



*About
the
Author*

Dr. Robert S. Fleming, *Associate Professor of Management and MIS at Rowan College, has a B.S. from Philadelphia College of Textiles and Science, an M.A.R. from Eastern Baptist Theological Seminary, an M.G.A. from the University of Pennsylvania, and an M.B.A., two M.S. degrees, and an Ed.D. from Temple University. Bob's numerous certifications include Certified Network Administrator, Certified Network Engineer, Enterprise Certified Network Engineer, and Master Certified Network Engineer.*

At Rowan College, he has taught a variety of undergraduate and graduate courses in management and MIS.

Bob is a frequent speaker at conferences and professional meetings, including PC Expo and Networkd. He is actively involved in professional and community service and serves as a board member of a number of regional and national organizations.

The Impact of Computer Networking on Business Organizations



Robert S. Fleming

Abstract

The purpose of this spring 1995 study was to gain an understanding of the impact on organizational behavior of the implementation of a local area network (LAN) within an organization. Survey subjects were from a variety of business organizations that previously installed such a network. Each participant in the survey had job responsibilities that involved frequent use of the LAN.

The survey population of 457 subjects responded to a series of 41 questions concerning how the implementation of a LAN had changed individual, group, and organizational behavior.

The findings of this study reveal a number of behavioral dimensions that should be considered during the planning and implementation of a LAN.

The world has changed dramatically in the past decade and promises to change no less remarkably in the coming decade. Innovative technologies have been pioneered in the laboratory, then commercialized, and finally institutionalized in contemporary organizations. The implementation of new telecommunications and computer networking technologies has revolutionized the way most contemporary organizations transact business.

This paper provides a basic introduction to computer networking. It relates networking technologies to organizational

behavior in the areas of group dynamics, leadership, motivation, communication, and decision making. The paper focuses on the challenges these new technologies offer two groups: organizational behavior and systems professionals, and college and university faculty preparing these practitioners.

Computer Networking

Most contemporary organizations make extensive use of computers. As a result of the rapid development and commercialization of computers in recent years, computers that are smaller in physical size and have extensive processing and storage capabilities are now available at reasonable prices.

The contemporary manager can have a microcomputer available on his or her desk, operating in a stand-alone mode, in a network configuration with other microcomputers, as a terminal in a minicomputer or mainframe computer system, or as a tool to access larger networks outside the organization. Many contemporary organizations, both small and large, are using local area networks (LANs) to network their microcomputers.

A LAN permits the sharing of hardware, software, and data resources. A LAN allows a number of microcomputers to share the use of hardware devices, such as printers, plotters, hard disks, and modems. Software sharing allows multiple users to access software packages, such as word processing, spreadsheet, database management, graphics, communication or electronic mail, and organization-specific programs. Data sharing includes the sharing of data files and electronic file transfer and can lead to significant productivity increases within the organization.

Organizational Behavior

Three dimensions of organizational behavior exist within an organization. *Individual dimensions* involve the behavior of individuals who perform organizational work within the context of a workgroup. *Group dimensions* involve behavior within and between groups. *Organizational dimensions* involve the

overall functioning of the organization.

Job design, motivation, and job satisfaction are *individual dimensions*. The successful organization must design jobs so that all essential organizational work is performed effectively and efficiently. Job design incorporates division of work and labor specialization. Job design and organizational staffing attempt to create a meaningful work experience that contributes to individual motivation and job satisfaction. Ideally, job satisfaction should lead to improved job performance, which in turn should contribute to job satisfaction.

The *group dimensions* include intragroup behavior, intergroup behavior, leadership, and power. Topics of interest related to intragroup behavior are group norms, roles, status, and leadership. Group cohesiveness, where group members share a common bond and work well together, is a desirable group attribute. Intergroup behavior is behavior between groups. Two important aspects of group behavior are power and conflict. The extent of task interdependence within and between groups will determine the extent to which conflict can be detrimental.

Communication, decision making, and organizational structure are three important *organizational dimensions* that influence organizational effectiveness and efficiency. Communication and decision making are fundamental to all managerial functions. The organizational structure dictates the framework within which the work of the organization is performed.

Methodology

The intent of this study was to gain an understanding of the impact on organizational behavior resulting from the implementation of a local area network within an organization. An earlier study established the relevant aspects of organizational behavior for the present study.

The survey population in the earlier exploratory study consisted of 50 subjects, representing small, medium, and large organizations. All participants were from organizations that had implemented a LAN. Each individual in the survey had job

responsibilities that involved the frequent use of the LAN.

Each survey participant was provided with a basic understanding of LAN technology and the potential organizational benefits of using a LAN. Each survey participant was also provided with an understanding of the basic concepts of organizational behavior.

After receiving this conceptual presentation from the researcher, each survey participant was asked to reflect upon his or her experience regarding the implementation of an organizational LAN. Each was asked to formulate a response to the question, "How has implementation of a LAN changed individual, group, and organizational behavior within your organization?" This open-ended question was intentionally used to ensure that survey participants would have latitude in responding to the question.

The researcher then interviewed the study participants. During the first half of the interview, participants were given the opportunity to respond to the above question. The researcher served as a recorder during this part of the interview. After affording the survey respondent the opportunity to provide a comprehensive response to the question, the researcher utilized appropriate interview questions to clarify the subject's response. The researcher added clarifying comments to the interview record.

Responses were categorized according to ten organizational behavior dimensions, and a 41-question survey instrument was developed. This instrument was used in the data collection for the present research study.

The present study of 457 survey respondents represented three sizes of organization: small (138 respondents), medium (167 respondents), and large (152 respondents). Small organizations had fewer than 100 employees, while medium organizations had between 100 and 1000 employees, and large organizations had more than 1000 employees.

All the organizations had implemented a LAN within the past three years. In all cases the LAN had been in operation for at least one year. All participants selected for the survey had

worked in the organization before and after the installation.

Each survey participant was provided with a basic understanding of LAN technology, the potential organizational benefits of using a LAN, and an understanding of the basic concepts of organizational behavior.

Each participant answered 41 survey questions. Data collection took place during spring 1995. The following findings derive from analysis of 457 completed surveys.

Findings

Summarized survey results are presented by organizational size as a percentage of total responses within size classification and as an overall percentage of those responding to the survey.

Individual Dimensions

Responses related to individual behavior dimensions are reported in three categories: job design, motivation, and job satisfaction. These results are presented in Table 1.

Table 1

Individual Dimensions

	<i>Small</i>	<i>Medium</i>	<i>Large</i>	<i>Total</i>
<i>Job Design:</i>				
Increased Required Technical Knowledge	73.9	58.1	51.3	60.6
Changed Job Responsibilities	84.1	74.9	69.1	75.7
Provided Useful Tool	87.7	85.6	86.8	86.7
Changed Work Interactions	56.5	71.9	87.5	72.4
<i>Motivation:</i>				
Increased Sense of Teamwork	62.3	61.7	81.6	68.5
Provided Learning Opportunity	57.2	55.1	55.3	55.8
Identified Task Contribution	33.3	45.6	79.6	53.2
Provided New Challenges	48.6	50.9	48.7	49.5
Increased Feeling of Self-Worth	54.3	44.3	58.6	52.1
Caused Frustrations	71.1	67.1	51.3	63.1
<i>Job Satisfaction:</i>				
Identified Tangible Results	76.8	71.2	84.2	77.2
Provided Feeling of Accomplishment	69.6	68.2	79.6	72.4
Provided Opportunity to Use Skills	63.1	55.7	71.1	63.1

Note: All figures represent percentages.

Job Design

Subjects were asked if the implementation of a LAN had:

- resulted in an increase in their required technical knowledge. An inverse relationship between organization size and the increase in required technical knowledge was found.
- resulted in a change in their job responsibilities. An inverse relationship between organization size and the change in job responsibilities was found.
- provided them with a useful tool for performing their work. The majority of respondents indicated that the LAN had proved to be a useful tool. There was no significant difference based on organization size.
- resulted in a change in their work-related interactions with others. A direct relationship between organization size and the change in work-related interactions with others was found.

Motivation

Subjects were asked if the implementation of a LAN had:

- resulted in an increased sense of teamwork within their organization. The majority of respondents indicated that the LAN had increased teamwork. The increase in teamwork was significantly greater in large organizations.
- provided them with the opportunity to learn and utilize new skills. The majority of respondents indicated that the LAN had provided this opportunity. There was no significant difference based on organization size.
- provided them with an understanding of how a given task contributes to the overall work of the organization. A direct relationship was revealed between organization size and this new understanding.
- provided them with new challenges. There was no significant difference based on organization size.
- increased their feeling of self-worth. There was no significant difference based on organization size.

cant difference based on organization size.

- caused frustrations during system implementation. An inverse relationship between organization size and the change in job responsibilities was found.

Job Satisfaction

Subjects were asked if the implementation of a LAN had:

- enabled them to see tangible results of their contribution. There was no significant difference based on organization size.
- resulted in a feeling of personal accomplishment. There was no significant difference based on organization size.
- provided an opportunity to use their skills. There was no significant difference based on organization size.

While none of the three survey questions in this category resulted in a significant correlation with organization size, they all received an affirmative response from a majority of survey participants.

Group Dimensions

Responses related to group behavior dimensions are reported in four categories: intragroup behavior, intergroup behavior, leadership, and power. These results are presented in Table 2.

Table 2

Group Dimensions

	<i>Small</i>	<i>Medium</i>	<i>Large</i>	<i>Total</i>
<i>Intragroup Behavior:</i>				
Reinforced Group Norms	48.6	52.1	67.8	56.2
Reduced Direct Workgroup Interaction	39.1	46.7	84.2	55.8
Reduced Group Cohesiveness	34.8	40.1	65.1	46.9
Facilitated Interaction of Separated Workgroups	49.3	52.1	89.5	63.7
<i>Intergroup Behavior:</i>				
Facilitated Interaction of Groups Connected to LAN	84.8	87.4	87.5	86.7

	<i>Small</i>	<i>Medium</i>	<i>Large</i>	<i>Total</i>
Discouraged Interaction of Groups Not Connected to LAN	56.6	55.7	82.2	64.8
Identified Design Considerations	76.9	73.1	75.6	75.1
Encouraged Exclusion of Individuals and Groups Not Connected to LAN	56.6	58.1	86.9	67.2
<i>Leadership:</i>				
Facilitated Situational Leadership	39.1	52.1	49.3	47.3
Enabled Leadership of Users Connected to LAN	73.9	84.4	86.9	82.1
Changed Leadership Patterns	42.1	47.3	69.1	52.9
Provided Timely Feedback	62.3	62.3	79.6	68.1
<i>Power</i>				
Facilitated Power Acquisition Through Expert Power	83.3	86.9	86.9	85.8
Demonstrated Legitimate Power Dictates LAN Privileges and Access	55.1	64.1	82.9	67.6
Diminished Personal Power	47.1	55.1	84.9	62.6

Note: All figures represent percentages.

Intragroup Behavior

Subjects were asked if the implementation of a LAN had:

- reinforced group norms within their organization. A direct relationship was revealed between organization size and reinforcement of group norms.
- resulted in a reduction of direct interaction with the members of their work/reference group. A direct relationship was revealed between organization size and this reduction of direct interaction.
- resulted in a loss of group cohesiveness. A direct relationship was revealed between organization size and this reduction in group cohesiveness.
- facilitated effective group work when group members are physically separated. A direct relationship was revealed between organization size and facilitation of physically separated workgroups.

Intergroup Behavior

Subjects were asked if the implementation of a LAN had:

- facilitated intergroup interaction between groups connected on the network. While the majority of respondents provided an affirmative response, there was no significant difference based on organization size.
- discouraged intergroup interaction between groups not connected on the network. While there was no significant difference based on organization size between small organizations and medium organizations, the majority of those responding from large organizations agreed that it had discouraged interaction.
- revealed the need to consider necessary group interdependencies when designing the network and granting access rights. While the majority of respondents provided an affirmative response, there was no significant difference based on organization size.
- encouraged the exclusion of individuals and groups not connected to the network. While there was no significant difference based on organization size between small organizations and medium organizations, the majority of those responding from large organizations agreed that the LAN had encouraged exclusion.

Leadership

Subjects were asked if the implementation of a LAN had:

- facilitated situational leadership. There was no significant difference based on organization size.
- enabled network users to exert leadership. While the majority of respondents provided an affirmative response, there was no significant difference based on organization size.
- changed established leadership patterns. A direct relationship was revealed between organization size and this change in established leadership patterns.

- provided timely feedback to organizational leaders. While there was no significant difference based on organization size between small organizations and medium organizations, the majority of those responding from large organizations agreed that feedback was timely.

Power

Subjects were asked if the implementation of a LAN had:

- facilitated power acquisition through expert knowledge of system use. While the majority of respondents provided an affirmative response, there was no significant difference based on organization size.
- revealed the fact that the legitimate power of an individual determines his or her system privileges and access. A direct relationship was revealed between organization size and the level of system privileges and access.
- resulted in diminished personal/referent power as a consequence of the impersonal nature of network communications. A direct relationship was revealed between organization size and this reduction of personal/referent power.

Organizational Dimensions

Responses related to organizational dimensions are reported in three categories: communication, decision making, and organizational structure. These results are shown in Table 3.

Table 3

Organizational Dimensions

	<i>Small</i>	<i>Medium</i>	<i>Large</i>	<i>Total</i>
<i>Communication:</i>				
Facilitated Timely Communication	74.6	82.6	98.1	85.3
Reduced Communication Formality	55.1	70.7	96.7	74.7
Facilitated Communication	73.9	86.8	92.8	84.9
Lessened Status Barriers	40.6	61.1	90.8	64.8
Facilitated Communication Feedback	65.2	72.5	82.2	73.6
Increased Premature Communication	61.6	74.3	85.6	74.2

	<i>Small</i>	<i>Medium</i>	<i>Large</i>	<i>Total</i>
<i>Decision Making:</i>				
Facilitated Group Decision Making	67.4	68.3	84.2	73.3
Facilitated Timely Decision Making	73.2	76.1	90.8	80.1
Facilitated Group Involvement in Decision Making	59.4	70.1	89.5	73.3
Resulted in Premature Decisions	48.6	51.5	51.3	50.5
<i>Organizational Structure:</i>				
Resulted in No Formal Organizational Change	91.3	92.2	96.7	93.4
Created Informal Organizational Structure	85.5	73.7	89.5	82.5
Facilitated Boundary Spanning	68.1	76.1	96.1	80.3

Note: All figures represent percentages.

Communication

Subjects were asked if the implementation of a LAN had:

- facilitated more timely communication within their organizations. A direct relationship was revealed between organization size and this increase in the timeliness of communication.
- resulted in less formal communications. A direct relationship was revealed between organization size and this reduction of formal communications.
- made it easier to communicate. A direct relationship was revealed between organization size and this increase in the ease of communication.
- lessened status barriers that can reduce communication effectiveness. A direct relationship was revealed between organization size and this reduction of status barriers.
- facilitated two-way communication and feedback. A direct relationship was revealed between organization size and this increase in two-way communications.
- resulted in the sending of messages before thoroughly thinking them through. A direct relationship was revealed between organization size and this premature sending of messages.

Decision Making

Subjects were asked if the implementation of a LAN had:

- facilitated group decision making. While there was no significant difference based on organization size between small organizations and medium organizations, a majority of those responding from large organizations agreed that it facilitated group decision making.
- facilitated more timely decision making. While there was no significant difference based on organization size between small organizations and medium organizations, the majority of those responding from large organizations agreed that it had facilitated more timely decision making.
- facilitated group involvement in decision making. A direct relationship was revealed between organization size and this increase in group decision making.
- resulted in making premature decisions before necessary information was available. There was no significant difference based on organization size.

Organizational Structure

Subjects were asked if the implementation of a LAN had:

- changed the formal organization structure. The majority of respondents indicated that there had not been a change in the formal organizational structure, and there was no significant difference based on organization size.
- created an informal organizational structure of network users. While the majority of respondents indicated that this informal organizational structure had developed, there was no significant difference based on organization size.
- facilitated the spanning of departmental boundaries. A direct relationship was revealed between organization size and this boundary spanning.

Conclusions

The findings of this study indicate that the implementation of a LAN can have a significant impact on behavior at all three levels within the organization.

At the individual level, a LAN can change the nature of the job and the resulting motivation and job satisfaction of the job incumbent. Both intragroup and intergroup behavior can change at the group level. In addition, the implementation of a LAN can result in changes in leadership and power, thus creating the potential for conflict.

While the implementation of a LAN seldom changes the formal organizational structure of an organization, it often results in the development of a network-based informal organizational structure. It is at the organizational level that the greatest advantages of computer networking can be realized. These advantages typically involve increases in the effectiveness and efficiency of organizational communication and decision making.

The results of this study provide organizational behavior and systems professionals with important insights. While there are certain themes that are consistent in all organizations, regardless of size, it should be noted that the significance of some of the findings of this study is closely related to organization size.