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The impact of computerization and managerial satisfaction

Lewis Knapp, Zondra Lee, D.P.A.

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THE IMPACT OF COMPUTERIZATION AND MANAGERIAL SATISFACTION

A Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree
Doctor of Public Administration

Zondra L. Lewis Knapp

College of Graduate and Professional Studies

Department of Public Administration

June, 1990

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BACKGROUND AND EXPERIENCE

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FORMAL EDUCATION

Present - 1986	Doctorate, Public Administration (D.P.A.)	University of La Verne (ULV)
1983	Master of Science (M.S.) Management Technology	University of La Verne (ULV)
1981	Master of Arts (M.Ed.) Curriculum & Instructional Methodology	Chapman College
	Bachelor of Science (B.S.) Chemistry & Biology, Mathematics	Chapman College

CREDENTIALS

CA Vocational Education: Business & Computer Applications	
CA Administrative	Clear
CA Community College: Professional and Basic Education	Life
CA Standard Secondary	Life
CA Standard Elementary	Life
Bilingual Cross Cultural	Specialist

EDUCATIONAL CONSULTING EXPERIENCE

Present - 1989	Consultant: Office of Teacher Education Science 2000 Project, Decision Development Corporation Explorations in Middle School Science Josten's Learning Corporation (CA State Department of Education)	University of California, Irvine (UCI)
	Consultant: Dept. of Physical Sciences Laboratory Science Demonstrations Summer Science Institutes (National Science Foundation)	University of California, Irvine (UCI)
	Koto Corporation, U.S. Operations Consultant: High-Technology/Marketing	
	Health Care Management Program Instructor: Management Information Systems (MIS), Bachelor/Masters programs	University of La Verne (ULV)
	Vocational Education Program Instructor: Computer Applications; Diploma programs: Science - Mathematics Adult Learning Centers	Garden Grove Unified School District (GGUSD)

ADMINISTRATIVE EXPERIENCE

Business		
Present - 1989	Professional Consultant Decision Development Corporation Josten's Learning Corporation Koto International	
1986 - 1989	Project/Program Manager Rockwell International Corporation	
1980 - 1977	Administrative Assistant/Clinical Staff Development/Education	Lake Havasu City Hospital
Education: Curriculum and Staff Development		
1986 - 1984	National Science Foundation (NSF) Mentor Teacher	UCI
1986	Consultant, State Science Assessment Committee, CA Assessment Program (CAP)	CA State Dept. of Education
1986	Representative, College Board Educational Equality Colloquium	Western Region
1986	Representative, CA Association for the Gifted and Talented Student	CAG
1986	NEWMAST Mentor Teacher (Cal Tech - Pasadena)	National Aeronautic and Space Administration, NASA
1986 - 1984	Director, District Science Fair (5 - 12)	Santa Ana Unified School District
1985	California Mentor Teacher (6 - 12)	CA State Dept. of Education
1985	Chairperson, Elementary - Secondary Steering Committee (K - 8)	Santa Ana Unified School District
1985 - 1983	Regional Science Addendum Panel, CA Science Framework	CA State Dept. of Education
1985	Curriculum Specialist, Instructional Materials Evaluation Panel (IMEP)	CA State Dept. of Eduction
1983	Gifted and Talented Education Resource Specialist (GATE)	Santa Ana Unified School District
1982	Project Coordinator, Bilingual GATE Science	SAUSD
1982	Curriculum Developer, Bilingual Science Project (6 - 7 - 8)	SAUSD
1980	Board Member, Chairperson	Orange County Science and Eng. Fair

Education: Teacher Training/Workshop/In-service

1989	Workshop Leader, Management Information Systems (MIS)	ULV Doctoral Intensive
	Workshop Leader, Educational Computing	GGUSD
	Workshop Leader, Technology Tools	Koto Internationa Tokyo, Japan
	Workshop Coordinator Science 2000 Project Explorations in Middle School Science	CA State Dept. of Education/ UCI
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	Workshop Leader, Science Laboratory & the Science Fair	Corona - Norco; Lynwood Unified; Downey; Norwalk
	Workshop Leader, Phi Delta Kappan Symposium	Chapman College
	Workshop Leader, Conference for the Education of Gifted and Talented Minority Student	CA State University Long Beach (CSULB)
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	Workshop Leader, District GATE Inservice	SAUSD, GATE
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Classroom Teacher Instructional Improvement Program (CIITP)	SB 813
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GATE Pilot Project Proposal	SAUSD

Business: Writing Communications

Doctoral Thesis: 'The Impact of Computerization on the Work of Managers: How Perceived Involvement and Participation in an Introductory Training Program Effects Job Satisfaction and Satisfaction with the Implementation Processes'

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National Aeronautics and Space Administration (NASA): 'Space Station Proposal: Brochures, flyers, radio-, video-, billboard-, technical journal-, magazine-, newspaper-, and promotional-productions

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Professional business plans - educational/high-technology companies: List submitted on request

Education: Writing Communications

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Writing Consultant, Science Framework Addendum	CA State Departmen of Education
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Principal Writer, Bilingual Biological, Physical and Earth Science Modules	SAUSD

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Abstract of the Dissertation

The Impact of Computerization and Managerial Satisfaction

By Zondra L. Lewis Knapp, DPA

University of La Verne: 1990

This research examined job satisfaction and satisfaction with implementation processes during computer conversion to perceived managerial involvement in decision-making about computerization and participation in a formal, introductory computer training program. The literature examined socio-technological, planned change, decision-making theory in the computerized office, job satisfaction, and computerization and the work of managers. The study emphasized the role of a formal, introductory training program intervention. A review of organizational computer training completed the section to identify how companies can be successful in promoting agreement of the nature of, problems inherent in, and ways to effectively implement computer usage early in the conversion.

The research involved a quasi-experimental case study of management strategies in the initial phases of computer conversion. Six research questions guided this study:

1. Will there be a difference in job satisfaction levels on the Minnesota Satisfaction Questionnaire between managers who perceive themselves as more involved in the

decision-making processes about computer implementation and those less involved?

2. Will there be a difference in satisfaction with computerization implementation levels on the Automation Satisfaction Questionnaire between managers who perceive themselves as more involved in the decision-making processes about computer implementation and those less involved?

3. Will job satisfaction levels on the Minnesota Satisfaction Questionnaire of managers computer trained in a formal, introductory computer program be higher those not trained?

4. Will satisfaction with computerization implementation levels on the Automation Satisfaction Questionnaire of managers computer trained be higher than those not trained?

5. Will job satisfaction levels on the Minnesota Satisfaction Questionnaire of managers who perceive themselves as more involved and computer trained be higher than those less involved and not trained?

6. Will computer implementation levels on the Automation Satisfaction Questionnaire of managers who perceive themselves as more involved and computer trained be higher than managers less involved and not trained?

The population included managers from five business offices at a large multi-national, defense corporation in Southern California. In-house and outside trainers were included. Pre-, posttest design used the Minnesota

Satisfaction Questionnaire - Short Form and the Automation Satisfaction Questionnaire. Descriptive analyses were conducted on an Open-ended Questionnaire for Management and a Trainer Survey. Parametric statistics using SPSS-X Rel. 3.1 for VAX/VMS calculated Analysis of Variance (ANOVA), Cronbach's Coefficient Alphas and the Pearson Correlation Coefficient, r. Significant levels at $p < .10$, .05, and .01 were used in testing the hypotheses. Dependent variables included perceived decision-making involvement in the computer implementation processes and participation in a formal, introductory computer training program; independent, variables included job satisfaction in general and satisfaction with the computer implementation processes.

The central findings of the study were:

1. Managers who perceived themselves as more involved in the decision-making processes about computerization made higher job satisfaction and computer implementation level gains on both the Minnesota Satisfaction Questionnaire and the Automation Satisfaction Questionnaire than those less involved.

2. Managers who received computer training made higher job satisfaction and computer implementation satisfaction level gains on both the Minnesota Satisfaction Questionnaire and the Automation Satisfaction Questionnaire than managers not computer trained.

3. The interaction between perceived involvement and computer training was not significant on the Minnesota

Satisfaction Questionnaire and only marginally significant on the Automation Satisfaction Questionnaire.

Recommendations included:

1. Replication of the study in organizations where governmental regulations require documentation

2. Longitudinal research to examine detailed accounting of influencing factors

3. Evaluation of other computer training methodologies during a conversion, and

4. Investigation of the effects between supportive departments not computerized with supportive computerized departments.

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DEDICATION

To Ernie, David Matthew, Andrea Michal,
Rose and Hyman

-- the best family in the world ...

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To my friends in the Orange County Cluster
University of La Verne
Doctor of Public Administration
1986 - 1990

CHAPTER I

INTRODUCTION

Today, the widespread use of microcomputers and terminals and the addition of text processing, database facilities, spreadsheets and word-processed documentation by shared computers has extended the range of activities which support computing. Kling (1987) suggested that those computing arrangements which can support management and the general office in writing, data filing, processing, communication support and decision making are and will continue to be high priority items with substantial capital investment. Hardware devices, software systems and applications programs, and the humanware training to support computer implementation will be critical items. For many companies computerization is seen as a major method to maintain accountability, raise productivity and, thereby, profitability--computing provides a key to attaining the competitive edge. Moran (1982) documented productivity improvements directly attributable to office automation. Lucas (Krepps 1986) compared the installation of office automation systems and factory automation systems and stated that office productivity during the 1970s had increased by only 4 percent while factory productivity had risen 85 percent over the same decade.

According to Silvestri and Lukasiewicz (1988) in the Bureau of Labor Statistics report, "A Look at Occupational Employment Trends to the Year 2000," about 50 percent of the North American work force are in white collar occupations; of these about 40 percent work in offices. The authors projected that over 50 percent of the twenty million new jobs proposed by 2000 will be white collar jobs within managerial, professional, technical, sales and clerical categories. It is estimated that about 7 million personal computers and 300,000 multiuser systems were installed by early 1985. If one considers that up to ten people used each multiuser system, there were terminals or microcomputers for about ten million people or 20 percent of the white collar work force. These numbers are even more staggering when considering that many terminals and microcomputers are on a time-share system, where additional users can link into the system.

In a 1987 study by the California State World Trade Commission, it was noted that California's sixth largest service sector exporter was data processing lagging behind tourism, construction, aviation, entertainment and maritime categories (Los Angeles Times 1987), creating revenues between $600 million and $1.4 billion. Even more remarkable is that several experts had forecasted that by the year 2000, 80 percent of the United States work force will depend on this category to carry out their daily job functions.

This study examines the extent to which computerization may be a significant catalyst in changing managerial work organization and work life, decision-making processes and the ways conversion can be supported so a clearer picture of how companies can successfully implement computerization could emerge. The results could promote agreement on the nature of, problems inherent in, and ways to effectively implement computer usage early in the conversion process and point out the importance of identifying well thought out training interventions.

The $10 billion, multi-national corporation under study included four umbrella divisions in the United States and six foreign countries including Italy, Sweden, France, England, The Netherlands, and Federal Republic of Germany. Approximately twenty-five thousand employees supported a variety of services and products. In 1988, its operating revenues exceeded $12 billion. This study examined the largest division of the corporation located in an urban area of Southern California with a total of seven thousand employees. Efforts to reduce expenses and increase quality and services led to a decision to establish an infrastructure to support computerization in most departments of the division. Those systems included large mainframes and supporting local area network arrangements to engineering computer-aided stations and basic office systems with personal computer or terminal work stations.

large mainframes and supporting local area network arrangements to engineering computer-aided stations and basic office systems with personal computer or terminal workstations.

Many problems in the implementation processes are common to all large companies installing computerized equipment and/or modifying automated work functions. One area which needs further investigation is how managers perceive their involvement in these changes as they transition from a manual, labor-intensive work mode to an automated system using computers; and, how the introduction of a computer training program affects their perceptions of job satisfaction and satisfaction with the implementation processes during the implementation.

As there are limited scholarly research and significant journalistic accounts conducted at the supervisory level and above which characterize the socialization and decision-making processes at these levels, this research will stand as to document how managers operate during the initial phases of computerization.

Significance of the Study

Computing was embraced by United States business and industry in the early 1980s as one way to reverse or at least stabilize declining revenue due to strong external competition from abroad along with tightening internally competitive markets (Sheets 1988). Computing may be the most significant technological innovation in white collar

workplaces in the 1980s and beyond (Kling 1987). This impact will have a significant effect on the manager. Especially notable will be changes in the manager's perception toward job satisfaction and satisfaction with the processes occurring during the implementation; a leading question is how they will involve themselves in the decision-making processes during conversion and, participate in special interventions, such as formalized training program to support these processes.

The technical tools to aid the tremendous increases in processing and communicating of information are available. Research indicates that by using computer-based applications alone, the potential of increasing management's productivity is raised an average of 15 percent and that of clerical staff many times 15 percent (Poppel 1982). It is estimated that office operations costs rise faster than any other segment within the total business spectrum, reaching annual increases between 12 - 15 percent (Connell 1981). The literature further suggests that a potent way for businesses to deal with this cost problem is to focus on improving the productivity of the decision-making agents within the organization, especially at the managerial level (Silvestri 1988).

The massive thrust to computerize the American workplace requires extensive research into the methodologies involved in managerial decision-making and the relationship of subsequent interventions selected to promote its

making processes when organizing computer-based work tasks and projects. Since many top officials see computing as a direct means of increasing productivity and bottom-line performance this information should be especially significant.

2. Assist top administrators, managers and planners in preparing the design of additional support interventions such as formal, introductory computer training programs as an intervention tool to meet the requirements of converting to computers, and

3. Help familiarize top administrators in preparing managerial level employees to involve themselves in the change processes during computerization

In summary, the findings of this study should result in formal recommendations to better prepare managers during the initial phases of computer implementation, aid managers in identifying and understanding some aspects of the technical and social processes involved in changing from a manual, labor-intensive work mode to a computerized one, stand as a careful description of the varieties of managerial work at a particular time and place, and add to the growing body of research on training programs to support computerization.

General Problem Statement

In today's workplace, the most widespread communication technology is computerization. The personal

computer (PC) or microcomputer, the computer terminal, the dedicated word processor, the mainframe system, Local Area Network (LAN) and Wide Area Network (WAN) systems have become key elements in information literacy for major businesses and industries. There are problems inherent in changing from a primarily manual and labor-intensive work organization to a computerized work scheme. It is suggested that the ways managers make decisions and implement mechanisms to support the change are directly related to the successful operation of the company. Research strongly indicates (Blau et al. 1976) that studies using comparative analysis of groups before and after computer conversion need careful planning:

> Studies of the impact of computers on . . . structure and decision making are following a course similar to that taken by research on production technologies, with impressionistic observations preceding more systematic comparative efforts (21).

The literature convincingly suggests that the manager and the officer worker need a planned training intervention to effectively implement new computer-based systems (Goldstein 1980; Helgott 1988; Huszczo, Blanchard and Camp 1983).

Computing rapidly emerged as an important but little understood function of organizations primarily in response to the changes in computer hardware advances, better software designs and increased functionality for the workplace. There has emerged evidence of tremendous increases in the amount and rate of information produced by

today's work force. Understanding the mechanisms to support the manager and office worker during development of new computer applications programming, overwhelming revisions to existing applications programs, and scores of enhanced hardware and peripheral devices for greater ease of computing has been slow in coming (Kauffman 1987). To continue the residence of computerization in the workplace, administrators will need to look carefully at key elements which are essential for the manager during increased information requirements--decision making and training.

A major problem area exists in defining the work environment during the initial phases of computerization. In fact, studies indicate that managers are overwhelmed, confused and most importantly undertrained in the necessary skills to operate the new equipment and perform the needed operations to carry out work requirements (Kerber 1983). Progress in humanware activities to support computerization has not yet caught up with hardware and software advances. It is clear that by the further study of decision-making processes and the ways conversion can be supported, especially through training interventions, a clearer picture of how companies can successfully implement computerization will emerge. This will promote agreement of the nature of, problems inherent in, and ways to implement effectively computer usage early in the conversion process and point out the importance of identifying a well thought out training intervention (Goldstein 1980; Raymond 1988; Hubbarat 1983).

Research on the difficulties groups experience in changing from a manual to a mechanized one indicates that employee attitudes are strongly affected by the open communications and support between management and non-management during the change and have much to do with how computerization is viewed or perceived and how well it works (Blau et al. 1976).

Purpose of the Study

The purpose of this study was to profile current perceptions of the roles and responsibilities of managers involved in the implementation phases of computer conversion in a large division of a multi-national corporation in Southern California and make recommendations for implementing technology and work. Furthermore, the results will assist administrators in reviewing current policies and procedures regarding management's decision making regarding the use of computers and provide data to support changing or augmenting their activities to better match those found in successful sites.

The survey questionnaires, open-ended questionnaire and trainer survey along with the review of current literature provide the basis for the analysis and comparison of the changes in work organization when managers undergo a planned change in their worksite: how being involved in the processes and participating in a formal introductory computer training program affects managerial job

satisfaction and satisfaction with the implementation processes.

The study addresses three major areas: (1) the perceived involvement of managers in the decision-making processes of computerization in relationship to satisfaction with their job and the computer implementation processes; (2) the effect of a formal, introductory computer training program on managerial job satisfaction and satisfaction with the computer implementation processes; and, (3) the interactive effect of perceived involvement and computer training on managerial job and implementation process satisfaction.

Design of the Study

The greater Los Angeles basin is an area often referred to as the "hub" of the high-technology defense industry. The region provides a rich source of offices which are undergoing various stages of change involved with technology implementation, especially computerization. The selected site had a diversity of work groups which included both technical and non-technical business-related functions; and, was in the initial stages of implementing a Division-wide computerization project supported by an introductory, formal training program.

The population included managers from five business offices at a large multi-national defense corporation in Southern California. In-house and outside trainers were

included. The pretest and posttest design used the Minnesota Satisfaction Questionnaire - Short Form and the Automation Satisfaction Questionnaire. Descriptive analyses were conducted on an Open-ended Questionnaire for Management and a Trainer Survey. Parametric statistics, using SPSS-X Rel. 3.1 for VAX/VMS calculated Analysis of Variance (ANOVA), Cronbach's Coefficient Alphas, and the Pearson Correlation Coefficient, r. Significant levels at $p < .10$, .05, and .01 were used in testing the hypotheses. Dependent variables included perceived decision-making involvement in the computer implementation processes and participation in a formal, introductory computer training program; independent variables included job satisfaction in general and satisfaction with the computer implementation processes.

Assumptions, Delimitations, and Limitations

Assumptions

The following assumptions may exist:

1. Computerized equipment in the workplace is an accepted and integral part of office operations and will dramatically increase through the year 2000.

2. Companies will emphasize better ways to promote the work of managers with computers from daily routine business operations to sophisticated decision-making transactions using expert- and other higher-order language systems.

3. Job satisfaction, satisfaction with the computerization process and decision making will continue to be significant factors in job performance.

4. Companies will become more adroit in supporting management's use of computer-based equipment and will place more emphasis on computer training programs.

5. ANOVA is an appropriate strategy to use with the population of this study.

Delimitations

Due to the nature of computer training programs, the diversity of hardware and applications programs needed for work operations in the field, and the growing concern for support of humanware issues, the following delimitations and limitations may exist:

1. This study is limited to populations of managers in a large defense company and no attempt is made to generalize the results to other populations.

2. A mixed array of hardware devices was used: approximately 60 percent were Apple Macintosh models with approximately 40 percent IBM-compatible AT or XT models; other hardware devices were also included such as terminal-connected mainframe devices, etc.

3. A mixed array of software applications programs was used due to the variety of hardware devices: (1) Microsoft Excel and Symphony 5.0 for spreadsheets; (2) Apple

MacDraw for graphics; and (3) Wordperfect 4.2 and 5.0 and Microsoft Word for word processing.

Limitations

General limitations included:

1. Although sites were randomly selected, subjects were not always assigned randomly but were often purposely selected on the basis of the current or projected involvement with computer-related job tasks within their department.

2. Management respondents were unable to address many questions due to their involvement in different phases of implementation processes or lack of knowledge of a particular aspect of computerization.

Definition of Terms

For the purpose of this study, the following definitions are used:

Automation Satisfaction Level. Satisfaction a manager perceives from using a computer or desktop computing device including general and specific aspects of computer-related support during implementation, changes in job performance and resulting quality of work factors; measured by itemized responses on the Automation Satisfaction Questionnaire (ASQ).

Computerization. Synonymous with desktop computerization; a purposeful social and technical "intervention" strategy using the personal computer (PC),

supporting software application programs and systems, and humanware interventions; a way of shaping information and work environments with computer equipment and social practices.ü

Decision-Making Involvement. How a manager perceives him/herself as more or less involved in the decision-making processes about computer implementation at the managerial level including identification, selection and implementation of computer hardware, software, computer training, facility support, financial requirements and other computer-related tasks as defined by selected items on the Open-ended Questionnaire for Management including items 2, 4a., 4b., 4c., 4d., 4e., 5 and 8.

Desktop Computerization. Social process for organizing access to information and other resources through desktop computing; a computer-based service using a variety of equipment and services which are locally available to workers at all levels on or near their primary desk/ workplaces/workstations. Included are the following five modes of computing (Kling 1989):

a. Computer Terminal. Device attached by wires or a modem to a host computer where software systems reside (examples: DEC VT 100 or IBM 3270).

b. Microcomputer. General purpose workstation which functions as a stand-alone piece of equipment with its own software on floppy disks or a hard disk; multifunctionally used for word processing, financial

analysis, or other functions (examples: IBM PC/AT or XT, an Apple Macintosh, or a general purpose workstation--Apollo Domain).

c. Dedicated Word Processor. Device designed specifically and solely dedicated to the single function of word processing (examples: IBM Displaywriter, Wang Word Processor).

d. Local Area Network (LAN). Electronic net or network which connects several microcomputers so they can share files and software systems (examples: Novell, MacTalk, Ungerman Bass).

e. Computer-based Reports. Reports received on a consistent or ad hoc basis contain data manipulated by computer systems which are then put into hard copy (paper) format to be used by various workers (examples: department or divisional reports, accounting and Manufacturing Resources Program (MRP) reports).

Formal, Introductory Computer Training Program. An instructor-led formally conducted computer training program for managers using basic software applications programs for the Apple Macintosh and IBM-compatible personal computer (examples: introductory spreadsheets, basic word processing, introduction to graphics, etc.)

Humanware. Activities supporting human involvement when using automated or computerized devices (examples: ergonomic treatments, social work organization, training support, etc.).

Manager. Technical or professional worker in an office at a supervisory level or above who makes key decisions and/or allocates resources.

Job Satisfaction Level. Satisfaction a manager perceives from working on the job including the chance to do different tasks, tasks which use one's abilities, freedom of judgment, changes to working conditions, feeling of accomplishment, directing others, etc., as defined by items on the Minnesota Satisfaction Questionnaire - Short Form (MSQ - SF).

Research Questions

To determine the relationships that may exist between job satisfaction and computerization implementation process satisfaction with perceived managerial involvement in decision-making processes about computerization and participation in a formal, introductory computer program, the following questions were addressed:

Question 1.

Will there be a difference in job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form between managers who perceive themselves as more involved in decision-making processes about computerization and those who perceive themselves as less involved?

Question 2.

Will there be a difference in satisfaction with computer implementation levels on the Automation Satisfaction Questionnaire between managers who perceive themselves as more involved in decision-making processes about computerization and those who perceive themselves as less involved?

Question 3.

Will job satisfaction levels on the Minnesota Satisfaction Questionnaire of managers computer trained be higher than those not computer trained?

Question 4.

Will satisfaction with computer implementation levels on the Automation Satisfaction Questionnaire of managers computer trained be higher than those not computer trained?

Question 5.

Will job satisfaction levels on the Minnesota Satisfaction Questionnaire of managers who perceive themselves as involved in decision-making processes about computerization and computer trained be higher than those not involved and not computer trained?

Question 6.

Will satisfaction with computer implementation levels on the Automation Satisfaction Questionnaire of

managers who perceive themselves as more involved in decision-making processes about computerization and computer trained be higher than those less involved and not trained?

Research Hypotheses

To determine the relationships that may exist between job satisfaction and satisfaction with computer implementation processes with perceived managerial involvement in decision-making processes about computerization and participation in a formal, introductory computer training program, the following research hypotheses were raised:

Hypothesis 1.

Managers who perceive themselves as more involved in decision-making processes about computer implementation will have higher job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form than managers less involved.

Hypothesis 2.

Managers who perceive themselves as more involved in decision-making processes about computerization will have higher computer implementation satisfaction levels on the Automation Satisfaction Questionnaire than managers who perceive themselves as less involved.

Hypothesis 3.

Managers who are computer trained will have higher job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form than managers not computer trained.

Hypothesis 4.

Managers who are computer trained will have higher computer implementation satisfaction levels on the Automation Satisfaction Questionnaire than managers not computer trained.

Hypothesis 5.

Managers who perceive themselves as more involved in decision-making processes about computerization and computer trained will have higher job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form than managers less involved and not trained.

Hypothesis 6.

Managers who perceive themselves as more involved in decision-making processes about computerization and computer trained will have higher satisfaction with computer implementation levels on the Automation Satisfaction Questionnaire than managers less involved and not trained.

Summary

In summary, this research attempts to examine job satisfaction and satisfaction with the implementation

processes associated with computer conversion in relationship to managerial perception when involved in decision-making processes about computerization and when participating in a formal, introductory computer training program. The assumptions, delimitations, and limitations to the study are presented. Terms used in the research are operationally defined to clarify their usage in the research. Six research questions and research hypotheses are forwarded for investigation. Additionally, a table (table 1) of predicted outcomes between the dependent and independent variables is proposed where experimental groups are predicted to attain higher satisfaction level gains than control groups on both instruments for all main and interactive effects.

TABLE 1

PREDICTED RESULTS OF THE EFFECTS OF COMPUTER TRAINING, PERCEIVED INVOLVEMENT, AND THE INTERACTION OF COMPUTER TRAINING AND PERCEIVED INVOLVEMENT ON JOB SATISFACTION AND COMPUTER IMPLEMENTATION SATISFACTION

	Dependent Variables Satisfaction:	
Independent Variables	Job	Computer Implementation Processes
<u>Perceived Involvement</u>		
Hypothesis 1		
E	E > C	
C		
Hypothesis 2		
E		
C		E > C
<u>Computer Training</u>		
Hypothesis 3		
E		
C	E > C	
Hypothesis 4		
E		
C		E > C
<u>Computer Training and Perceived Involvement</u>		
Hypothesis 5		
E	E > C	
C		
Hypothesis 6		
E		
C		E > C

Note: E = experimental groups; C = control groups

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Although several classical studies stand as the basis for depicting the affects of technology on workers' social structure, there are few current formal research studies which have investigated the social impact of implementing the greatest singular technological force changing the operation of today's offices--computer-based equipment.

Subsequently, this study will involve an historical review in those areas supporting computerization and its social aspects in the workplace: socio-technical research, planned social change, decision-making theory, computerization in the workplace, worker attitudes toward computerization, job satisfaction, motivation theory, and computer training. The infrastructure will provide a framework for analyzing how people adapt to and learn the necessary skills required in the transition from manual, labor-intensive work to computer-based operations.

Socio-technical Studies

The founding study in socio-technical systems was Trist and Bamforth's (1951) longitudinal investigation of twenty workers in various mining occupations. Small

independent working pairs where one, two or up to eight individuals were assigned formed the social work pattern prior to mechanization. The work method was by hand and work was done on a series of short mine wall faces. Many small groups were united by kinship ties. Over the years, stable relationships developed often extending beyond the work setting. Each group was responsible for the complete coal-getting task. No management assignment was made because of the mining conditions of darkness and separation. Leadership and supervision were internal, production was adjusted by the team to fit the individual worker's physical conditions, namely age and stamina. This responsible autonomy was characterized by wholeness of work tasks, multiplicity of individual skills and self-selection of tasks within the group (Trist and Bamforth 1951).

With the introduction of a new technology the Longwall method, different work units were required because of the introduction of mechanical conveyors. Now, groups of 40-50 men were assigned to one of three shifts; each group functioned in only one role. Although close interdependence was required, workers were now rotated with mistakes from one shift carried over to the next. The accumulated stress of bad conditions and bad work left by others contributed to widespread mental and physical disorders (Trist and Bamforth 1951). A norm of low productivity existed because resolution of problems were beyond the worker's control. To counter these conditions, three types of defenses arose:

informal small groups were formed to perpetuate loyalties, individualism was fostered to counter isolation and loss of control, and withdrawal in the form of absenteeism became prevalent as a form of defiance of the system and as a means of prolonging work-life at the coal-face (Trist and Bamforth 1951). The author's concluding recommendations in the coal mining scenario are applicable to current socio-technical activities in that management should consider creating a social whole as well as a technological one when considering overall work structure; and, that management should consider training workers for more than one role, thereby allowing flexibility in the work place to increase one worker's tolerance for another's work function. They concluded that this would result in the rebuilding of work teams (Trist and Bamforth 1951).

The second study by Cooper and Foster (1971) suggested three critical dimensions of the work structure that must be considered when viewing man-machine interface systems:

1. Role differentiation--the degree of task variety in a given job which offers challenge and thus affects individual motivation.

2. Task dependence--the degree to which two or more people work together or share a limited common pool of services, materials or tools; this "convergent dependence" is vulnerable to disruption.

3. Goal dependence--the existence of mutual or common goals that increase the likelihood of reciprocal supporting behaviors, particularly valuable in work places susceptible to disruption (Cooper and Foster 1971, 469-470).

The authors conclude that improved worker attitudes and productivity levels result when there is an element of choice in redesigning work systems. Greater individual work satisfaction results when teams are self-selected and the group task is allowed a variety of skills. They further suggest the term "psycho-technical units" to describe the individual's work-relationship structure rather than "socio-technical units" which refers to the social group's work structure:

> Man is a proacting, self-realizing organism capable of considerable achievement given the right environmental conditions but who becomes refractory when placed in a dependency relationship and when forced to function at a fraction of his capacity. Therefore, in considering the "fit" between man and machine, it is more constructive to think of how they can complement each other.
>
> Man performs optimally when he knows he can control environmental contingencies, when he lacks such control, his performance becomes correspondingly degraded . . . but no matter how well we relate man to machine, unless he is properly motivated he will not function very effectively as a complement to it (Cooper and Foster 1971, 470).

The third classical study by Billings, Klimoski and Breaugh (1977) examined the affect of a technological change in a hospital's meal assembly line on job characteristics, worker satisfaction and degree of absenteeism. A fifty-foot long conveyer belt replaced steam tables and delivery carts. Workers knew of the change and participated in a committee

that planned and coordinated the implementation. Several weeks before the installation, workers practiced their assigned roles on the new equipment in a nearby gymnasium. The only changed variables were the operations and rigidity of work flow which tended to reduce task variety and task identity. Also, there was no longer any direct contact with the patients. According to the authors, this created increased task interdependency, time pressure and closeness of supervision (Billings, Klimoski and Breaugh 1977). The authors measured seven work structure variables: job importance, task variety, mobility, task interdependence, time pressure, task effort and feedback. The major variables of the study, closeness of supervision, job satisfaction, and absenteeism showed no change over the course of the study. Several factors that may have affected the results were cited as a "well managed and timely change," "informed and involved employees" and that the "new equipment was perceived as being desperately needed." In summary the authors concluded that:

> Effects may begin with the identification of the need for change and the knowledge of the impending change, continue through the preparations and the actual change, and end only after a period of adjustment (Billings, Klimoski, and Breaugh 1977, 338).

A recent case study by Kling and Iacono (1984) involved a company which designed, produced and marketed dot matrix line printers for the mini-computer and business computer marketplace. During the late 1970s the company established itself in the marketplace. During the 1980s the

firm grew rapidly and became a major producer. Early on, the manufacturing staff recognized problems building inventory and proceeded to convince management that a complex computerized inventory control system (MRP) would solve the problems.

The company became more competitive and its business strategy changed to include customized printers. Soon, an IBM System 34 minicomputer was purchased. Extensive, informal "behind-the-scenes" activities were initiated to help create more accurate data. Staff was formally educated in the importance of timely updating or transactions and daily manual inventory counts. To achieve 79 percent accuracy required consistent training for stockroom staff. For over three years, seminars, workshops, inside meetings and informal/formal group discussions evolved. Managers devised ways to produce acceptably accurate data. The stockroom manager's supervisor monitored his performance; material managers instituted manual cycle counting schemes whereby stockroom clerks regularly rotated the counting of specific parts in stock. All stockroom employees were trained in all stockroom functions thereby strategically enlarging their jobs and increasing their skills. Work became more disciplined as the control program was woven into the firm's operations. Work was restructured by increasing knowledge about system usage, expanding jobs and increasing awareness of constraints imposed by the interdependent nature of the system. One department work

group was under continuous pressure from another department work group to improve the accuracy of data which led to new work practices and tighter social controls.

However, not every group complied with these pressures. It was decided within a small management group that a new system was needed to replace the original system. There was difficulty hiring staff with appropriate development skills in its programming language, the conversion took longer than originally anticipated and morale sank to an all time low. Numerous problems seemed unsolvable, support for the system was not locally available and users were tired of waiting indefinitely to satisfy their needs.

Although staff felt they desperately needed a replacement, because of the lack of worker involvement in the decision-making processes, poor timing, and the continued lack of responsiveness of managers, the conversion failed.

Several interesting alternative microcomputing arrangements developed as a consequence. Several departments obtained microcomputers or managers purchased their own microcomputers and developed their own small applications. Over one million dollar's worth of "personal" microcomputing equipment was now dispersed throughout the organization. By 1983 management had seized control of these devices and placed them under central oversight and regulation.

The authors suggested that the intricacies of the social relationships which facilitate implementing cross departmental computer systems are central to examining replacement computerized system and that we know little about the role and shape of computerized systems which are implemented in organizational terrains which are fraught with conflicts, large or small.

Most significantly the authors question if computerization denotes the whole package of equipment and procedures that accompany an automated strategy, or if computerized systems are only equipment ensembles. They suggest that this complicates matters further in that attributing an outcome primarily to a focal computing resource change depends upon the definition of computerization. They go on to suggest that:

> The leverage provided by computing technologies cannot be directly inferred from characteristics of the technology alone; its integration into a particular work organization or social order explains important variations in the actual leverage provided (Kling 1987, 40).

In summary, these classical and modern studies stand as clear representatives of socio-technical research. The focus is on how technology affects workers' social structure and investigates the social impact of implementing mechanical or automated systems into a well-defined socially structured unit previously dependent upon hand operated tasks and how technological advancement forces a change in socialization factors of individual group members. These

studies are applicable to conditions in today's offices. They provide an infrastructure/framework for investigating how people react to, adapt to and subsequently make decisions required for transitioning to computer-based operations.

Planned Change

Given that change will occur, and is in fact necessary, much research has been directed to this topic in an attempt to understand its dynamics.

Historically, change strategies are divided into three categories: empirical-rational, normative-reeducative, and power-coercive. Assuming that man is rational and will follow rational self-interest, the empirical-rational approach is used in the workplace in personnel selection and replacement and systems analysis of staff and consultants. The normative-reeducative approach assumes that intellectual change must be supported by sociocultural norms and that individual attitudes and values must be considered as an integral part of change strategy. In the workplace, this approach is used in improving the problem-solving abilities of the system and releasing and fostering growth in persons who make up the system to be changed. The third approach, power-coercive is found in legitimate power or authority requiring compliance of those with less power. Within the workplace these changes are manifested by political institutions using strategies involving nonviolence and

change through the recomposition and manipulation of the power elite (Zaltman and Kalter 1972).

Martindale (1972) suggests that the boundaries of the social system are continually changing as the result of material production development of tools, weapons, and technical processes. As the technical aspect of the culture grows, it forces changes upon the social structure which is resistant and much slower to change, thus lagging behind and creating several processes of change such as education, training, orientation, guidance, indoctrination and therapy, all of which are well suited for investigating the work environment. Kaufman (1972) defines directed social change as "a planned attempt to modify the attitudes and behavior of target individuals or groups by agencies of change, seeking to introduce ideas or innovations into a social system to achieve the goals of the agency or constituency" (22).

Zaltman, Florio and Sikorski (1977) theorize that barriers to change arise from dynamics within the social structure, the organizational structure, individuals' psychological make-up, competing forces, or from the very nature of the innovation. Resistance, they suggest, is an ever present phenomenon and one necessary and healthy to the organization by providing useful information about resources, constraints, attitudes, values, norms, and external relationships which can help the change agent in selecting appropriate strategies.

A mathematical model for formulating the probability of adopting an industrial innovation was developed by Slevin (1972). House (1967) further attempted to demonstrate this relationship between costs, rewards, current success levels or anticipated levels and formulated an employee innovation zone, that area where an employee can be moved if the organization considers the influence of the costs versus the rewards as appropriate:

$$Pn - Ps > C / R$$

where: Pn = the probability of success of the new thing

Ps = the probability of success of current strategies

C = the costs

R = the rewards

By manipulating the variables of C (costs,), R (rewards), and Ps (current success levels), employees can move from one innovation zone to another (House 1967).

Much of the literature on change focuses on how individual change affects the organizational and cultural environment. Group influence on individual change has been extensively referenced because of its relevancy to changes within the group-oriented social context of the workplace.

In Creating Social Change, Zaltman and Kalter (1972) point out that the group to which one belongs sets the standards for an individual's behavior. When instituting change, a level of influence can be achieved through group dynamics within the environment. Additional studies are

cited where productivity was greatly increased by focusing on the organization of the work-group rather than the individual. An environment where participants in training are treated like team members produced more enduring changes because of the continuous support and reinforcement for the member (Allen and Silverweig 1975).

Zaltman and Kalter (1972) further suggest that groups enter the change process in three major ways: (1) as a medium of change; (2) as the target of change; or (3) as an agent of change. When a group is the major sphere of influence it acts as the "medium of change"; when a group has a powerful influence exerted upon it, it becomes the "target of change"--when the standard of the group, the style of leadership, emotional environment or stratification of cliques and hierarchies is changed. And, lastly, the group may act as an "agent of change" when organized efforts such as employee associations, action groups, labor unions or other internal or external groups influence the group.

To better understand group dynamics and its role in planned change, the author developed eight principles of change. The group which is to act effectively as the medium of change would have the following characteristics: Principle 1 states that those people who are to be changed and those who are to exert influence for change must have a strong sense of belonging to the same group. Principle 2 states that the more attractive the group, the greater the influence on its members. Principle 3 states that the more

relevant attitudes, values and behaviors are to the basis of attraction of the group, the greater the influence the group exerts upon them. Principle 4 states that the greater the prestige of a group member in the eyes of the other members, the greater influence s/he can exert. Principle 5 states that changing individuals or subparts of the group results in making them deviate from the group norms which results in strong resistance.

The group which acts effectively as a target of change would have the following characteristics: Principle 6 states that strong pressures for changes within the group create a shared perception of the need for change, making the source of pressure for change internal to the group. Principle 7 states that information relating the need for change and consequences of the change must be shared by all relevant group members. And, lastly, Principle 8 states that changes in one part of the group produces strain in other related parts which is reduced only by eliminating the change or by bringing about readjustments in the related parts (House 1967).

In summary, this section investigated the impact of planned change and how technological advancement affects the dynamics within the social structure, the organizational structure, individuals' psychological make-up, competing forces, and the very nature of the innovation. An historical look at change strategies defines the three most common categories--empirical-rational, normative-

reeducative, and power-coercive. Directed social change is defined as a planned attempt to modify the attitudes and behaviors of target individuals or groups by agencies of change, seeking to introduce ideas or innovations in to a social system to achieve the goals of the agency or constituency. This infrastructure will provide a framework for investigating change and its characteristics and how employees adapt to it during the transition to computer-based operations.

Decision-Making Theory

It is difficult to cope with ordinary problems that cannot be understood by a deductive, linear, cause-and-effect explanation. Our respect for the scientific method, which relies on deduction, has led us to try to solve all problems through local debate. But when we deal directly with ideas rather than sense perceptions, things lose their precision. To understand and deal with what is going on in our environment we need to improve our recollection of events and the precision of our knowledge by reviewing the facts and organizing them in a logical framework. If we are to make decisions that are rational and effective we must participate intensely in the act of understanding the world around us. But with the complexity of social systems coupled with rapidly changing technology, we cannot wait for a full, logical analysis of most situations. We need to

include within our analytic procedures time, space and human behavior to determine the outcome.

Two fundamental decision theories have been identified for organizing knowledge for program solving: the deductive approach and the systems approach. Basically, the deductive approach focuses on the parts whereas the systems approach concentrates on the workings of the whole.

The scientific, deductive theorists analyze natural systems in which they structure a network, look for explanations for the functioning of its parts, then synthesize an explanation for the whole network. Critics of this approach point to the fact that this ignores the feedback mechanisms among the parts and between the parts and the environment that affects the whole system.

Systems theorists have pointed out that we can better understand an entire system by examining it from a general, holistic perspective that does not give as much attention to the function of the parts as to the whole.

Clearly both the deductive and the systems approach contribute to our understanding or complex systems. But, as Saaty (1986) points out, logic, intuition and experience play a major part in everyday decision-making. He goes on to state that employees in the public and private sectors tend to cooperate in defining and structuring problems broadly and richly so that all ideas can be included. But when they need to explain which factors have the greatest impact on the outcome of a decision, not even experts with

the clearest logic can hold fast to their positions in the face of objections. As a result, they are willing to compromise. Thus decisions are based not so much on the clarity of ideas about the amount of information exchanged as on the persistence of some participants in the decision-making process and on that person's ability to persuade others to accept his or her ideas.

People not only have different feelings about the same situation but their feelings change or can be changed by discussion, new evidence, interaction with other experienced people, and new experiences. Usually the outcome is a compromise of many viewpoints involving substantial change in individual attitudes. Our actual decision-making processes have been illuminated by recent studies conducted by behaviorists, psychologists and brain researchers.

Some theorists consider rational thinking as a veneer over human behavior. Much of our action is driven by instinct--patterns woven into the mind, bone and muscle. Although instinct-drive theory describes unlearned patterns of behavior, it does not explain them: sentiment, value, ambition, attitude, taste and inclination are inadequately accounted for in most adult behaviors.

Reason-Impulse Theory explains our actions as driven by rationality based on objective or real criteria. We acknowledge that needs and personal motives drive human behavior, but we contend that we use reason to attain our

goals efficiently and without harm or injury. Through reason we get what we want within the limits of available resources. Critics of this view say that our reason is an abyss of unconscious or barely conscious urges and habits that overwhelm the intellect. They argue that human relationships are essentially governed by irrational, emotional forces with rational appeal playing only a minor role. Actions are based on imitation, habit, suggestion, or other subrational forms of thinking and are rarely due to pure logic. Planned actions are the result of analysis based on preferences as to which objectives are served best --and preferences are strongly influenced by habit and training rather than by rational thinking.

In Dynamic-Field Theory, the influence of environmental factors on human behavior is explored. Humans react to a "dynamic field" of stresses and tensions when they perceive the environment denying or fulfilling the satisfaction of our wants and needs. The hierarchy of human needs that motivate behavior has been examined by Maslow (1954) and others. These needs range from the most basic physiological, safety and security needs to sophisticated self-actualization and aesthetic needs.

The importance of intuition, feeling and experience in human behavior and decision making is further underscored by the findings of brain researchers. In particular, neurobiologists have recently discovered a distinction in the function of the two halves of the neocortex of the

brain: the left is the logical, rational and calculating member, the right is the intuitive, creative and verbally inarticulate half. The verbal half's job is to interpret for ourselves and the world the decisions of its mute brother. Decisions are actually made by the intuitive, not the logical half. The left hemisphere merely arranges and puts into words the insights of the right. Saaty (1986) stated that the qualities we study are simply those we can perceive, and the laws we develop are concoctions of our sense-limited brains.

Because it is possible in complex, unstructured situations to present convincing arguments that have little correspondence to reality, one must apply certain standards to the decision-making processes. A philosopher at Boston University (MacIntyre 1966) has identified four qualities that should characterize a decision-maker's approach to dealing with social issues. They include:

1. Truthfulness by not oversimplifying complexity. Our processes demonstrate that it is easier to consider issues such as computer implementation in a narrow, piecemeal way than to look at all the critical variables, fit them together, and determine their priorities and implications.

2. Justice by evaluating costs and benefits and assigning costs to those who get the benefits. Everyone involved in a decision-making situation should decide whether or not to develop a corporate-wide computer policy

and should have a chance to weigh costs and benefits. The philosopher points out that everyone should have a voice and a vote but also that those who will bear the risks and dangers should have more of a voice and vote than others.

3. Ability to plan for the unknown by calculating changes, determining where they are likely to occur, and deciding which priorities should dictate action. Leaders must plan and deal both with projected futures and with desired and less predictable futures, and

4. Flexibility in adapting to change by planning, implementing, and responding to new conditions, replanning and reimplementing. This is an iterative approach where we can balance immediate needs and short-term solutions with changes stemming from our initial attempts.

Managerial Attitudes Toward Computerization

Morgan (1989) suggests there are obvious benefits of an "on-line" computerized communication system that must be considered in the development of managerial competencies. He goes on to point out that the system can exert both positive and negative effects:

> The new technology makes decision making real time. Increasingly, managers have to make decisions now! It changes the way they do business. They can't procrastinate. They can't say they weren't in or didn't see a particular memo, because when they log into their mail system, the situation is irreversible. There is no excuse for not being totally current.
>
> Even when one is away from the office, there is no excuse for not logging in and collecting messages or reading the latest draft of a report; the procrastinators are much more easily identified by the

> new technology, with twenty-four hours (to make decisions), not the usual six weeks (Morgan 1989, 107-108).

Processes associated with computerization have many implications for managers, especially in terms of the ability to make quick decisions on specific issues while retaining the broader picture in view. They have implications for managerial accountability; managers must learn to deal with issues that they might otherwise avoid. There are also implications for the politics of decision making. As Marien (1983) reports, computerization creates a change in the timing of decision making. Timing can be vital in the exchange of information; it adds new dimensions to information exchange; it speeds up and broadens communications in a positive way and adds to the "political" complexity of the manager's role.

He further suggests that it is executive and managerial attitudes which create the environment for organizational responsiveness to change. Managers can do much to symbolize and communicate key values and attitudes necessary for success, and the technology can itself be used for this purpose and cites that executives who have direct experience with that technology described how quickly it becomes an important part of the office culture. He goes on to suggest that managers must use the technology to automate tasks and work processes, not just to automate jobs. Managers must step back, rethink the whole process and see

how the technology can be used to create new modes of work organization.

Otway and Peltu (1983) and Drucker (1980) suggest that computerization has the capacity to transform organizations into "electronic villages" where employees have a strong sense of interconnection and are active contributors to the community. They argue that these managers responsible for introducing the technology must carry with them a particular attitude toward change and technology that will facilitate this transformation--an ethos that encourages the "soldier" or literate office worker to harness the transformative impact of the technology by finding new ways to make effective contributions to their organization.

Ellison (1988) points out that personal computers can be a valuable tool for the art of management, adding authority to ideas, keeping projects on track and assisting managers even in intensely human endeavors. She defines computer-based programs for management under five categories: (1) decision-support programs; (2) groupware; (3) electronic mail; (4) project management; and (5) vertical support programs. She suggests that managerial decision-support programs can clarify problems using desktop computerization for "what-if" analyses, using spreadsheet formats to help management teams test the validity of their solutions. For issues requiring more than simple solution, innovative decision-support and project-management software

identifies options and lists the pros and cons after weighing each variable. Management then weighs each variable in relationship to its importance with goals outlined in the organizational framework, and the program calculates a score for each option. Initial agreement by all participants about the assumptions must first be met before a scenario is created. With the use of groupware programs using a local area network or LAN, managers can promote electronic conferences and reduce the need for organizing costly and time-consuming face-to-face meetings. Additionally, managers can use groupware products to circulate questions to all appropriate network users either close or at far distances, solicit ideas and recommendations, and circulate responses for review or action with greater accuracy and preciseness and within a shorter timeframe. Decisions can be arrived at more effectively and efficiently.

Whether accessed via public telephone (modem) or on the company LAN or WAN (Wide Area Network), electronic mail can be used as a team-building device, allowing managers to communicate directly with one another during working- and off-hours to maximize the response time for decision making.

Project management programs focus on discrete tasks, specific time lines and well-defined activities. By involving a wide and varied range of users with discrete and separate data, managers can better integrate large amounts of seemingly unrelated data into appropriate groupings so

decisions can be made within appropriate and effective timeframes.

Vertical application programs address the needs of line managers who generate reports, analyze labor costs, and make decisions regarding data information from hourly employees. Other management programs include employee and department information and the creation of employee handbooks. Still in the infant stages of development, they may prove to be valuable tools for the decision-making processes because of the great amount of information each stores, thereby having data and information available from wide and varied sources. They furnish data from business, technical, and other operational sources so managers can make quick but well-grounded decisions.

Managerial computer software programs to support decision-making activities are listed in table 2.

Decision-Making Theory in the Computerized Office

The office has been described as a new frontier. No doubt the increase in the cost of office operations has contributed to this conclusion. Nationally, over 50 percent of the costs to operate a business are spent in the office. Of this 50 percent, labor accounts for over three-quarters of the dollars spent. While the costs of office operations are increasing, office productivity has remained relatively unchanged throughout the past twenty years. On one hand, the cost of labor is increasing, while on the other hand the

TABLE 2

COMPUTER-BASED PROGRAMS TO SUPPORT MANAGERIAL DECISION-MAKING WORK TASKS

Program	Recommended Management Uses
Decision Support	
Prism. Palisade Corp. 2489 Elmira Rd., Newfield, N.Y. 14867; 800-432-7475, 607-564-9993.	High-end decision support program to clarify managerial options; establishes assumptions; builds scenarios; identifies pros & cons; weighs variables; calculates score for each option.
What's Best! Personal version network version, Broderbund Software, Inc., 17 Paul Dr., San Rafael, CA 94903; 800-521-6263	Low-end decision support program to clarify managerial options; especially designed to include spreadsheet information to assist managers during meetings with group decision-making.
Groupware	
ForComment. Personal version, network version. Broderbund Software, Inc.	Groupware support program to track information presented during electronic conferencing by individuals and group participants; assists in decision-making processes.
Higgins. Enable Software/ Higgins Group, 1150 Marina Village Pkwy., Suite 101, Alameda, CA 94501; 415-430-8875.	File system tracking information of group communications; personal information manager to organize data for decision-making in individual or group settings; PC fax programs to send messages/files directly from PC to facsimile machines.

TABLE 2--Continued

Program	Recommended Management Uses
Groupware, Continued.	
The Coordinator, Personal version, Network version, Action Technologies, Inc., 2200 Powell St., 11th.Flr., Emeryville, CA 94608; 800-624-2162.	Electronic conferences for immediate decision-making using group interaction and a conversation metaphor.
Syzygy, Personal version, Network version, Information Research, 2421 Ivy Rd., Charlottesville, VA 22901; 800-368-3542.	Personal organizer; multi-level Gantt charts; Activity lists and assignment sheets; primarily used for decision-making, project management activities; supervision of independently working employees.
Wang LAN Office, Per server, Wang Laboratories, Inc., One Industrial Ave., Lowell, MA 01851; 800-835-9264.	Relational database structure built around word processing concepts for use as data retrieval system; used for decision-making integrating inter-department data.
Who-What-When, Chronos Software Inc., 555 De Haro St., Suite 240, San Francisco, CA 94107; 800-777-7907.	Personal information manager to organize data for decision-making activities, in individual or group settings.
WordPerfect Office, Per server, Personal version, WordPerfect Corp., 1555 N. Technology Way, Orem, UT 84057; 801-225-5000	Relational database structure built around word processing concepts for use as data retrieval system; used for decision making, integrating inter-department data.

TABLE 2--Continued

Program	Recommended Management Uses
Harvard Project Manager, Software Publishing Corp., 1901 Landings Drive., P.O. Box 7210 Mountain View, CA 94039; 415-962-8910.	Project management tool which integrates time lines and resources, specific assignments and discrete tasks; customized reporting system; use in decision-making activities.
Project Calc/Resources, Frontline Systems, 140 University Ave., #100, Palo Alto, CA 94301; 800-451-0303	Project scheduling and resource management tool to development times lines and track available resources; integrates spreadsheet formats.
Vertical Applications	
Personnel Policy Expert, personal and network versions, KnowledgePoint, 1311 Clegg St., Petaluma, CA 94952; 800-727-1133.	Database for variety of managerial activities such as decision-making involving cost analyses, project management during integration and development phases, personnel selection, and competitive data retrieval.

cost of automated office equipment is declining (Mitchell, Mach and LaBarre 1987).

Technological advancements associated with computerization and competition within the marketplace are contributing factors to the decline. These facts support the conclusion that the office is indeed a frontier--an area on the threshold of change. At the center of this change is the manager. As Mitchell, Mach and LaBarre (1987) point out, one has only to review some startling facts which represent a sampling of the office environment the manager of today operates in to realize the complexities of today's managerial challenges:

1. An individual whose primary work environment is the office spends approximately 60 percent of the time communicating with others--orally and in written form.

2. More than 25,000,000,000,000 (trillion) pages of paper are stored in Canada and the United States. Managers and other office workers are creating over 1 million documents per minute--that is over 190 million per day and over 47 billion per year.

3. Approximately 90 percent of all information created in the office is distributed within one-half mile, and more than 75 percent is distributed within six hundred feet. Yet fewer than one out of one hundred documents is distributed electronically; rather, documents are created on paper and are distributed manually.

4. Typical internal mail delivery time of hard copy (paper) documents is two to four days, external mail delivery time by the postal service is four to seven days, and electronic delivery of messages is seconds to minutes.

5. A total of one-third of all office costs lies in the preparation, duplication, handling and storage of paper. Approximately 80 percent of the material keyed is repetitive and one out of every four documents is revised. With computerization repetitive material is stored and retrieved whenever needed and revisions are not re-keyed in total.

The work that is done in an office, how it is done, and the equipment used, reinforce the conclusion that the office is a place where change is imminent. Computerization has a distinct role to play in this change. But the pivotal point within this framework is the manager.

The authors predict that computerization will increase the productivity of executives, supervisors and managers and provide more responsive support at all management levels; will upgrade the quality and quantity of document and message output; will increase the speed of communicating information between manager and receiver; reduce the costs of office operations; improve internal and external oral and written communications, and consolidate information processes into a unified work station terminal--word, data, image and voice.

To apply the objectives of computerization in most organizational settings requires adjustments at all levels

in the duties, responsibilities, procedures and equipment utilized by office personnel. The implementation of computerization often involves changes to include support staff, location and configuration, job activities, organizational report structure, and working relationships.

Some authors support the fact that in most work settings with computerized systems, both the management and the office worker benefit. They cite the fact that support personnel have an opportunity to become specialists, to become more involved as members of the management team and to make more meaningful contributions to business while achieving greater job satisfaction and satisfaction with the processes involved in the change. They also point out that through the implementation of computerization, management is provided with reduced operating costs, increased office productivity, a higher level of efficiency and expanded management support, while achieving greater job satisfaction and satisfaction with the processes involved in the transition (Mitchell, Mach, and LaBarre 1987; Drucker 1980).

Computerization will strongly impact the way managers operate. It is a new and dynamically emergent process whose rapid conversion from a large transaction system of the 1960s and 1970s to a sophisticated inquiry-based system of the 1980s (Kling 1987) left managers bewildered and untrained. Microcomputers and personal computers (or PC's) are now commonplace and subject to standardization and scrutiny. Along with its

implementation, managers must now deal with new technical arrangements and work practices, policies and procedures. There are many potential choices about what kind of technology is used, how it is organized and how managers work with and around it (Kling 1984a; 1987).

Many senior managers came of leadership age before the advent of today's technology boom. Kaufman (1972) points out that affecting change is the difficult aspect of the problem, for convincing older managers that there are newer and better ways to do what they did manually is the real challenge. Examples of typical situations which can improve the work of managers through the use of today's computerization has been advanced by the author. Work activities include Electronic or E-Mail, where messages are left in personal electronic mailboxes any time of the day or night for twenty-four hour retrieval. Electronic scheduling and computer conferencing coordinate meeting schedules automatically with software that coordinates available times and dates for members of the management team who use computers. By using a fax board in a PC, managers have the ability to convert the unit into a desktop fax machine for transmitting information to another fax or to a PC similarly equipped anywhere in the world. Through document, page and optical character scanning, data is collected and entered into the computer for managers to manipulate, review and transmit to others. With the addition of modems, bridges and gateways over a computer network system, the manager has

the power to effectively and efficiently transmit textual and graphic information to counterparts either close or at a far distance.

Not only has the rapid advancement of computers affected what tasks managers will be doing within the management team and with their staff, but also what types of new decisions they will be making because of computerization. Reports indicate that frequently a combination of policymakers participate in the decision-making processes regarding the purchase and/or location of high-technology equipment and software products. Usually the department manager or supervisor or top management are involved, but general requirements are often set by the department manager with the supervisor as a consultant (Levine 1987). Depending on the mix of computing technologies and the specialized ways of organizing work around them, work can be beneficial; however, other mixes may lead to poor working conditions and low satisfaction for some or many employees (Kling 1987).

Additional changes are already noted in the work environment regarding localization of control within the workplace and decision-making processes when computers are implemented. Rifkin (1979) cited Sauter's research at the National Institute for Occupational Safety and Health (NIOSH) which indicated that computer users reported less individual control over their jobs than did non-users. They also reported less ability to make independent decisions and

felt less capable of taking action. Champion (1965) cited nonmanagement employee's decision-making power decreased significantly after the installation of automated systems. This finding was supported by Kerber's (1983) survey of college students' attitudes toward computer use. Respondents viewed the computer as efficient, but dehumanizing, and associated dehumanization with the loss of active decision making. However, Champion's subjects reported slightly increased job satisfaction. He hypothesized that factors other than participation in the decision-making process were sufficiently powerful enough to offset the ordinarily adverse conditions accompanying this type of change. A general implication of his findings was that jobs associated with computer systems have more prestige from the standpoint of increased complexity.

The question is not whether managers will take advantage of computerization but how quickly they will respond to its many social, operational and technical challenges. Computerizing the manager is no longer a matter of choice, but one of survival for the company.

Indicators to Justify the Implementation of Computerization

For an organization to determine whether the system used for supporting management is as effective as it might be, several situational indicators have been identified by Mitchell, Mach and LaBarre (1987). They include the present practices:

1. Documents are keyed and handwritten, as opposed to machine dictated.

2. Management and professional staff members do not have ready access to administrative support in realtime support needs.

3. Managers and professional staff members are involved in tasks more effectively done by support staff.

4. The turnaround time to complete documents for the support staff for keyboarding exceeds two working days.

5. Manual processing of information system functions includes filing and retrieving documents in paper copy format, the manual transmission of documents, mathematical calculations with pencil and paper, and manually searching records for information.

6. Repetitive documents are not recognized as repetitive by those originating them and the documents are being recreated by management and staff.

7. Keyboarding repetitive documents on electric typewriters does not store and retrieve keystrokes, thus they are essentially treated as original documents.

8. The additional expenditure of increased overtime and employment of temporary help signal that management-support configuration which cannot cope with workload requirements. This may be attributed to staff assignments that minimize opportunities to assist one another, bottlenecks in procedures and workflow, and/or inappropriate equipment or lack of system integration.

9. Poor quality documents in both content and image lead to unprofessional appearance.

10. Office workers are developing and/or keyboarding reports as summaries from computer printouts which could have been originally keyed on the computer.

11. Increased paperwork is caused by government requirements.

12. Information is not available when needed.

13. Labor costs, postal and telephone costs, and other overhead costs related to office operations increase office expenditures.

It is clear that by the further study of decision-making processes and the ways conversion can be supported, a clearer picture of how companies can be successful in implementing computerization will emerge. This will promote agreement of the nature of, problems inherent in, and ways for managers to effectively implement successful decision-making techniques to promote computer usage early in the conversion process.

Summary

Research indicates that computer hardware, software and humanware issues will strongly affect the ways managers make decisions. A re-think process generally accompanies the implementation of computerization where the manager re-evaluates the departmental and work-group tasks, especially manual activities, to find more effective and efficient ways

of proceeding with increasing the use of the computer. Several indicators have been identified which justify the importance of computerization in the office. The ways decisions are identified and arrived at tend to change as do the methodologies for problem resolution. Managers may change due to the increased knowledge of office workers about technology. It is clear that the manager must be knowledgeable about which computer-based program best fits into the environment to support his/her workplace tasks.

Job Satisfaction

The relationship between attitudes and behavior has been a traditional topic of research for industrial psychologists, social scientists and researchers. This section focuses on the broad class of attitudes and classes of behaviors that are job-related.

Work has always been and continues to be the major nonfamily activity undertaken by most human beings. For most people, their work is a way of life that largely determines where they live, with whom they associate, and even what their children will become. Traditionally, attitudes have been studied by psychologists because they provide important insights into human cognitive processes, and because they contribute to the understanding and prediction of human behavior. In this section attention is focused on a particular set of job attitudes because of their relevancy for understanding employees' desires to

perform effectively in carrying out their work; and, the kinds of rewards and satisfaction available from work.

Job attitude research in industry typically has studied only one kind of attitude--employee's satisfaction with his or her job. Such a focus follows a narrowly limited definition of the term attitude that only views approval and disapproval. A preferred definition was given by English and English (1958) who stated that attitudes were "all learned predispositions to react to an object or class of objects, as they are conceived to be" (134). As Krech, Crutchfield, and Ballachey (1962) pointed out, attitudes include cognitive belief components, feeling components and action tendency components. Porter and Lawler (1965) collected data of verbal statements about objects that contain belief components as well as feeling components and action tendency components. These "attitudes" contain both belief and evaluative cognitions so one can better understand behavior on the job. To look at either separately in relation to behavior, they contended, makes it difficult to understand the tie-in between cognition and behavior. The rapid expansion of our industrialized society has led to a situation in which the role of the manager has achieved such a level of importance that it is a key job in today's world. The manager in today's society finds him/herself in a position to influence complex enterprises that contain unparalleled mental and physical resources. The

pervasiveness, importance, and complexity of the managerial job demand that we learn as much as possible about it.

In a very real sense, when one talks about human behavior in organizations, individual performance effectiveness is a sine qua non. It is the central issue for most organizations and as a result provides a sort of magnified picture of the kind of attitude-behavior relationships that might be found if other types of behaviors were being studied.

There is an additional reason for studying managerial effectiveness. Increased knowledge in this area may lead to applications to improve the effectiveness of organizations. Only by the scientific analysis of the preconditions for and the consequences of effective on-the-job behavior can we arrive at practical recommendations that have some degree of merit and generality. In other words, careful research in this area must precede attempts to prescribe future courses of action.

Historical Perspective

The interaction between work and workers has been studied for almost a century. Munsterberg's (1913) original textbook serves as a landmark and signals the start of psychologists' concern with work behavior. He emphasized techniques concerned with personnel selection, placement and the problems of improving physical aspects of the work situation. Interest about attitudes of employees and their

relation to employee behavior increased in the late 1930s with the strongest stimulant for this switch being the Hawthorne studies (Roethlisberger and Dickson 1939). Later work by Lewin (Lewin, Lippit and White 1939) served to emphasize the importance of individuals' attitudes and feelings about their work. By the early forties, research to study job satisfaction and the importance of work factors was well established.

The study of workers' attitudes developed rapidly. Herzberg, Mausner and Snyderman (1959) were able to find several hundred studies on workers' job attitudes. Herzberg et al. (1957) focused on the relationship between workers' job attitudes and their job behavior. Brayfield and Crockett (1955) cited more than twenty studies on the relationship between satisfaction and performance, while Herzberg et al. (1957) cited twenty-six studies. Likert (1961) hypothesized that job satisfaction may be more closely related to managerial performance than it is to worker performance. Missing from these reviews, however, were studies that looked at managers' job attitudes.

The early 1960s marked the beginning of large-scale studies of managers' job attitudes, with Rosen and Weaver (1960) signaling the start of this trend. At the present time, a clearly visible literature has developed on the topic of managerial attitudes justifying the conclusion that managers are an identifiable group whose attitudes are worth studying in their own right, independent of the attitudes of

workers (Vroom 1965; Porter and Lawler 1965). Early studies focused on the relationship between job satisfaction and management level, and job satisfaction and organizational size. Most notably lacking was research directed at the relationship between managers' job attitudes and their job behaviors. Vroom (1964) found twenty studies that looked at the relationship between satisfaction and performance, but only three involved individuals with supervisory responsibilities and then only at first-level management. A larger gap existed in the relationship between attitudes and performance and the consideration of theories between the two variables.

Motivation Theory

It has been customary to study job attitudes concerned with satisfaction and need importance because of their assumed relationship to the employee's desire, willingness or motivation to come to work and to perform his or her job. It is because the study of attitudes is so closely tied to the study of motivation and motivation theory that one can draw upon a considerable body of basic psychological theory to build a model of the relationship between job attitudes and job behavior.

Motivation theory attempts to explain "how behavior gets started, is energized, is sustained, is directed, is stopped, and what kind of subjective reaction is present in the organism while all this is going on" (Jones 1957). The

obvious concern of motivation theory with the subjective reactions of the organism means that it must deal with attitude variables. Atkinson (1964) argued that there are two basic theories, the "drive (x) habit" theory and the "expectancy (x) value" theory.

These two theories are grounded in the principles of hedonism, traced to the English utilitarians of the eighteenth and ninteenth centuries. According to this principle, people are oriented "away from pain and toward pleasure." One selects from alternatives on the basis of his/her assumptions about the relative amounts of pleasure and pain each has to offer. As a psychological theory, it is untestable because of the problems in operationalizing its concepts--its failure to specify what kinds of experiences are likely to be satisfying and what kinds are likely to be dissatisfying.

Drive Theory

"Drive" Theory and "Expectancy" Theory essentially represent two different attempts to deal with the criticisms of hedonism. Drive theory continues to be a dominant theory of motivation today among experimental psychologists.

Thorndike's (1911) statement of the "law of effect" in which responses which were accompanied or closely followed by satisfaction were more likely to recur than those followed by physiological discomfort, stood as the pillar of this theory. It emphasized previous behavior-

reward connections where one's present behavior was determined not by impending thoughts of pleasure but by past associations. Hull (1935) later extended this version by stating that, "behavior is determined by the product of drive strength and habit strength," or drive strength (x) habit strength. Drive strength was defined as some function of the length of physiological deprivation and habit strength was defined as taking into account past learning and previous stimulus-response connections.

Expectancy Theory

In contrast to the typical emphasis on animal behaviorism in Drive Theory, Expectancy Theory focused on human behavior. Developed by Lewin in 1938, this theory is cognitive in nature. Basic to both theories is the concept that people have behavioral response "expectations" about future events taking the form of beliefs concerning the likelihood that a particular act will be followed by a particular outcome. Such expectations can take values between 0 or no chance, and 1 or completely sure it will follow. Expectancy theorists assume that people have preferences among outcomes; they emphasize psychological motives and use terms such as "reinforcement value, reward value, utility, and demand for goals" to describe preferences among outcomes. Drive and expectancy theories also contain the concept of an association between events. For drive theory this is the "habit strength"; for

expectancy theory, an "expectancy." Both theories see these two basic elements combining in a multiplicative fashion, so that they indicate that for motivation to exist, there must be both positive outcomes and some kind of appropriate connection between behavior and the outcomes.

Vroom (1964) found expectancy theory to be the best framework within which to approach the issue of managerial motivation. As he stated in Work and Motivation:

> Job satisfaction is closely affected by the amount of rewards that people derive from their jobs and . . . level of performance is closely affected by the basis of attainment of rewards. Individuals are satisfied with their jobs to the extent to which their jobs provide what they desire and they perform effectively in them to the extent that effective performance leads to the attainment of what they desire (264).

The terminology and concepts involved are more applicable when considering the complexities of human motivation and behavior and more applicable to understanding the attitudes and performance of managers in organizations. The emphasis on rationality and expectations seems to best describe the kinds of cognitions that influence managerial performance. This theory facilitates the incorporation of motives like status, achievement and power into a theory of attitudes and performance. There is considerable evidence that the central motives for most managers are achievement, self-actualization, power and status, and income and advancement (Veroff et al. 1960). Because it emphasizes explaining performance rather than learning, it fits better into the attempt to understand managerial behavior. New

research by social scientists is emerging to study the on-the-job relationships between job satisfaction, job performance and attitudes (Kling 1984a, 1984b, 1987) within an even more turbulent and dramatic work environment--that created by various mechanized conveniences to support work activities. The computer, the automated system, the robot and other technological advancements has impregnated the worksite to produce radical changes for the manager.

Summary

This section emphasized that the study of the relationship between job attitudes and job performance is important because it can make contributions both to a motivational theory of work behavior and to organizational practice designed to increase performance effectiveness. An historical survey of the Drive and Expectancy Theories is presented to show early concerns for a better understanding of the variables within job satisfaction and attempts to reconcile the difficulties in quantifying such data. At the present time, a limited amount of documentation exists about the relationship between managerial job attitudes and job behavior. This condition has arisen because of the introduction of and rapid infiltration of automated devices which is creating a dramatic change in work and organizational environments. Particularly lacking are: (1) data on the relationship between managers' job attitudes and their job behavior in an environment of change, and

(2) a conceptual model of the attitudes-performance relationship based on past occurrences and modern trends.

Organizational Training

Training and computerization have much in common. Training like computerization has been broadly defined as a socialization process in which employees can more effectively and efficiently affect change. It is the acquisition of skills, concepts and attitudes that result in the improved performance of the individual within the workgroup and the company within the workplace; it is through training that such improved performance can best be effected (Goldstein 1980).

Green (Krepps 1986) indicated that pre-training could be significant in influencing user understanding and utilization. Green's research also concluded that employees need to be introduced to computers in a friendly setting. She, along with other researchers (Mitchell, Mach and LaBarre 1987) advocated learning how to use keyboards in a non-threathening way.

Jacobs (Krepps 1986) observed significant positive correlations between "hands-on" training and timeliness of implementation, degree of implementation and cost effectiveness of the automated project.

Several other studies have indicated that experienced computer users have more favorable attitudes

toward computers than inexperienced ones (Mitchell 1989; Kerber 1983).

Many changes in training methodologies have occurred because of the rapid increases in workplace mechanization especially the now widespread use of the personal computer either in a mini-, micro-, or dumb terminal configuration. Current literature on organizational training focuses on several basic areas, namely, (1) at what level or levels should training occur, (2) what degree of content should the training encompass, and (3) who within the oganization should be identified for the training. Wexley (1984) has defined three specific areas of a training needs assessment continuum as organizational analysis, task analysis, and personal analysis.

Organizational analysis focuses on how the organizational climate affects training needs. Several authors (Goldstein 1980; Huszczo, Blanchard and Camp 1983) stress that a common cause of training ineffectiveness is due to organizational constraints. Huszczo, Blanchard and Camp discussed the need for an organizational development infrastructure. According to these authors, training must be an integral part of an organization's long-term effort for planned change with specialized trainers as front line soldiers in battle to keep up with change. Trainers, Drucker (1980) suggests, are charged with developing individual goals, increasing productivity, and supporting long-range organizational goals; and, training should be

viewed as a major ongoing concern in organizational development rather than having the traditional startup and end times.

Only recently has task analysis received major attention with the advent of the Subject Matter Expert (SME) who is entrusted to rate knowledge (K), skills (S), abilities (A), and other personal characteristics (O) as they relate to training for job performance. Their reported consensus is tested for statistical significance and reported as a content validity ratio (C) for each of the personal characteristics.

These and other approaches need to be validated for where effective performance is contingent on varied situations, particularly for supervisory, managerial, sales, and other occupations, the degree of effectiveness in the design of training programs still remains problematic and not well defined (Bahn 1973; Goldstein 1980; Helgott 1988; Raymond 1988; Kling 1989).

The third element, personal analysis, is the measurement of the discrepancy between "actual" and "ideal" behaviors. When a discrepancy ocurs where the actual is less than ideal behavior, training may be indicated. Additionally, assessment instruments to determine management, subordinate and peer evaluations are abundant for these analyses.

According to Goldstein (1980) and Helgott (1988), special attention should be directed to evaluation results

where low validity is due to errors of overestimation and high ratings on perceived skills which the organization deems as important and, hence, the evaluator. However, there is growing support (Wexley 1984), that validity can be maximized under specific conditions as when: (1) employees expect that self evaluation will be compared with criterion measures; (2) employees have previous experience with self-evaluation instruments; (3) employees are guaranteed anonymity; and/or (4) employees are asked to make relative as opposed to absolute judgements.

With the growing concern in today's marketplace for cost effectiveness the development and implementation of formal training programs require the establishment of criteria to determine an employee's trainability--the ability to acquire the skills, knowledge or behaviour necessary to perform a job at a given level and to achieve these outcomes in a given time (Wexley 1984).

Common methods currently in practice to rate employee's trainability include the employee's performance on a company-authorized standardized test, short-term training performance observations, and/or performance on self-paced training courses. Evaluations are generally by supervisory or managerial feedback. However, these methods focus only on the acquisition of skills, rather than on other elements which influence employee trainability, namely motivational and situational factors.

Bahn (1973) found that although final session evaluations and short-term measured effects of training are good, long-term effects are disappointing. He stated that this was due to a number of complex factors such as individual motives, differences in organizational climate or environment, the rigidity of superisory attitudes and the functional non-applicability of the training. He coined the term "counter training" as a means to identify those elements which can nulify the positive effects of training. He stated that the psychological basis of "counter training" is found in resistance to change due to fear of the unknown, ego involvement, the established required system of past behaviors and the built-in inertia of all social systems.

He further suggested that several factors will augment training while minimizing counter training, they include: (1) train at all relevant levels for counter training comes from the next adjacent affected level; (2) train to the work situation; (3) train in an environment that resembles the actual worksite; (4) train in a relatively homogenous group setting to reflect the actual group setting; (5) train with a trainer familiar with the trainee's job functions and work conditions; and, (6) train for employee knowledge of the benefits of the change.

According to Allen and Silverweig (1975) the primary influences within orgaizations are the cultural differences which shape behaviour. They suggested that it is important that these influences work to the mutual benefit of the

individual and the organization. They go on to point out that elusive and unrecognized group norms can influence training effectiveness. Many training programs have been rendered ineffective because they have come into conflict with the real and often hidden training being done within the particular culture. If a training program is to be effective it must support the day-to-day experience of people on the job. It is suggested that a good training program can help seed new norms and refine old ones (Allen and Silverweig 1975).

The authors suggested that normative change is a three step process: (1) developing an understanding within the organization regarding the immense influence that norms have upon the effectiveness of the organization; (2) identifying the specific norms of the culture and determining the distance between these norms and end goals so priorities and change strategies can be established; and, (3) examining and modifying each of the various negative norm influences.

For a training program to be effective it must provide for positive transfer of learning to the workplace setting. Research findings (Wexley 1984) indicated that people in positive or favorable organizational environments, where there is freedom to set personal performance goals, take risks, and set growth-oriented goals--and those with innovative personalities--high needs achievement, high

activity levels, high involvement--are more likely to adopt new practices and adapt to change more readily.

Rigorous research studies of various instructional strategies have produced many questions but few answers about effective training techniques in industrial settings. Several training methods have been identified to improve trainee performance: the behaviour-modeling technique, simulation techniques, behaviour-modification techniques, and behaviour self-management techniques.

Behavioral-role modeling appears to be an effective technique in industrial and nonindustrial settings; overall the studies suggest that these programs influence behaviour and result in an improved training setting. Simulation techniques are frequently used in management development and sales training programs; however, there is little empirical evidence that they can change attitudes and behaviors that transfer to the work setting.

Research of behavior modification techniques shows that partial scheduling, where trainees are uninformed when reinforcement will be given or for how long, improve both effort and performance. Employees also perceive their jobs as including more environmental variables such as recognition and feedback with a partial schedule of reinforcement than with a continuous schedule (Champion 1965). Behavioral self-management is a current technique that involves teaching trainees how to manipulate stimuli

and rewards to help themselves make changes in any direction they desire (Wexley 1984).

Evaluation of the training program is a critical element in the overall program's effectiveness. Program evaluation, as currently practiced, is reported to be quite poor in both private and public sectors. Organizations and their members tend to react negatively to evaluation as a concept (Goldstein 1980; Kerber 1983). Goldstein (1980) addressed the need to establish multiple criteria for program evaluation that rejects various instructional objectives as well as organizational goals that training is designed to meet.

Several models have been designed by various researchers to overcome the resistance to program evaluation. Wexley (1984) suggests that evaluative research should avoid an "either/or approach" working instead to instill a "spirit of inquiry" or "scientific attitude." Organizations, he felt, make greater strides in this direction when they evaluate the training program rather than people, reduce the conflict between evaluation outcomes and resource allocation, and establish neutral, in-house evaluation consultants.

The findings of Mitchell (1989) indicated that training not only prepares the user to use the system more efficiently, thus raising productivity, but affects the user's feelings of self-esteem, security and general well-being. He and his associates review how implementation of

automated systems affects ultimate effectiveness. They indicated that any assistance users were given, not only in using the system but anticipating the impact of the new technology on their jobs, helped enhance the overall effectiveness of the system. Rosenheim (Krepps 1986) designed and tested a three-part training program utilizing printed text, audiocassette and direct "hands-on" experience for a national consumer financing corporation with one thousand offices. His experience in refining and testing training materials indicated that employees had a less difficult conversion experience when the training had motivational material built into the program. The basic training program was expanded to include information on what automation meant to the company as a whole. It proposed that decreased record keeping activities and workload in the branch offices would result in more aggressive sales efforts, thus justifying the existing staff.

The implications of training, its quality, style of delivery and follow-up are just beginning to be investigated and understood by the research community. Using three dependent variables: the timeliness of implementation, the degree of implementation and the cost effectiveness of selected automation projects withing the services industry, Jacobs (Krepps 1986) investigated the impact of the level of training, type of training, and level of materials. She used an interview and survey method with three hundred subjects from Fortune 500 Firms located in New York City.

Her findings indicated significant positive correlations between the three dependent variables and hands-on skill sessions, on-the-job training, a technical background for trainers and training program designers, and predominant use of "user-friendly" manuals.

Salvendy (1987) supported these findings by demonstrating that immediate performance feedback accelerated the training process and appeared to improve worker motivation. Green (1983) documented that employees who did not fully understand how to use the automated systems used the equipment less frequently and for fewer applications. Hubbart (1983) indicated that although most companies introduce automated office equipment because of time savings and productivity improvements, a common problem experienced was under-utilization of the computerized equipment because of inadequately trained employees. As with many other investigators researching this topic, he recommended including the employee in the evaluation of the system and initiating training prior to system installation. In addition, development of a selection criteria for employes to be trained was recommended (Salvendy 1987; Champion 1965).

Quality may vary depending on the sophistication of the organization's training capabilities. Poor quality training affects user attitudes. Studies indicated that a greater number of errors made while learning to use a computer may be associated with unfavorable judgments of

specific applications (Rosenburg and Reznikoff cited in Kerber 1983). Research also indicated that the more errors students make while using a computer-assisted-instruction program, the less positive their attitudes toward computers were in general (Mitchell 1989). Hodge (cited in Hodgdon and Huthingson 1979) indicated that the attitudes of users toward the computer improved as their perceived self-proficiency improved.

Summary

The organizational training issue is an important humanware issue. With the rapidly increasing usage of a variety of technological tools, with computerization leading the pack, companies have to address how best to maximize the managers', hence the workgroups', improved performance and productivity levels. Most major companies have a training department to support various departmental specifications, with more medium to smaller companies putting in place similar programs. Studies indicated that organizational training is a multi-faceted and complex operation which suggests that not one but several factors play a role within a particular company in determining the success of the program.

Pre-, during- and post training studies have been conducted to determine which factors most optimize a trainee's future performance. Factors such as organizational and workgroup setting, timeliness, manager and worker

attitude, organizational climate; personal characteristics, initial abilities, psychological state of and personality and self esteem of the trainee; evaluation methods, organizational norms, perception of advancement, type of training, trainer ability, and kind of computer program selected have been investigated.

CHAPTER III

METHODOLOGY

Introduction

This research was designed to examine job satisfaction and satisfaction with computer implementation processes when managers perceive themselves as being more or less involved in the decision-making activities concerning computerization and, when they participated or did not participate in a formal, introductory computer training program.

The departments selected were representative of other office work groups in large industry and business settings with typical technical and business functions represented. The participants included managers and associated levels within five departments of a large division of a multi-national corporation.

The purpose of the study was to serve as preliminary research on the effects of socio-technical change in today's workplace during computer conversion.

This chapter discusses the population, samples, sampling techniques and the development and selection of survey and evaluative instruments. An overview of the data-gathering procedures follows and concludes with a presentation of the statistical treatment using parametric

methods: Analysis of Variance or ANOVA, Cronbach's Alpha Coefficient of reliability, and the Pearson Product-Moment Correlation Coefficient, r.

Population and Sampling Methods

Since the research was based on a general subject or problem area the theoretical sampling approach developed by Glasser and Strauss (1967) was used:

> Theoretical sampling is done . . . to discover categories and their properties, and to suggest the inter-relationships into a theory (105).
>
> The adequate theoretical sample is judged on the basis of how widely and diversely the analyst chooses his or her groups for saturating categories according to the type of theory he (she) wishes to develop (106).

The sample was drawn from a population of five departments whose managers were in the initial stages of computer implementation and had formally targeted at least one work group's function on the computer. Of the five groups selected each had different group-specific work functions. Managers were categorized as "experimental" if they were selected for the formal, introductory computer training program offered after-hours at an off-site location from the main plant and "control" if they were informally trained on-the-job at their work sites using vendor supplied and/or departmentally developed manuals, and/or peer tutoring or had no training whatsoever. Additionally, managers were categorized if they perceived themselves as

"more" or "less" involved in the decision-making processes associated with the implementation.

For experimentals approved trainers, associated either with the company or contracted out from a local community college provided computer instruction using a variety of curricular techniques. Methodology included instruction-led demonstrations, verbal exercises with "hands-on" assignments, specific exercises using a class manual, and self experimentation of application program features. The control groups were trained informally on-the-job at their work sites using vendor supplied and/or departmentally developed manuals, and/or peer tutoring or had no training whatsoever.

Both the experimental and control groups used IBM-compatible and/or Apple Macintosh personal computers. Company-standard word processing software applications programs for both groups included: WordPerfect 5.0 for word processing; Microsoft Excel, Lotus 1-2-3 and Symphony 4.0 for spreadsheets; and MacDraw and Harvard Graphics for graphics. An introductory or beginning level of instruction was offered to experimental groups. Class sessions generally lasted ten weeks; each class was approximately three hours in length with a total of sixty class hours per offering.

Five departments were selected for the study: industrial engineering, human resources, logistics,

financial, and plant services. To understand their composition, descriptions follow:

Description of Worksites

Worksite I: Industrial Engineering Department

This department functioned as the center for facilities arrangements and relocations. The staff included managerial and supervisory personnel, industrial and environmental engineers, financial personnel, other specialized professional staff, and administrative and clerical support to maintain the activities of the almost one million square foot facility. This group was responsible for installing the Division's new computerized equipment and supporting peripheral devices.

Upper and middle managerial and professional staff participated in the automation project as well as administrative assistant levels (clerical) who were associated with top managerial staff. Participation in the training program was, for the most part, on a managerial-selected basis, but there was a small percentage of volunteers. Those managers who did not participate in the training program had on-the-job training at their work sites using vendor supplied or department developed manuals, could consult with members of the staff enrolled in the formal training program, or had no training.

Managerial-level activities associated with the conversion included selection of work groups to use the

computer for job-related tasks, placement and other facility-related activities associated with installation, identification and selection of hardware devices and software applications programs, and financial arrangements to support the implementation at the worksite. Some managers participated in other related tasks in a marginal role, either delegating minor responsibilities to technicians or other support personnel; or, were totally detached from any involvement whatsoever.

Worksite II: Human Resources

This department provided employee assistance programs for the entire Division. Employee benefits, compensation and payroll, grievances, security, employee evaluations and employment information as well as various other employee support activities were examples of departmental activities. Personal computers were provided on a limited basis for specialized tasks. It was anticipated that a large number of new, computer-related tasks were to be implemented. A large number of additional computers were scheduled for installation to support the growing needs of the work groups to support the large amounts of data input and tracking new anticipated tasks which included employment application scanning and an enlarged employee tracking system. The vice president of the department, top managerial and supervisory staff, and key department heads and their staff were selected to

participate in the formal, introductory computer training program. Those managers that did not participate could consult with members from their department who were enrolled in the training program for any computer assistance. Some managers were in charge of employees who had few computer-related tasks. These managers took a marginal role and either delegated minor responsibilities to technicians or other support personnel or were totally detached from any involvement.

Worksite III: Logistics Department

This department functioned as the center for tracking product parts and spares throughout the Division. The staff included various managerial and supervisory personnel, schedulers, planners, other specialized professional staff, and administrative and clerical support. Special computer-based functions were required of this group, especially spreadsheets and column formats. The staff participated in the formal, introductory computer training program on a voluntary basis or were chosen by managerial selection. Those managers that did not participate could consult with members of staff enrolled in the training program for computer assistance or use vendor-supplied or department-developed manuals for informal on-the-job training or be trained by an instructor-designee identified by the department to perform introductory training. Several managers were active in a variety of

computer-related activities including selection of work groups to use the computer for job-related tasks, placement and other facility-related activities associated with the installation of the computers, identification and selection of hardware devices and software applications programs, and financial arrangements to support the implementation within the worksite. Some managers were in charge of those employees who were marginally involved in computer-related tasks. These mangers either delegated minor responsibilities to technicians or other support personnel or were totally detached from any involvement.

Worksite IV: Financial Department

This department provided analytical and descriptive financial information to the Division. Personal computers were provided to aid the staff in this task and a large number of additional computers were scheduled for installation to support changing government documentation requirements. Prior to formal computer training the staff was self-taught using peer training and vendor-supplied manuals and department-developed manuals. The staff included various managerial and supervisory personnel, financial analysts, financial planners, budget specialists, other specialized professional staff, and administrative and clerical support. Special computer-based functions were required of this group, especially spreadsheets and columnar formats, sorting and mathematical formula. Those staff who

did not participate could consult with members of staff enrolled in the formal computer training program for computer assistance or use the vendor supplied or department-developed manuals for informal on-the-job training. Those managers who were in charge of those employees who had few computer-related tasks took a marginal role and either delegated minor responsibilities to technicians or other support personnel or were totally detached from any involvement.

Worksite V: Plant Service Department

This department functioned as the center for servicing all plant equipment and custodial and maintenance support services. The staff included managerial and supervisory personnel, scheduling planners, other specialized professional staff, administrative and clerical support and custodial and maintenance personnel. The staff was divided into two units, those who worked on automated equipment and those who did not. This group was responsible for moving the Division's existing and new computerized equipment to designated locations. Additionally, this department was to be the center for a computer-based service for employees where they could call in messages for automated device service repair. Several managers were active in a variety of computer-related activities including selection of work groups to use the computer for job-related tasks, placement and other facility-related activities

associated with the installation of the computers, identification and selection of hardware devices and software applications programs, as well as financial arrangements to support the implementation within the worksite. Others were in charge of employees who had custodian or arrangement tasks. These staff members usually took a marginal role and either delegated minor responsibilities to technicians or other support personnel or were totally detached from any involvement in the conversion whatsoever.

The new service would greatly affect this department's operations requiring greater numbers of staff and management to use computer-based devices. Upper and middle managerial, professional and administrative and clerical staff participated in the introductory, formal computer training program on a managerial selection basis. Those managers that did not participate either had on-the-job training at their work sites using vendor supplied or department developed manuals, could consult with members of the staff enrolled in the formal training program, or had no training.

Case Summaries

Each case summary was designed along the same format. Descriptive factors of the department site provided background information regarding the function of each workplace setting. A discussion follows on the status

of the department prior to two major events: (1) Division-wide purchase of computer hardware and software, and (2) implementation of a formal, introductory computer training program.

The next section identifies departmental factors which drove the increased computerization and hence the decision-making processes to support it; additionally, it discusses the attempts of introducing an introductory training program for managers.

The five departmental sites selected were located in a major division of a large, multinational corporation in Southern California. Activities included non-technical business-related functions which support the Division's work. Departments were purposely selected because of their non-technical nature; most technical departments already had various degrees of sophisticated and specialized computers and computer-related devices in place. Also, those departments selected were undergoing an introductory computer training program offered through the Division's Training Department in partnership with a local community college. The college was contracted to supply the site, hardware devices and software applications programs, as well as any outside computer trainers. Several in-house computer trainers were contracted through the Division by the college.

Department 1: Facility Support

This department was initially automated in 1982 but had slowly continued to expand. A dedicated support group which handled computer hardware requests related to facility installation and maintenance was established in 1987 for the Division's ever increasing needs. The initial hardware was centrally located in the dedicated support group's area and consisted of Apple Macintosh personal computers and several IBM-compatible devices. Both dot matrix and laser printers were installed. Several groups within the department had access to the mainframe system as early as 1981 but users were limited because of their function and the security factor. Training was viewed as an integral part of this department's attempt to increase efficiency and improve productivity. The initial training consisted of learning through vendor-supplied manuals, peer tutoring and short-course, formal training sessions. Several classes had been conducted through the Information Systems Group which handled mainframe activities.

Although several systems had been tried in the past, and employees had been given the opportunity to become familiar with computer programs, the department felt that the formal, introductory training program offered through the Division's Training Department would best suit current training needs of employees since new devices were to be installed and new tasks assigned with new personnel.

The Department Head fully supported the training of employees whose work functions required computerized support. All supervisory and managerial staff was encouraged to attend the training as were all staff members. However, three managers approved the employee list of possible trainees. Several employees who were not initially accepted requested training at the next session offered. A training coordinator was identified from within the department and developed a full scale plan to help employees select appropriate classes, programs and times. Additionally, several "Resident Experts" were identified from several groups for an advanced training project--"Train-the-Trainer"--offered through the Division's Training Department coinciding with the general training. Their function was to act as peer tutors within the department for those selected to attend the introductory formal computer classes; and, to assist those not selected.

The actual usefulness of the training was effective because by the end of the initial training sessions the department had received many computers (both Apple Macintosh and IBM-compatible) and most of the software applications programs presented in the training program.

Department 2: Human Resources

This department was initially automated in 1982 and had slowly continued to expand. This department consisted of several specialized groups which handled employee

benefits, compensation, security-related items, medical, labor, suggestions, patents, and other tasks related to human resource functions. Computer support was established in 1987 for the Division's ever increasing needs. The initial hardware was centrally located in the compensation and benefits support groups area and consisted of several mainframe computers and IBM-compatible devices. Dot matrix printers were installed. Several groups within the department had access to the mainframe system as early as 1981 but users were limited because of their function and the security factor. Training was viewed as an integral part of this department's attempt to increase efficiency and improve productivity. The initial training consisted of learning through vendor-supplied manuals, peer tutoring and short-course, formal training sessions. Several mainframe classes had been conducted through Information Systems.

Although several programs had been tried in the past, and employees had been given the opportunity to become familiar with computer programs, the department felt that the formal, introductory training program offered through the Division's Training Department would best suit current training needs of employees since new devices were to be installed and new tasks assigned with new personnel.

The vice president of this unit strongly supported computer assisted work functions. The Department Head fully supported the training of employees whose work functions required computerized support. Both the vice president and

department head attended the training sessions. All supervisory and managerial staff were strongly encouraged to attend the training as were all staff members. Five managers approved the employee list of selected trainees. Several employees who were not initially accepted strongly requested training at the next session offered. The training coordinator of this department was the Division Training Coordinator. He assisted within the department to develop a full scale plan to help employees select appropriate classes, programs and times. Additionally, many "Resident Experts" were identified from several groups for an advanced training project--"Train-the-Trainer"--offered through the Division's Training Department coinciding with the general training. Their function was to act as peer tutors within the department for those selected as trainees; and, to assist those not selected.

By the end of the initial training sessions the department had received several computers (both Apple Macintosh and IBM-compatible) and most of the software applications programs presented in the formal, introductory computer training program but installation was slow and most users were unable to utilize the equipment.

Department 3: Logistics Support

This department was initially automated in 1982 and had continued to expand. A dedicated support group to handle computer hardware requests related to logistics

support activities was established in 1986 for the Division's ever increasing needs. The initial hardware was centrally located in various support group's areas and consisted of Apple Macintosh personal computers and several IBM-compatible devices. Both dot matrix and laser printers were later installed. Several groups within the department had access to the mainframe system as early as 1981 but users were limited because of their function and the security factor. Training was viewed as an integral part of this department's attempt to increase efficiency and improve productivity. The initial training consisted of learning through vendor-supplied manuals, peer tutoring and short-course, formal training sessions. Many mainframe classes had been conducted through the Information Systems group.

Although several systems had been tried in the past, and employees had been given the opportunity to become familiar with computer programs, the department felt that the program offered through the Division's Training Department would help support current training needs of employees since new devices were to be installed with new and expanded tasks assigned to new personnel.

The Department Head had become more receptive in supporting employee training whose work functions required computerized support. All supervisory and managerial staff was encouraged to attend the training as were all staff members. Managers approved the employee list of possible trainees concentrating on supervisory levels and above as

well as employees with specific computer-related tasks. Several employees who were not initially accepted requested training at the next session offered. A training coordinator (Lead Supervisor) was identified from within the department. He developed a full scale plan to help employees select appropriate classes, programs and times and created an intra-department training program so this department had no excuse for not updating their education. Additionally, many "Resident Experts" were identified from several groups for an advanced training project--"Train-the-Trainer"--offered through the Division's Training Department coinciding with the general training. Their function was to act as peer tutors for those selected and to assist those not selected.

By the end of the initial training sessions the department had received several computers (both Apple Macintosh and IBM-compatible) and some of the software applications programs presented in the formal program.

Department 4: Financial

This department was initially automated in 1982 but had slowly continued to expand. In 1985 this department installed several computer devices to support financial requirements for the Division's ever increasing needs. The initial hardware was located in several support groups work areas and consisted of one Apple Macintosh personal computer and several IBM-compatible devices. Dot matrix printers

were installed. Several groups within the department had access to the mainframe system as early as 1981 but users were limited because of their function. Users were selected but maintained a security code because of the high confidentiality of the data. Training was viewed as an important part of this department's attempt to increase efficiency and improve productivity. Initial training consisted of learning through vendor-supplied manuals, peer tutoring and short-course, formal training sessions. Several classes had been conducted through the Information Systems group which handled mainframe activities.

Although several systems had been tried in the past, and employees had been given the opportunity to become familiar with computer programs, the department felt that the formal, introductory training program offered through the Division's Training Department would cover current training needs of employees since several new devices were to be installed and new tasks assigned with new personnel.

The Department Head fully supported the training of employees whose work functions required computerized support. Government regulations required computerized documentation; several large proposals required that the financial information be submitted via computer disk. Several large losses associated with pricing information provided the impetus for the department to more fully computerize. All supervisory and managerial staff was encouraged to attend the training as were all staff members.

Managers approved individual requests for training. Several employees who were not initially accepted requested training at the next sessions offered. A training liaison was identified from within the department to coordinate the installation of the new devices. Several "Resident Experts" were identified from several groups for an advanced training project--"Train-the-Trainer"--offered through the Division's Training Department coinciding with the general training. Their function was to act as peer tutors within the department for those selected to attend the introductory formal computer classes; and, to assist those not selected.

By the end of the initial training sessions the department was beginning to receive computers (both Apple Macintosh and IBM-compatible) and several software applications programs presented in the formal, introductory computer training program. Problems in installation were attributed to the slowness of fully realizing computer support.

Department 5: Plant Services

This department was automated in 1982 but had only slowly continued to expand. A dedicated support group to handle computer hardware requests related to facility moves was established for the Division's ever increasing needs. Although most of the department's staff--those involved in the physical move, repair, or other blue-collar work tasks--did not require the use of the computer, several groups who

tracked the move and the equipment needed for department requested computer support. The initial hardware was centrally located in several support group areas and consisted of several IBM-compatible and other mainframe terminal devices. Dot matrix printers were installed. Groups within the department had access to the mainframe system as early as 1981 but users were limited because of their function and the security factor. However, an important new factor was the driver for the current interest in computerization. The number of "HELP" calls for moves and repairs had steadily increased over the years. To accommodate this now burdensome increase, an additional computerized system was to be installed and handled through this department. Plans were underway for developing a system design, installing the new apparatus and considering many support features: manpower additions, training requirements, and the like.

Training was viewed as an important part of this department's attempt to increase efficiency and improve productivity especially with the ever-pending installation of the new HELP system. Initial past training consisted of learning through vendor-supplied manuals, and short-course, formal training sessions for selected employees. Additionally, several classes had been conducted through the Information Systems group which handled mainframe activities but most employees found these sessions not well organized. Although employees had been trained on several systems, the

department now felt that the formal, introductory computer training program offered through the Division's Training Department would best suit current training needs to support special work tasks and help familiarize them with the basic computer operations.

The Department Head supported the training of employees whose work functions required computerized support. He approved the list of possible trainees. The training coordinator from the facility department developed a full scale plan for the department to help approved employees select appropriate classes. Additionally, two "Resident Experts" were identified from one group for an advanced training project--"Train-the-Trainer"--offered through the Division Training Department. Their function was to act as peer tutors within the department for those undergoing the introductory, formal computer classes and those in the informal program. The actual usefulness of the training was diminished because the department did not have ready access to many machines; the building site where this Department resided was separated from the Local Area Network (both Apple Macintosh and IBM-compatible) and cabling was difficult to install. The software applications programs presented in the formal, introductory computer training program were only installed on five computers in the department. Of the five departments it was most limited in computer involvement. The difficulty in cabling was the limiting factor because no LAN access was available from the

main plant site to this location. An initial effort to lay the cable for several new IBM-compatible devices had been extremely difficult.

Instrumentation

The four major survey instruments used in this study were the Minnesota Satisfaction Questionnaire - Short Form (MSQ-SF), the Automation Satisfaction Questionnaire (ASQ), an Open-ended Questionnaire for Management (OEQ-M), and a Trainer Survey. A Cover Letter and Biographical Data Form were attached as front pieces to the survey packet assembled for each participant. All participants received the MSQ-SF, ASQ and OEQ-M; only training staff received the Trainer Survey. Additionally, class enrollment and weekly attendance records were reviewed to determine enrollment and continued participation in the company-sponsored, Division-wide computer training program.

Discussion of Survey Instruments

The Work Adjustment Project, or Minnesota Studies in Vocational Rehabilitation (Weiss et al. 1967) developed a form for a diagnostic assessment of the work adjustment potential of applicants for vocational rehabilitation and the evaluation of work adjustment outcomes. Because of its ease of administration and tight and standardized format, the "Short Form" was used for this study rather than the more complicated "Long Form." The Questionnaire consists of a twenty-item, multiple-choice test; each item referred to a

reinforcer in the work environment. Respondents indicated how satisfied they were with the reinforcer on their present job by selecting one of the five response alternatives for each item including: Very Dissatisfied (Very Dissat.; 1), Dissatisfied (Dissat.; 2), Neither (N; 3), Satisfied (Sat.; 4), and Very Satisfied (Very Sat.; 5). The twenty categories are listed below:

1. Ability utilization: The opportunity to do something that makes use of my abilities.

2. Achievement: The feeling of accomplishment I get from the job.

3. Activity: Being able to keep busy all the time.

4. Advancement: The chance for advancement on this job.

5. Authority: The chance to tell other people what to do.

6. Company policies and practices: The way company policies are put into practice.

7. Compensation: My pay and the amount of work I do.

8. Co-workers: The way my co-workers get along with each other.

9. Creativity: The chance to try my own methods of doing the job.

10. Independence: The chance to work alone on the job.

11. Moral values: Being able to do things that do not go against my conscience.

12. Recognition: The praise I get for doing a good job.

13. Responsibility: The freedom to use my own judgment.

14. Security: The way my job provides for steady employment.

15. Social status: The chance to do things for other people.

16. Social service: The chance to be "somebody" in the community.

17. Supervision--human relations: The way my boss handles workers.

18. Supervision--technical: The competence of my supervisor in making decisions.

19. Variety: The chance to do different things from time to time.

20. Working conditions: The conditions where work activities occur (Weiss et al. 1967; see appendix B).

The Automation Satisfaction Questionnaire (ASQ), Open-ended Questionnaire for Management (OEQ-M) and Trainer Survey, the latter developed by Lee (1985), were selected because of their applicability to this study. The Open-ended Questionnaire for Management instrument was modified after consultation with professionals in the field and managers who were users of computerized equipment in other

large companies including a brokerage house, banking corporation, a medical instrument corporation and a community college. Additionally, an extensive literature review was undertaken to include current professional journal reports regarding managerial adjustment to technology and computer implementation. Changes in format for the questionnaires were completed following Payne's (1951) alternate suggestions.

The Automation Satisfaction Questionnaire (ASQ) measured the degree of managerial satisfaction with computerized systems and the processes involved in computer implementation. In its original form, it included seventeen items each referencing a specific aspect of office automation. The respondents indicated their degree of satisfaction with each item within five response categories each with a respective weight, "1" being the lowest satisfaction and "5" being highest. The five alternatives included: Very Dissatisfied (Very Dissat.; 1) , Dissatisfied (Dissat.; 2), Neither (N.; 3), Satisfied (Sat.; 4), and Very Satisfied (Very Sat.; 5). The response patterns followed the same format as the Minnesota Satisfaction Questionnaire - Short Form. This was purposely constructed to minimize confusion which might rise from different patterned responses (see appendix C). For the purposes of this study, three additional questions were added: (1) Item 7: The informal training received; (2)

Item 19: Job security; and (3) Item 20: Internal motivation to work.

The Open-ended Questionnaire for Management (OEQ-M) was designed as a vehicle to provide more in-depth analyses of managerial involvement in the implementation processes and to expand on the responses on the MSQ - SF and ASQ instruments. From the total response pattern on eight selected items, managers were classified to perceiving themselves as "more involved" or "less involved" in the implementation processes (see appendix D).

The Trainer Survey instrument focused on trainer qualifications, job satisfaction, training satisfaction, and other training specifics. It is included as an appendix E only. Response items in part 1 included: pre-assessment of trainee's needs, selection of computer applications programs, site, equipment, hours and training departments, perception of supervisory support and trainee's accessibility to computing equipment. Part 2 responses included a Likert-like scale where respondents reported their involvement with training elements, evaluation elements, overall program satisfaction, physical setting, and their overall perceptions of managerial attitudes and decisions supporting computerization. The survey concluded with trainer perceptions about staff and the need to train mangers.

The two questionnaires and the Demographic Data Form were piloted at four separate sites from the plant and

training sites associated with the study to validate and refine the questions. A copy of each instrument and the Demographic Data Form appears in appendices A, B, C, and D.

Demographic Data

Data regarding the factors of sex, age, education and work tenure were requested of all respondents for use in the detailed analysis of descriptive data (see appendices A and D). Also, several of these factors were used with the parametric statistic the Pearson Product-moment Correlation Coefficient, r, to identify possible correlations with job satisfaction and computer implementation satisfaction.

Cover Letter

An introductory cover letter was included with all survey materials to discuss the purpose of the study, request for participation, statement of guaranteed confidentiality, anonymity and definition of terms (see appendix A).

Additional Training Data

To confirm the enrollment and continuous participation of selected managers in the Division's formal, introductory computer training program, the instructor's enrollment and attendance forms for the duration of the sessions were tracked. Managers who participated in 70 percent of the classes, or seven weeks out of the ten weeks,

maintained their classification as "Experimental." Two managers left the program due to retirement.

Data Gathering Procedures

The Minnesota Satisfaction Questionnaire - Short Form (MSQ-SF), Automation Satisfaction Questionnaire (ASQ) and Open-ended Questionnaire for Management (OEQ-M) with the Demographic Data Form were the three major survey instruments. Prior to administration, all documents were approved by company officials.

Pretest surveys were administered in a survey packet at on- and off-site plant locations by the researcher. Administrators at the on-site locations for each of the selected departments were given an introductory letter defining the project and requesting their staff's participation (see appendices A and D). Participation in the surveys was voluntary; all responses were anonymous and each participant was assured that results were to be held in strict confidentiality. Forms were completed during off-hours and all returns were dropped-off during off-hours only. A special tray for returns along with explicit directions was in place. Completed surveys were picked up at the end of each work day by the researcher; additionally, respondents returned materials directly to the researcher's office area before or after work and during lunchtime.

At the off-site training location, pre-training questionnaires were given out before the first class of each

session. Questionnaires were either completed immediately at the first class meeting the same afternoon or evening, and turned in at the Director's office site or researcher's office within one-to-two days. Pretest questionnaires for the control groups were individually given to managers within the corresponding experimental work groups to coincide with the first class sessions of the control groups. Both groups were post-assessed during the same time frame with the same instruments used in pretesting. Both groups were given posttest surveys at the end of the training session or one-two weeks after the conclusion of class. Both groups followed the same procedures for returning posttest questionnaires as with the first set: data were again collected at the off-site location after an approximately ten week period and immediately returned or within one-to-two days. Participants from the five departments are categorized according to posttest and difference posttest--pretest in table 3.

Statistical Treatment

The research was designed to include descriptive and statistical data. Statistical treatments included parametric methods. Data from the five selected departments were analyzed in five main sections: (1) compilation of class enrollment information and attendance forms for the Division's formal, introductory computer training program; (2) analysis of Open-ended Questionnaire for Management

TABLE 3

MANAGERS BY DEPARTMENTS: COMPUTER TRAINED AND PERCEIVED INVOLVED PRETEST, POSTTEST DELIVERIES

	Computer Trained Not Trained		Computer Trained Trained		Perceived Involved Less		Perceived Involved More	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Group								
Facilities Pre- : Posttest N=26 : N=26 D Pre-Post = 0	10*	9	16	17	15*	14	11	12
Human Resources Pre- : Posttest N=24 : N=24 D Pre-Post = 0	10	10	14	14	13*	14	11	10
Logistics Pre- : Posttest N =20: N=20 D Pre-Post N=2	8**	6	12	12	12**	9	8	9
Financial Pre- : Posttest N=18 : N=18 D Pre-Post N=0	8	8	10	10	10*	8	8	10
Plant Services Pre-: Posttest N=15: N=15 D Pre-Post N=0	7	7	8	8	9*	10	6	5

Note: D = Differences; * = Control or Experimental change within group; ** = 2 Controls lost to retirement.

responses; (3) compilation of responses from the Demographic and Bibliographic Data Forms; (4) questionnaire response analysis of the Minnesota Satisfaction - Short Form; and (5) questionnaire analysis of responses on the Automation Satisfaction Questionnaire. An additional section was included to identify possible correlations between the factors of age, work experience, years in the organization and years in current positions to job satisfaction and satisfaction with computer implementation.

Initial procedures included the preparation of data to determine how managers fell into the two independent variable categories: (1) training in a formal, introductory computer training program, and (2) perceived involvement in the computer implementation processes.

Procedures for Identification of Computer Training Criteria: Enrollment and Attendance Surveys

First, to identify a manager's participation in the Division's formal, introductory computer training program, weekly class enrollment sheets were surveyed to confirm selection, actual enrollment and attendance at 70 percent or seven out of ten class sessions. Managers not attending were assigned the rating "1" for "not computer trained" or control; and those attending were assigned the rating "2" for computer trained or "experimental" in the program. Of the 103 total participants, sixty pretest and sixty-one posttest managers were assigned experimental status; forty-

three pretest and forty posttest managers were assigned control status.

Procedures for Identifying Perceived Involvement: Open-ended Questionnaire for Management

In the questionnaire format developed by Lee (1985) for the "Open-ended Questionnaire for Management," she points out:

> Care was taken to develop response categories which were as general and inclusive as possible without misrepresenting or distorting the individual responses (62).

Criteria were developed to identify those managers who perceived themselves as being more involved in the computer implementation processes from those less involved. To identify a manager's perception of his/her involvement in the computer implementation processes, eight questions on the Open-ended Questionnaire for Management were selected: Items 2, 4a., 4b., 4c., 4d., 4e., 5 and 8 related to the manager's involvement in developing a need's assessment, the identification, selection and implementation of hardware, software, training, facility, and financial requirements for computerization, and ongoing support and perceptions of involvement in other pertinent computer process-related tasks. Managers with positively-oriented responses to less than 80 percent (less than six out of the eight selected items) were assigned a rating by the researcher of "1" for "less-involved" and managers with six or more positively-

oriented responses were assigned the rating "2" for "more involved."

Demographic Data

Data on population demographics were included in the "Biographical Background Sheet" attached as a front piece to the MSQ-SF and ASQ survey questionnaires and in the information section entitled "Demographic Data" on the Open-ended Questionnaire for Management. For this research items included for analysis were: gender, age, total years of work experience, total years with the company, and total years in present position. Gender was assigned the discrete value "1" for female or "2" for male; age, total years work experience, total years with the company, and total years on present job were reported within six ranges of years and in actual years. Group means and standard deviations were calculated and are reported in table 3.

Job Satisfaction Criteria: Minnesota Satisfaction Questionnaire - Short Form (MSQ-SF) Analysis Procedures

The Minnesota Satisfaction Questionnaire - Short Form (MSQ-SF) is a nationally standardized test developed in 1963 for use in business and industry to measure job satisfaction. Of the two forms, the Long and the Short, the latter was selected for administration in this study. Each participant responded to twenty items, one from each of the instrument's twenty scales including: ability utilization, achievement, activity, advancement, authority, company

policies and practices, compensation, coworkers, creativity, independence, moral values, recognition, responsibility, security, social service, social status, supervision-human relations, supervision-technical, variety, working conditions, and general satisfaction (Weiss et al. 1967). Response categories, with their corresponding weighting factors of "1" for least satisfied and "5" for most satisfied, were: Very Dissatisfied (1), Dissatisfied (2), Neither satisfied nor dissatisfied (3), Satisfied (4), and Very Satisfied (5).

Automation Satisfaction Questionnaire Analysis Procedures

The Automation Satisfaction Questionnaire (ASQ) was constructed by Lee (1985) in a format similar to the Minnesota Satisfaction Questionnaire - Short Form to measure satisfaction with automation implementation processes. Each participant responded to twenty items, one from each of the instrument's twenty scales including: satisfaction with the decision-making processes about computerization, hardware and software installation, location of equipment, formal and informal computer training support, adjustment time, management support, job changes, performance, quality and productivity levels, overall job satisfaction, management's computer equipment satisfaction, job security and internal motivation to work. Response categories, with their corresponding weighting factors of "1" for least satisfied and "5" for most satisfied, were: Very Dissatisfied (1),

Dissatisfied (2), Neither satisfied nor dissatisfied (3), Satisfied (4), and Very Satisfied (5).

Evaluation Instrumentation

A special-purpose computer software program, the SPSS-X Release 3.1 for DEC's VAX/VMS Version 5.0-2 was used for parametric analyses of the relationships within and between the independent and dependent variables. Tests included a two-way Analysis of Variance (ANOVA) for main effects and interactions, Cronbach's Coefficient Alpha Test for internal reliability of the research instruments and the Pearson Product-Moment Correlation Coefficient, r, for correlations between specific demographic/biographical factors and satisfaction. Each respondent was reported on each response to the twenty question sets on the MSQ-SF, the ASQ, the OEQ-M, and the demographic and biographical data sheets.

Statistical Methodology: ANOVA

The Analysis of Variance or ANOVA technique provides the method for testing the statistical significance of differences between means of several samples. It indicates whether observed differences among means of the samples may or may not be ascribed to sampling fluctuations. The analysis of variance technique may be used when there is more than one factor to be considered. For several factors, a cross-tabulation of values is prepared. According to Buros (1974, 1986) this application to multi-factor problems

enables the simultaneous evaluation of the significance of each of the factors involved (main effects) and of the effect of all combinations of factors (interactions). Computations are generally accomplished in a form known as an ANOVA table and consist of determining the sum of squares of the deviations divided by the appropriate degrees of freedom to obtain the estimates of variances.

This study used a two-way Analysis of Variance (ANOVA) test of significance with one dimension as perceived involvement and the other dimension as computer training (main effects) on the Minnesota Satisfaction Questionnaire - Short Form and the Automation Satisfaction Questionnaire; additionally, results were reported for interaction effects between the two independent variables. Means and standard deviations were calculated for posttest and differences between posttest and pretest data on the two survey instruments.

Statistical Methodology: Cronbach's Coefficient Alpha

Reliability of any test is the estimated average correlation of that test with all possible tests with the same number of items which are obtainable from sampling a domain. Cronbach's Coefficient Alpha reliability measurement provides a basic formula to determine reliability based on internal consistency (Nullally 1967).

Results of Cronbach's Alpha coefficient reliability tests were computed and data were presented to indicate

overall alphas for the Minnesota Satisfaction Questionnaire - Short Form and the Automation Satisfaction Questionnaire.

Statistical Methodology: Pearson's Product Moment, r

Six independent variables were selected for correlation: pre-, post- and differences between post- and pretests on the Minnesota Satisfaction Questionnaire - Short Form with the same combination of variables on the Automation Satisfaction Questionnaire. The four variables selected were: managerial age, total years of work experience, number of years in the organization, and number of years in the present position. For purposes of this research, significance levels at $p < .10$, .05 and .01 were considered.

Hypotheses to be Tested

Six hypotheses were constructed to test control and experimental groups on the impact of computerization on the work of managers and how perceived involvement and participation in a computer training program affected their job satisfaction and their satisfaction with the implementation processes. The following hypotheses were forwarded:

Hypothesis 1: Managers who perceive themselves as more involved in decision-making processes about computer implementation will have higher job satisfaction levels on

the Minnesota Satisfaction Questionnaire - Short Form than managers less involved.

Hypothesis 2: Managers who perceive themselves as more involved in decision-making processes about computerization will have higher computer implementation satisfaction levels on the Automation Satisfaction Questionnaire than managers who perceive themselves as less involved.

Hypothesis 3: Managers who are computer trained will have higher job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form than managers not computer trained.

Hypothesis 4: Managers who are computer trained will have higher computer implementation satisfaction levels on the Automation Satisfaction Questionnaire than managers not computer trained.

Hypothesis 5: Managers who perceive themselves as more involved in decision-making processes about computerization and computer trained will have higher job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form than managers less involved and not trained.

Hypothesis 6: Managers who perceive themselves as more involved in decision-making processes about computerization and computer trained will have higher satisfaction with computer implementation levels on the

Automation Satisfaction Questionnaire than managers less involved and not trained.

Summary

Five departments were selected from the largest division of a multi-national defense corporation in Southern California. All departments were at one location. Participants included managers and associated supervisory personnel who held a technical or professional status and made key decisions about computerization and/or allocated resources to support the computerization processes. Experimentals and controls within each of the five departments were identified. Experimental groups underwent the Division's formal, introductory computer training program sponsored by the company at an off-site location after hours. Experimental groups were also categorized to their perceived more or less involvement in the computer implementation processes using eight, pre-selected questions on the Open-ended Questionnaire for Management (OEQ-M). Survey instruments used for both experimental and control groups to determine job and computer implementation satisfaction included the Minnesota Satisfaction Questionnaire - Short Form (MSQ-SF) and the Automation Satisfaction Questionnaire (ASQ). Additionally, a Demographic Data Form and Bibliographic Data Form were developed to gather demographic data. A Trainer Survey was used as an adjunct indicator of trainer satisfaction.

Additionally, several demographic factors were investigated for possible correlation with job and implementation satisfaction using the Pearson Product- moment Correlation Coefficient, r.

For experimental groups, surveys were administered and collected by the researcher at an off-site training location; for the control groups, collection was at two main drop-off points at the main plant site.

Responses for involvement and training participation categories on the Open-ended Questionnaire for Management and computer training status sheets were reported on a discrete scale of "1" or "2." Data from the Minnesota Satisfaction Questionnaire - Short Form and Automation Satisfaction Questionnaire underwent parametric statistical analyses using each participant's response to each item with its accompanying assigned weighted value. A special-purpose computer assisted program, the SPSS-X for DEC's VAX/VSM Version 5.0-2, calculated data for the Analysis of Variance (ANOVA), Cronbach's Alpha Coefficient test for internal reliability, and the Pearson Product-moment Coefficient of Correlation, r. Four levels of significance were considered: $p < .10$, .05, .01 and not significant.

CHAPTER IV

ANALYSIS OF DATA

Introduction

Initial analyses were performed on the Demographic Data Form, Training Status sheets, and Open-ended Questionnaire for Management (OEM-Q) to determine classification criteria and descriptive factors for reporting. Parametric statistical approaches used the Two-way Analysis of Variance (ANOVA), Cronbach's Coefficient Alpha test of internal reliability, and the Pearson Product-moment Coefficient of Correlation, r. Job satisfaction on the Minnesota Satisfaction Questionnaire - Short Form (MSQ-SF) and satisfaction with implementation on the Automation Satisfaction Questionnaire (ASQ) as well as demographic factors were analyzed.

Analysis of Instrumentation

Demographic Data

The data from the Demographic Data Form are presented in table 4. A majority of participants were males, sixty-nine of 103 (67 percent) with only thirty-four of 103 or 33 percent reported as females, an almost 2:1 ratio. The mean age of managers was approximately forty years. Over 48 percent were over forty-five years old with twenty-seven (26 percent) between the ages of thirty-six and

forty-five; twenty-four (23 percent) managers reported twenty-five to thirty-five years and only two (2 percent) reported less than twenty-five years old. Ninety-nine managers (96 percent) had been employed over seven years, with only two employed four to seven years (2 percent). The mean number of years of service to the company was approximately 13.5 years with thirty-three managers reporting five or less years (32 percent), twenty-one reporting six to ten years (20 percent), and twenty-one reporting more than twenty-five (20 percent). The mean number of years of service in their current job position was slightly under eight years: forty (39 percent) managers reported five years or less (39 percent), thirty-four (33 percent) reported six to ten years (33 percent), and twenty-two (16 percent) reported eleven to fifteen years. Only seven (7 percent) managers reported they had been in their job between sixteen and twenty years.

In summary, a majority of managers from the five departments selected for the research were male, around forty years of age, had been in the workplace over eighteen years with over thirteen years of service to the company, and held their current job position about eight years.

TABLE 4

DEMOGRAPHIC CHARACTERISTICS FOR MANAGERS

	N	%	M	S.D.
Sex				
Male	69	67.0		
Female	34	33.0		
			1.6 (on 2 pt.scale)	.47
Age				
< 25	2	1.9		
25 - 35	24	23.3		
36 - 45	27	26.2		
> 45	50	48.5		
			38.42	.87
Years Employed				
< 5	4	3.9		
6 - 10	18	13.5		
11 - 15	28	27.2		
16 - 20	14	13.5		
21 - 15	17	16.5		
< 25	26	26.4		
			18.64	7.94
Years with Organization				
< 5	33	32.1		
6 - 10	21	20.4		
11 - 15	13	12.6		
16 - 20	7	6.8		
21 - 25	8	10.7		
< 25	21	20.5		
			13.46	9.42
Years in Present Job				
< 5	40	38.8		
6 - 10	34	33.1		
11 - 15	22	15.6		
16 - 20	7	6.8		
21 - 25	--	----		
< 25	--	----		
			7.84	4.75

Training Status

Managers selected to participate in the program were tracked for actual enrollment and continued attendance at 70 percent or seven out of ten class sessions. Managers not attending the training program were designated as the controls and managers attending the program were designated as the experimental group. There was a total of 103 managers in the pretest and 101 in the posttest. Of these, sixty experimentals were in the pretest, and sixty-one in the posttest. Controls were forty-three in the pretest and forty in the posttest. In several instances, a respondent in the control group changed to an experimental or vice versa within the same group; the mortality rate was very low, only two managers were lost in the research grouping and this was due to retirement. There were no replacements for any experimentals or controls.

Open-ended Questionnaire for Management

Participants perceived themselves as "more" or "less" involved in the computer implementation processes. Of the participants perceiving themselves as "more" involved forty-four were in the pretest and forty-six in the posttest. Of those perceiving themselves as "less" involved, fifty-nine were in the pretest, and fifty-five in the posttest. There were no instances of "no response" because an answer was nonapplicable or unknown (see table 3). All participants were clearly identified within the two categories and assigned discrete values.

Test of Internal Consistency

From the responses on the Minnesota and Automation Satisfaction Questionnaires, Cronbach's Alpha coefficients were computed for internal consistency. On the Minnesota Satisfaction Questionnaire - Short Form (MSQ-SF), Cronbach's alpha posttest = .92, showed a high degree of internal consistency. On the Automation Satisfaction Questionnaire Cronbach's alpha posttest = .93 also showed a high degree of internal consistency.

Tests of the Hypotheses

Each research hypothesis was tested using means and standard deviations. The parametric statistic Analysis of Variance (ANOVA) for the Minnesota Satisfaction Questionnaire - Short Form (MSQ-SF) and the Automation Satisfaction Questionnaire (ASQ) were obtained and results reported for differences posttest - pretest data.

Difference, Posttest - Pretest Results

Hypothesis 1: Managers who perceive themselves as more involved in decision-making processes about computer implementation will have higher job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form than managers less involved.

Differences, posttest - pretest, group means and standard deviations were calculated for the Minnesota Satisfaction Questionnaire - Short Form. Managers who

perceived themselves more involved in the decision-making processes about computerization had higher job satisfaction levels than those managers perceiving themselves less involved. The means and standard deviations are presented in table 5.

Hypothesis 1 was tested using a 2 X 2 Analysis of Variance (ANOVA) procedure and the following result was obtained: the dependent variable, perceived involvement, was a significant main effect at $F(1,101) = 35.38$, $p < .001$. The results are presented in table 7.

Hypothesis 2: Managers who perceive themselves as more involved in decision-making processes about computerization will have higher computer implementation satisfaction levels on the Automation Satisfaction Questionnaire than managers who perceive themselves as less involved.

Differences, posttest - pretest, group means and standard deviations on the Automation Satisfaction Questionnaire were computed. Managers who perceived themselves more involved in the decision-making processes about computerization had higher computer implementation satisfaction levels than managers who perceived themselves as less involved. The means and standard deviations are in table 6.

Hypothesis 2 was tested using a 2 X 2 Analysis of Variance (ANOVA) procedure and the following result was obtained: the dependent variable, perceived involvement, was

a significant main effect at $F(1,101) = 13.63$, $p < .001$. The results are presented in table 7.

Hypothesis 3: Managers who are computer trained will have higher job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form than managers not computer trained.

Differences, posttest - pretest, group means and standard deviations for the Minnesota Satisfaction Questionnaire - Short Form were calculated. Managers who were computer trained had higher job satisfaction levels than managers not trained. The means and standard deviations are presented in table 5.

Hypothesis 3 was tested using a 2 X 2 Analysis of Variance (ANOVA) procedure and the following result was obtained: the dependent variable, computer trained, was a significant main effect at $F(1,101) = 1.38$, $p < .024$. The results are presented in table 7.

Hypothesis 4: Managers who are computer trained will have higher computer implementation satisfaction levels on the Automation Satisfaction Questionnaire than managers not computer trained.

Differences, posttest - pretest, group means and standard deviations for the Automation Satisfaction Questionnaire were calculated. Managers who were computer trained had higher computer implementation satisfaction levels than managers not trained. The means and standard deviations are presented in table 6.

Hypothesis 4 was tested using a 2 X 2 Analysis of Variance (ANOVA) procedure and the following result was obtained: the dependent variable, computer trained, was a significant main effect at $F(1,101) = 8.30$, $p < .005$. The results are presented in table 8.

Hypothesis 5: **Managers who perceive themselves as more involved in decision-making processes about computerization and computer trained will have higher job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form than managers less involved and not trained.**

Differences, posttest - pretest, group means and standard deviations for the Minnesota Satisfaction Questionnaire - Short Form were calculated. Managers who perceived themselves more involved in the decision-making processes about computerization and computer trained had higher job satisfaction levels than managers who perceived themselves as less involved and not computer trained. The means and standard deviations are presented in table 5.

Hypothesis 5 was tested using a 2 X 2 Analysis of Variance (ANOVA) procedure and the following results were obtained: Responses on the Minnesota Satisfaction Questionnaire - Short Form showed that the computer trained X perceived involved interaction effect was not significant at $F(1, 101) = 2.32$, $p < .131$. The results are presented in table 7.

Hypothesis 6. Managers who perceive themselves as more involved in decision-making processes about computerization and computer trained will have higher satisfaction with computer implementation levels on the Automation Satisfaction Questionnaire than managers less involved and not trained.

Differences, posttest - pretest, group means and standard deviations for the Automation Satisfaction Questionnaire were calculated. Managers who perceived themselves more involved in the decision-making processes about computerization and computer trained had higher computer implementation satisfaction levels than managers who perceived themselves as less involved and not computer trained. The means and standard deviations are presented in table 6.

Hypothesis 6 was tested using a 2 X 2 Analysis of Variance (ANOVA) procedure and the following results were obtained: Responses on the Minnesota Satisfaction Questionnaire - Short Form showed the computer trained X perceived involved interaction effect was marginally significant at $F(1, 101) = 3.03$, $p < .085$. The results are presented in table 8.

TABLE 5

MEANS AND STANDARD DEVIATIONS DIFFERENCES POSTTEST-PRETEST COMPUTER TRAINING AND PERCEIVED INVOLVEMENT - MINNESOTA SATISFACTION QUESTIONNAIRE - SHORT FORM (MSQ-SF)

	Differences Posttest - Pretest Perceived Involved				
	Less		More		
	M	S.D.	M	S.D.	Totals
No	-.39	.39	.44	.53	-.15
Differences Post - Pretest Computer Trained					
Yes	-.08	.75	.48	.44	.33
Totals	-.29		.45		.14

TABLE 6

MEANS AND STANDARD DEVIATIONS DIFFERENCES POSTTEST - PRETEST COMPUTER TRAINING AND PERCEIVED INVOLVEMENT AUTOMATION SATISFACTION QUESTIONNAIRE (ASQ)

	Differences Posttest - Pretest Perceived Involved				
	Less		More		
	M	S.D.	M	S.D.	Totals
No	-.23	.46	.39	.40	-.06
Differences Post- Pretest Computer Trained					
Yes	.28	.80	.52	.36	.47
Totals	-.07		.49		.26

TABLE 7

ANOVA FOR MAIN AND 2-WAY INTERACTION EFFECTS DIFFERENCES POST - PRETEST/COMPUTER TRAINING AND PERCEIVED INVOLVEMENT ON THE MINNESOTA SATISFACTION QUESTIONNAIRE - SHORT FORM (MSQ-SF)

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects:					
Posttest - Pretest Training	.32	1	.32	1.38	.024
Posttest - Pretest Perceived Involvement	8.28	1	8.28	35.38	.001
2-Way Interactions:					
Posttest - Pretest Training & Perceived Involvement	.54	1	.54	2.32	.131
Explained	14.30	3	4.77	20.37	.001
Residual	22.47	96	.23		
Total	36.77	99	.37		

TABLE 8

ANOVA FOR MAIN AND 2-WAY INTERACTION EFFECTS DIFFERENCES POSTTEST - PRETEST/COMPUTER TRAINING AND PERCEIVED INVOLVEMENT ON THE AUTOMATION SATISFACTION QUESTIONNAIRE (ASQ)

Source of Variation	Sum of Squares	DF	Mean Square	F	Sig. of F
Main Effects:					
Posttest - Pretest Training	1.81	1	1.81	8.30	.005
Posttest - Pretest Perceived Involvement	2.97	1	2.97	13.63	.001
2-Way Interactions:					
Posttest - Pretest Training & Perceived Involvement	.66	1	.66	3.03	.085
Explained	10.27	3	3.42	15.72	.001
Residual	21.13	97	.22		
Total	31.40	100	.31		

Additional Statistical Data: Pearson Product-moment Correlation Coefficient, r, and Demographic Data

This section identified four special demographic factors with job and computer implementation satisfaction, these factors included: (1) manager age; (2) total years of work experience; (3) total years employed in the organization; and (4) total years in current job position. Each factor was correlated using the Pearson Product-moment Correlation Coefficient r test for Pre-, Post-, and Differences, Posttest - Pretest, on the Minnesota Satisfaction Questionnaire - Short Form and the Automation Satisfaction Questionnaire.

In table 9, demographic factors were matrixed to job satisfaction and computer implementation satisfaction for r values with significance at $p < .10$. Major findings included:

1. Only on the Pretest Minnesota Satisfaction Questionnaire was age consideration significant as a factor in job or implementation satisfaction during computer conversion. Age tended not to be significant for job or computer implementation satisfaction for other test data.

2. On the Pretest and Posttest Minnesota, and Pretest Automation Satisfaction Questionnaires, total years of work experience were significant, suggesting that managers with increased years of service may be less satisfied with their job and the computer implementation

processes in the initial and possibly later phases of computer conversion.

3. On the Pretest and Posttest Minnesota Satisfaction Questionnaire and the Posttest, and Differences Pretest - Posttest on the Automation Satisfaction Questionnaire, total years in the organization were significant influence suggesting that as managers accumulated more service years in the same company, the less satisfied they tended to be with their job and conversion changes; and, lastly,

4. On the Pretest and Posttest Minnesota and Pretest, Posttest, and Differences, Post- Pretest, Automation Satisfaction Questionnaire, total years in current job position had the most significant influence of the four factors investigated, suggesting that managers who were in their current job a shorter period of time tended to be more satisfied with both their job and the computer implementation processes during conversion.

In summary, of the four factors, a manager's years in job position tended to have the highest correlation to job and implementation satisfaction levels: overall, as years in job position increased, both satisfaction levels tended to decrease; total years in the organization followed: overall, as years in the organization decreased, satisfaction levels tended to increase. A slight trend in total years work experience to satisfaction levels was observed: as total work years decreased, satisfaction

levels tended somewhat to increase. And, in general age tended not to be a meaningful factor for increased satisfaction on the job or with the computer implementation processes during conversion.

TABLE 9

PEARSON PRODUCT-MOMENT COEFFICIENTS OF CORRELATION, r, FOR SELECTED DEMOGRAPHIC DATA

	Age	Work Experience	Years in Organization	Years in Position
MSQ - SF:				
PRE-	-.09*	-.14*	-.18*	-.26*
POST-	.02	-.16*	-.14*	-.21*
DIFFERENCES				
POST- - PRE-	.10	-.08	-.00	-.02
ASQ:				
PRE-	-.11	-.20*	-.04	-.15*
POST-	-.09	-.21	-.15*	-.05*
D POST- - PRE-	-.01	-.09	-.18*	-.22*

Note: * Significant at $p < .10$, 1-tail.

Summary

Computerized parametric statistical approaches were used to evaluate responses on the Minnesota Satisfaction Questionnaire - Short Form (MSQ-SF) and Automation Satisfaction Questionnaire (ASQ) for means and standard deviations and a 2 X 2 Analyses of Variance (ANOVA); the

program also established Cronbach's Coefficient Alphas for internal reliability.

Initial analyses were performed on the demographic data, training sheets, Open-ended Questionnaire for Management and Trainer Survey to determine classification criteria and descriptive factors for reporting. The Pearson Product-moment Coefficient Correlation, r, was then used in a correlation study between job and computer implementation satisfaction levels and four of the demographic factors. Data were arranged in tabular and matrix formats.

CHAPTER V

SUMMARY AND CONCLUSIONS

Introduction

This chapter includes a summary of the study, a discussion of the findings as they apply to the research hypotheses and questions, conclusions, and recommendations for future research.

Summary

The purpose of this study was to describe the implementation of computerization as viewed by managers from five business offices located in a single large division of a multi-national defense corporation in Southern California. Special emphasis was placed on the training accompanying the implementation.

An extensive literature search was undertaken in preparation for the study to historically follow the emergence of the computerized office. Although computerization is relatively new it is fast becoming a pervasive work mode influence in the United States workplace.

The fields of socio-technical research involving the social ramifications of technological change provided the theoretical baseline for the study. Literature from related fields included planned change, decision-making theory and

examples in the computerized office, job satisfaction, motivation theory, computerization and the work of managers and organizational computer training.

Three major survey instruments were used in this study: (1) Minnesota Satisfaction Questionnaire - Short Form (MSQ-SF) to indicate degrees of job satisfaction; (2) Automation Satisfaction Questionnaire (ASQ) to indicate the degree of satisfaction with the computer implementation processes, and (3) Open-ended Questionnaire for Management (OEQ-M) to indicate "more or less" degrees of involvement in the computer implementation processes.

The data were gathered on-site and off-site at the training location and within the department setting by the researcher and subjected to descriptive analyses and parametric statistical analyses including 2 X 2 Analysis of Variance (ANOVA) and Cronbach's Alpha Coefficient. Differences between posttest - pretest data are presented. Additionally, Pearson Product-moment Correlation Coefficients, r, were run on several specific demographic factors with the Minnesota Satisfaction Questionnaire - Short Form and the Automation Satisfaction Questionnaire survey instruments.

Findings

The findings from the data which were presented in chapter IV are discussed in this section. The results of differences between posttest - pretest group means and

standard deviations, and the 2 x 2 Analysis of Variance (ANOVA) are presented. The Pearson's Product-moment Correlation Coefficient, r, is discussed to show correlated relationships between selected demographic data. The section concludes with the restatement of the research questions. Pertinent findings from the data are discussed in relationship to applications in the computerized workplace. A summary of research questions, hypotheses, and differences posttest - pretest are presented in tables 12 and 13.

Main Criteria: Difference, Posttest - Pretest Results, Hypotheses 1 - 6

Research Hypothesis 1: Managers who perceive themselves as more involved in decision-making processes about computer implementation will have higher job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form than managers less involved.

The first hypothesis was supported. On the Minnesota Satisfaction Questionnaire - Short Form for differences between posttest - pretest, those managers who perceived themselves more involved made more gains in satisfaction levels than managers who perceived themselves less involved. This finding is significant to companies converting to computerization. Employees who are actively involved in making decisions about computerization will tend be more satisfied with their job activities than those managers not actively involved. It is suggested that care

be taken to support these managers by providing an involvement awareness program prior to and during the initial phases of the conversion to enhance this effect.

Research Hypothesis 2: Managers who perceive themselves as more involved in decision-making processes about computerization will have higher computer implementation satisfaction levels on the Automation Satisfaction Questionnaire than managers who perceive themselves as less involved.

The second hypothesis was supported. On the Automation Satisfaction Questionnaire those managers who perceived themselves more involved made more gains in satisfaction levels than managers who perceived themselves less involved. This finding is significant to companies converting to computerization. Employees who are actively involved in making decisions about computerization will tend to be more satisfied with the computer implementation processes than those managers not actively involved. It is suggested that care be taken to support these managers by providing an involvement awareness program prior to and during the initial phases of the conversion to enhance this effect.

Research Hypothesis 3: Managers who are computer trained will have higher job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form than managers not computer trained.

The third hypothesis was supported. On the Minnesota Satisfaction Questionnaire - Short Form those managers who were computer trained made more gains in satisfaction levels than managers who were not computer trained. This finding is significant to companies converting to computerization. Employees who participate in a computer training program during computer conversion will tend to be more satisfied with their job activities than those managers not actively involved. This finding is significant to companies converting to computerization. Employees who are computer trained will tend to be more satisfied with their job activities than those managers not trained. It is suggested that care be taken to support these managers by providing continuous educational programs during the initial phases and continuing through implementation to enhance this effect.

Research Hypothesis 4: Managers who are computer trained will have higher computer implementation satisfaction levels on the Automation Satisfaction Questionnaire than managers not computer trained.

The fourth hypothesis was supported. On the Automation Satisfaction Questionnaire those managers who were computer trained made more gains in satisfaction levels than managers who were not computer trained. This finding is significant to companies converting to computerization. Employees who participate in a computer training program during computer conversion will tend be more satisfied with

the computer implementation processes during conversion than those managers not trained. This finding is significant to companies converting to computerization. Employees who participate in a computer training program during computer conversion will tend to be more satisfied with the computer conversion activities than those managers not computer trained. This finding is significant to companies converting to computerization. Employees who are computer trained will tend be more satisfied with their job activities than those managers not trained. It is suggested that care be taken to support these managers by providing continuous educational programs during the initial phases and continuing through implementation to enhance this effect.

Research Hypothesis 5: Managers who perceive themselves as more involved in decision-making processes about computerization and computer trained will have higher job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form than managers less involved and not trained.

The fifth hypothesis was not supported. On the Minnesota Satisfaction Questionnaire - Short Form those managers who perceived themselves more involved and computer trained did not make higher gains in job satisfaction ratings than managers who perceived themselves as less involved and not trained. There was no significant interaction effect between computer training and perceived

involvement. This finding is extremely significant for companies converting to computerization. Managers who are more involved in the decision-making processes about computerization need an educational program on how to manage staff and other managerial level personnel to increase the satisfaction with the work activities; however, their additional participation in an introductory computer training program does not tend to increase their job satisfaction. The converse also holds here: if the company has elected to provide a computer training program, managers who are trained need a continued education program to increase their satisfaction with work activities; however, these managers' additional involvement in decision-making activities about computerization does not tend to increase their job satisfaction additionally.

Research Hypothesis 6: Managers who perceive themselves as more involved in decision-making processes about computerization and computer trained will have higher satisfaction with computer implementation levels on the Automation Satisfaction Questionnaire than managers less involved and not trained.

The sixth hypothesis was marginally supported. On the Automation Satisfaction Questionnaire, those managers who perceived themselves more involved and computer trained tended to have slightly higher gains in computer satisfaction levels than managers who perceived themselves less involved and not computer trained. There was a

marginally significant interaction effect between perceived involvement and computer training. This finding is extremely significant for companies converting to computerization. The effect is significant at the $p < .10$ level. Companies in real-time decision-making have a nine out of ten chance that the two variables will be significant. In practical, everyday situations this is significant. Managers who are more involved in the decision-making processes about computerization need an educational program to support staff and other managerial level personnel to increase their satisfaction with the computer implementation activities; and, their additional participation in an introductory computer training program would tend to increase their satisfaction with the implementation processes as well.

Summary of Conclusions from the Hypotheses

The findings from differences between posttest - pretest data supporting Hypotheses 1 through 6 suggest that either having the manager participate in an introductory computer training program or involving him/her in the decision-making processes about computerization will provide a gain in job or implementation satisfaction levels; and that having the manager both participate in the computer training program and involving him/her in decision- making processes about computerization will not provide rater gains in job satisfaction but may provide gains in satisfaction

with the computer implementation processes. The following statements are concluded from this study:

1. Managers who were given formal computer training at the introductory levels were more satisfied with their jobs and the computer implementation processes during conversion than managers not trained.

2. Mangers who perceived themselves as being more involved in the decision-making processes about computer implementation were more satisfied with their jobs and the computer implementation processes during conversion than managers less involved.

3. The interactive effects of the dependent variables of those perceived more involved and computer trained did not produce higher gains in job satisfaction, pointing to the fact that managers who either perceived themselves as more involved or who were computer trained would lead to increased job satisfaction levels rather than a cumulative effect from both variables. Interactive effects of the two variables were marginally significant for increasing satisfaction with the computer implementation processes, pointing to the possibility that with an increase in managerial involvement and participation in training to support computerization greater gains may result. In the everyday work environment, this statistical significance is enhanced, especially when large companies consider that hundreds of employees will participate during the

conversion, thereby enhancing the probability of greater satisfaction gains.

Implementation Considerations

Because of these and other research findings, as reported in the "Literature Review" section, the final recommendations serve as a practical guide for those considering the implementation of computers in the workplace.

Because each workplace environment is unique, the planning stage must identify elements crucial to successful implementation. It is well documented and reported in this study that many researchers suggest that a thorough needs assessment is the foundation and first step in the decision-making process. As was suggested, specific questions should be considered as indicators prior to any final decisions regarding implementation:

1. How will top management and line supervisors be involved in the processes about computerization?

2. Will management be given formal, introductory training and be provided with ongoing support? Key issues in training to be considered should include:

    a. Supportive, professional training personnel
    b. Clearly written manuals
    c. Adequate learning time
    d. Disruption-free learning environment
    e. Reduced production pressures

The literature and this research supports the fact that effective management of a computerized system requires training of managers to understand the various functions and their applications so they can best provide guidance to their staff. Given that "involvement" is an important ingredient, the practical nature of technology infusion is paramount to the success of the company. As supported by this research and other investigators, managers must themselves use the technology tool or at minimum become familiar with their usage. A predicted, successful outcome eight out of ten times in the business environment is substantial justification for implementing a pilot project if not a full program.

In the process of planning for computerization it is crucial that the emphasis lies in the direction of purchasing equipment that will meet the requirement of managers by providing a tool to apply to their work tasks rather than adapting managers to the equipment.

3. What are the present and projected requirements and how does the equipment, software and training support match those needs? How will the equipment be adapted to specific work tasks?

4. How will computerization affect the social structure of the work environment considering the established norms, the rewarding aspects of employees' jobs, growth needs of the company and staff morale? Resistance is costly in terms of absenteeism, loss of time-on-task and

grievance procedures. As the literature and this research point out, all of these factors are important considerations for implementing computerization in the workplace.

Concluding Statement

In conclusion, this research is significant in that it is a basic inquiry and investigation in an area which is becoming critical to business success--the implementation of technological tools at managerial levels. With emphasis on how managers are involved in the socialization processes during conversion, and what effect participating in training intervention has on their satisfaction levels within that environment, provides valuable information on which approaches best satisfy the company and the worker and gives insight into ways to maximize effort and attain successful implementation for both sides.

Recommendation for Further Research

This study includes a descriptive and statistical analysis of several indicators to determine the success of implementing computerization in five business departments in a large corporation. The following suggestions are offered as areas in which further research could be conducted:

1. Replication of this study in other large corporations or other government-supported companies where requirements demand computerized documentation.

2. Extension of the study to a longitudinal research investigation where a more detailed accounting of factors which could influence the interaction effect between perceived involvement and computer training could be recorded and evaluated for management levels.

3. Extension of the study to include evaluation of managerial effectiveness during instructor-led, a vendor-supported, a computer-assisted, or a self-taught training programs.

4. Revision of the study to address the effects between supportive departments which are not computerized with supportive departments which are computerized.

APPENDICES

APPENDIX A

SURVEY PACKET COVER LETTER

BIOGRAPHICAL DATA FORM

ATTACHMENT TO QUESTIONNAIRE:

GROUP ONE - MODULE I
No. AR-54, 8

Dear Participant:

I am a doctoral candidate at the University of La Verne, and am collecting data for my dissertation. The topic is:

TRAINING FOR OFFICE AUTOMATION: THE EFFECTS OF A COMPUTER-BASED TRAINING PROGRAM ON EMPLOYEE JOB SATISFACTION AND PERFORMANCE

The purpose of this survey is to determine the level of job satisfaction experienced by workers who use automated office equipment (the personal computer) and the role training plays in aiding the introduction of new automated devices.

Individual responses will be kept confidential and anonymous; replies will be on the employee's own time. DO NOT WRITE YOUR NAME NOR THE NAME OF THE COMPANY ON ANY SHEET. The compiled results of all participants will serve as the basis for my thesis.

Throughout this questionnaire, the term 'automated' refers to computer-based equipment such as: the Apple MacIntosh microcomputer, the IBM and IBM clone (AT, XT) microcomputers, and dot- and laser-writer printers, and any hardware that serves as an input or output device for a computer.

Your timely reply is sincerely appreciated. If you have any questions, please contact me at home (714) 633-3996.

I sincerely appreciate your time and effort in filling out the information,

Zondra Lewis-Knapp

Zondra Lewis-Knapp

BIOGRAPHICAL BACKGROUND

1. Gender: Male_____ Female_____

2. Age:
Under 25_____ 25-35_____ 36-45_____46-55_____ over 55_____

3. Education: (Check appropriate box(es):
_____ Grade School
_____ Some high school
_____ Some Business College or Technical School experience
_____ Some College Experience (other than business/technical)
_____ Business College or Technical School Degree
_____ College experience
_____ College degree
_____ Some graduate work
_____ Master's degree or higher

4. My job title is:_____

5. Years (total) with Company: (Check one)
_____ under 1 _____ 1-5 _____ 6-10 _____11-15
_____16-20 _____ 20-15 _____ over 25

6. Have you ever used a CRT (Cathode Ray Tube/Monitor) before?
_____ yes _____no

7. If yes to Item 6, was it during the performance of your job?
_____ yes _____no

8. How would you rate your experience with a computer system?

_____ No experience
_____ Minor experience
_____ Moderately experienced
_____ Very experienced

9. Is one of your major objectives for taking this class to enhance your job skills? _____ Yes _____No

10. Are you a manager? _____ Yes _____ No. If Yes, do you feel that computerizing your office will create a more effective work setting? _____ Yes _____No. Please explain if no.

APPENDIX B

MINNESOTA SATISFACTION REQUEST LETTER

MINNESOTA SATISFACTION QUESTIONNAIRE - SHORT FORM

UNIVERSITY OF MINNESOTA
TWIN CITIES

Department of Psychology
Elliott Hall
75 East River Road
Minneapolis, Minnesota 55455

May 3, 1988

Zondra L. Lewis-Knapp
2137 East Larkstone Drive
Orange, CA 92667

Dear Ms. Lewis-Knapp:

We are pleased to grant you approval to use the Minnesota Satisfaction Questionnaire Short Form and to include a copy of the questionnaire instrument for your doctoral thesis.

We request that you send us a copy of your completed study to Vocational Psychology Research so we may include it in our archival documentation.

Thank you again for expressing interest in our materials and please do not hesitate to contact us if we can provide any further services for you in your effort.

Sincerely,

Ellen Stewart
Assistant Director
Vocational Psychology Research

minnesota satisfaction questionnaire

(short-form)

Vocational Psychology Research

UNIVERSITY OF MINNESOTA

APPENDIX C

AUTOMATION SATISFACTION QUESTIONNAIRE

APPENDIX D

OPEN-ENDED QUESTIONNAIRE FOR MANAGEMENT REQUEST LETTER

OPEN-ENDED QUESTIONNAIRE FOR MANAGEMENT

MAY-JUNE-JULY, 1988

TO: ALL SUPERVISORY AND MANAGEMENT PERSONNEL

This `Open-Ended Questionnaire for Management' is an integral part of the Division Automation Project. The survey is voluntary and to be completed only during your off-hours time. All responses will be confidential and anonymous. Do not write you name nor the name of the company on any of the sheets.

Please return the completed questionnaire to:

There is a tray marked Questionnaire Returns' for your convenience on the cabinet straight ahead as you enter the office. Please do not disturb his secretary.

Thank you so much for your help -- you are the key to the project's successful implementation.

Zondra Lewis-Knapp

APPENDIX E

TRAINER SURVEY REQUEST LETTER

TRAINED SURVEY

MAY-JUNE-JULY, 1988

TO: ALL COMPUTER TRAINING TRAINERS

This Trainer Survey Questionnaire is an integral part of the Division Automation Project. The survey is voluntary and to be completed only during your off-hours time. All responses will be confidential and anonymous. Do not write you name nor the name of the company on any of the sheets.

Please return the completed questionnaire to:

There is a tray marked Questionnaire Returns' for your convenience on the cabinet straight ahead as you enter the office. Please do not disturb his secretary.

Thank you so much for your help -- you are the key to the project's successful implementation.

Zondra Lewis-Knapp

APPENDIX F

SUMMARY OF RESEARCH HYPOTHESES, DIFFERENCE POST - PRETEST RESULTS AND DISCUSSION

SUMMARY OF RESEARCH HYPOTHESES, DIFFERENCES PRE-POST AND DISCUSSION

Hypothesis	Acceptance/ Rejection	Discussion
Hypothesis 1: Managers who perceived themselves as more involved in the decision-making processes about computer implementation will have higher job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form than managers less involved.	Accepted $p < .001$	Hypotheses 1 & 2: Perceived involvement has a significant in-influence on managers' job satisfaction levels. A significant difference lies between managers who perceive themselves as more involved from those less involved.
Hypothesis 2: Managers who perceived themselves as more involved in the decision-making processes about computer implementation will have higher computer implementation satisfaction levels on the Automation Satisfaction Questionnaire than managers less involved.	Accepted $p < .001$	
Hypothesis 3: Managers computer trained will have higher job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form than managers not trained.	Accepted $p < .038$	Hypotheses 3 & 4: Managers computer trained have a significantly higher job and computer implementation satisfaction level than those managers not trained.
Hypothesis 4: Managers computer trained will have higher computer implementation satisfaction levels on the Automation Satisfaction Questionnaire than managers not trained.	Accepted $p < .005$	

Hypothesis	Acceptance/ Rejection	Discussion
Hypothesis 5: Managers who perceive themselves as more involved in the decision-making processes and computer trained will have higher job satisfaction levels on the Minnesota Satisfaction Questionnaire - Short Form than managers less involved and not trained.	Rejected $p < .131$	Hypothesis 5: Managers who perceive themselves as more involved and computer trained are not significantly more satisfied with their job or the computer implementation processes than managers less involved and not trained. The interaction between training and perceived involvement was not significant; therefore, the hypothesis was rejected and the null was accepted.
Hypothesis 6: Managers who perceive themselves more involved in the decision-making processes and computer trained will have higher computer implementation satisfaction levels the Automation Satisfaction Questionnaire than managers less involved and not trained.	Marginally Accepted $p < .10$ [$p < .085$)]	Hypothesis 6: Managers who perceive themselves as more involved and were computer trained tend to be more satisfied with the computer implementation processes than those less involved and not trained.

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