Female	32	29.6	32	29.7	56	51.8
No report	4	3.7	1	.9	3	2.8
Total	108	100.0	108	100.0	108	100.0
Education:						
Graduate degree	18	16.7	14	13.0	10	9.3
Bachelor degree	58	53.7	63	58.3	45	41.6
Some college	20	18.5	20	18.5	36	33.3
Vocational school	5	4.6	2	1.8	3	2.8
High School	3	2.8	6	5.6	10	9.3
No report	4	3.7	3	2.8	4	3.7
Total	108	100.0	108	100.0	108	100.0

TABLE 3.2

MULTIPLE REGRESSION TEST FOR SYSTEMATIC BIAS BETWEEN JOB PERFORMANCE AND WRITTEN, ORAL, AND INTERPERSONAL COMMUNICATION SKILLS
Randomly Split Group 1

Dependent Variable: JPMEAN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	2.4607	0.8202	1.20	0.3204
Error	48	32.8484	0.6843		
Total	51	35.3091			
Parameter	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	2.8602	2.93	0.0052	0.9775	
WMEAN	0.3363	0.99	0.3265	0.3392	
IMMEAN	0.2455	0.88	0.3847	0.2798	
OCMEAN	-0.2901	-0.90	0.3748	0.3239	

JPMEAN = IS managers' job performance rating of the IS staff members
WMEAN= IS managers' importance rating of written communication skills
IMMEAN = IS managers' importance rating of interpersonal skills
OCMEAN= IS managers' importance rating of oral communication skills

TABLE 3.3

MULTIPLE REGRESSION TEST FOR SYSTEMATIC BIAS BETWEEN JOB PERFORMANCE AND WRITTEN, ORAL, AND INTERPERSONAL COMMUNICATION SKILLS
Randomly Split Group 2

Dependent Variable: JPMEAN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	3.6036	1.2012	2.26	0.0936
Error	49	26.0962	0.5325		
Total	52	29.6998			
	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	1.7179	1.89	0.0653	.09112	
WMEAN	-0.2539	-1.06	0.2929	0.2388	
IMMEAN	0.5759	2.05	0.0462	0.2815	
OCMEAN	0.1952	0.69	0.4953	0.2841	

JPMEAN = IS managers' job performance rating of the IS staff members
WMEAN= IS managers' importance rating of written communication skills
IMMEAN = IS managers' importance rating of interpersonal skills
OCMEAN= IS managers' importance rating of oral communication skills

TABLE 3.4

MULTIPLE REGRESSION TEST FOR SYSTEMATIC BIAS BETWEEN USER SATISFACTION AND WRITTEN, ORAL, AND INTERPERSONAL COMMUNICATION SKILLS

Randomly Split Group 1

Dependent Variable: TTUSMEAN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.3474	.01158	0.19	0.9054
Error	50	31.1180	0.6223		
Total	53	31.4655			
Parameter	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	4.3628	4.13	0.0001	1.0576	
TTWMEAN	-0.0355	-0.17	0.8636	0.2056	
TTIMMEAN	-0.0273	-0.12	0.9056	0.2295	
TTOCMEAN	-0.0653	-0.35	0.7287	0.2733	

TTUSMEAN = IS users' satisfaction rating of the IS product and service

TTWMEAN = IS users' importance rating of written communication skills

TTIMMEAN = IS users' importance rating of interpersonal skills

TTOCMEAN= IS users' importance rating of oral communication skills

TABLE 3.5

MULTIPLE REGRESSION TEST FOR SYSTEMATIC BIAS BETWEEN USER SATISFACTION AND WRITTEN, ORAL, AND INTERPERSONAL COMMUNICATION SKILLS
Randomly Split Group 2

Dependent Variable: TTUSMEAN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	3.2521	1.0840	1.98	0.1297
Error	49	26.8719	03.5484		
Total	52	30.1241			
	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	2.7386	3.07	0.0035	0.8910	
TTWMEAN	-0.4248	-2.21	0.0316	0.1919	
TTIMMEAN	0.2778	1.55	0.1283	0.1795	
TTOCMEAN	0.3309	1.49	0.1425	0.2220	

TTUSMEAN = IS users' satisfaction rating of the IS product and service
TTWMEAN = IS users' importance rating of written communication skills
TTIMMEAN = IS users' importance rating of interpersonal skills
TTOCMEAN= IS users' importance rating of oral communication skills

TABLE 3.6

DESCRIPTIVE ANALYSIS OF EXAMINED VARIABLES

IS Manager	Mean	Std. Dev.	Median	Skewness	Kurtosis
Interpersonal skill	4.28	.53	4.33	-.51	-.25
Oral communication skill	4.17	.61	4.17	-.31	-.45
Writing skill	3.81	.70	3.83	-.33	.05
Job performance	4.00	.80	4.08	-1.20	1.84

IS Staff	Mean	Std. Dev.	Median	Skewness	Kurtosis
Interpersonal skill	4.28	.55	4.33	-.55	-.35
Oral communication skill	4.32	.59	4.33	-.69	.21
Writing skill	3.66	.87	3.72	-.28	-.51

IS User	Mean	Std. Dev.	Median	Skewness	Kurtosis
Interpersonal skill	4.39	.56	4.55	-1.25	2.34
Oral communication skill	4.35	.63	4.33	-1.12	1.31
Writing skill	3.82	.78	4.00	-.94	.81
User satisfaction	3.72	.76	3.73	-.31	-.12

TABLE 3.7

MULTIPLE REGRESSION TEST FOR SYSTEMATIC BIAS BETWEEN JOB PERFORMANCE AND MANAGERS' DEMOGRAPHIC VARIABLES

Dependent Variable: JPMEAN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	4.4203	1.1051	1.80	0.1376
Error	78	47.9344	0.6145		
Total	82	52.3547			
Parameter	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	3.1903	5.85	0.0001	0.5449	
YEAR3	0.0208	1.41	0.1639	0.0148	
AGE1	0.0033	0.25	0.8013	0.0132	
GEN1	0.1085	0.54	0.5905	0.2009	
EDU1	0.1060	1.05	0.2964	0.1008	

JPMEAN = IS manager's mean job performance rating of IS staff member
YEAR3 = IS manager's years of work experience
AGE1 = IS manager's age
GEN1 = IS manager's gender
EDU1 = IS manager's education level

TABLE 3.8

MULTIPLE REGRESSION TEST FOR SYSTEMATIC BIAS BETWEEN USER SATISFACTION AND IS USERS' DEMOGRAPHIC VARIABLES

Dependent Variable: TTUSMEAN

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	1.1108	0.2777	0.46	0.7653
Error	89	53.8005	0.6045		
Total	93				
Parameter	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	3.6336	7.32	0.0001	0.4965	
TTYEAR3	0.0087	0.67	0.5015	0.0128	
TTAGE1	0.0031	0.26	0.7923	0.0119	
TTGEN1	-0.0607	-0.37	0.7095	0.1626	
TTEDU1	-0.0233	-0.31	0.7604	0.0762	

TTUSMEAN = IS user's mean satisfaction with IS product and service

TTYEAR3 = IS user's years of work experience

TTAGE1 = IS user's age

TTGEN1 = IS user's gender

TTEDU1 = IS user's education level

TABLE 3.9

MULTIPLE REGRESSION TEST FOR SYSTEMATIC BIAS BETWEEN MANAGERS' IMPORTANCE RATINGS OF WRITTEN, ORAL, AND INTERPERSONAL COMMUNICATION SKILLS AND MANAGERS' DEMOGRAPHIC VARIABLES

Dependent Variable: Written Communication Skills

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	1.7145	.4286	.83	.5118
Error	78	10.4174	.5181		
Total	82	42.1319			

Parameter	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	3.5736	7.14	.0001	.5003	
YEAR3	-.0015	-.11	.9089	.0136	
AGE1	.0078	.65	.5204	.0121	
GEN1	.1843	1.00	.3207	.1844	
EDU1	-.1237	-1.34	.1855	.0926	

Dependent Variable: Oral Communication Skills

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	3.6400	.9100	2.45	.0528
Error	78	28.9461	.3711		
Total	82	32.5861			

Parameter	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	4.2605	10.06	.0001	.4234	
YEAR3	-.0105	-.92	.3625	.0115	
AGE1	.0121	1.18	.2420	.0102	
GEN1	.0776	.50	.6202	.1561	
EDU1	-.2211	-2.82	.0061	.0783	

Dependent Variable: Interpersonal Skills

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	.7135	.1783	.62	.6498
Error	78	22.4538	.2878		
Total	82	23.1674			

Parameter	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	3.9550	10.61	.0001	.3729	
YEAR3	.0035	.35	.7239	.0101	
AGE1	.0047	.90	.3704	.1375	
GEN1	-.0193	-.28	.7805	.0690	
EDU1					

YEAR3 = IS manager's years of work experience
AGE1 = IS manager's age
GEN1 = IS manager's gender
EDU1 = IS manager's education level

TABLE 3.10

MULTIPLE REGRESSION TEST FOR SYSTEMATIC BIAS BETWEEN USERS' IMPORTANCE RATINGS OF WRITTEN, ORAL, AND INTERPERSONAL COMMUNICATION SKILLS AND USERS' DEMOGRAPHIC VARIABLES

Dependent Variable: Written Communication Skills

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	3.1874	.7968	1.405	.2385
Error	89	50.4417	.5667		
Total	93	53.6291			

Parameter	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	2.9130	6.059	.0001	.4808	
TTYEAR3	-.0012	-.099	.9215	.0124	
TTAGE1	.0089	.770	.4432	.0115	
TTGEN1	.2655	1.687	.0952	.1574	
TTEDU1	.0891	1.208	.2304	.0738	

Dependent Variable: Oral Communication Skills

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	1.7365	.4341	1.211	.3117
Error	89	31.9017	.3584		
Total	93	33.6383			

Parameter	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	3.6344	9.505	.0001	.3823	
TTYEAR3	-.0027	-.282	.7786	.0099	
TTAGE1	.0090	.982	.3285	.0091	
TTGEN1	.1753	1.400	.1649	.1252	
TTEDU1	.0680	1.159	.2497	.0587	

Dependent Variable: Interpersonal Skills

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	2.1211	.5303	1.695	.1581
Error	89	27.8362	.3127		
Total	93	29.9574			

Parameter	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	3.6862	10.320	.0001	.3571	
TTYEAR3	-.0043	-.473	.6371	.0092	
TTAGE1	.0076	.887	.3773	.0085	
TTGEN1	.1192	1.019	.3109	.1169	
TTEDU1	.1165	2.124	.0364	.0548	

TTYEAR3 = IS user's years of work experience
TTAGE1 = IS user's age
TTGEN1 = IS user's gender
TTEDU1 = IS user's education level

TABLE 3.11

MULTIPLE REGRESSION TEST FOR SYSTEMATIC BIAS BETWEEN IS STAFFS' IMPORTANCE RATINGS OF WRITTEN, ORAL, AND INTERPERSONAL COMMUNICATION SKILLS AND IS STAFFS' DEMOGRAPHIC VARIABLES

Dependent Variable: Written Communication Skills

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	5.0623	1.2655	1.619	.1754
Error	98	76.5878	37815		
Total	102	81.6501			

Parameter	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	2.5768	4.475	.0001	.5758	
TYEAR3	-.0202	-.957	.3410	.0211	
TAGE1	.0347	2.141	.0347	2.141	
TGEN1	.1562	.816	.4165	.1914	
TEDU1	-.0534	-.557	.5789	.0959	

Dependent Variable: Oral Communication Skills

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	.1290	.0322	.087	.9864
Error	98	36.43689	.3718		
Total	102	36.5658			

Parameter	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	4.2294	10.648	.0001	.3972	
TYEAR3	-.0047	-.325	.7459	.0145	
TAGE1	.0039	.352	.7256	.0111	
TGEN1	.0379	.287	.7743	.1320	
TEDU1	-.0195	-.295	.7689	.0661	

Dependent Variable: Interpersonal Skills

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	3.6121	.9030	3.041	.0207
Error	98	29.09935	.2969		
Total	102	32.7114			

Parameter	Estimate	T-Value	Pr > |T|	Std Error of Est.	
INTERCEPT	4.2547	11.986	.0001	.3549	
TYEAR3	.0090	.690	.4917	.0130	
TAGE1	-.0037	-.377	.7067	.0100	
TGEN1	.2828	2.397	.0184	.1180	
TEDU1	-.1290	-2.181	.0315	.0591	

TYEAR3 = IS staff member's years of work experience
TAGE1 = IS staff member's age
TGEN1 = IS staff member's gender
TEDU1 = IS staff member's education level

TABLE 3.12

DESCRIPTIVE ANALYSIS OF MATCHED PAIR DIFFERENCES

IS Manager vs. IS Staff	Mean	Std. Dev.	Median	Skewness	Kurtosis	Mean=0 T-test
Interpersonal skill	.56	.47	.48	1.02	.50	11.07*
Oral communication skill	.67	.52	.67	.90	.51	11.97*
Writing skill	.89	.59	.89	.39	-.39	14.01*
IS User vs. IS Staff	Mean	Std. Dev.	Median	Skewness	Kurtosis	Mean=0 T-test
Interpersonal skill	.50	.46	.29	1.50	2.70	10.07*
Oral communication skill	.60	.52	.50	1.03	1.02	10.89*
Writing skill	.77	.60	.61	.86	.02	11.93*

*significant at P < .0001 level

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