NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

The Social and Behavioral Impacts
of
Information Systems
in the
Automated Office:
A Literature Review

by

Joseph P. Cavanaugh

December 1991

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REPORT DOCUMENTATION PAGE		Form Approved OMB No. 0704-0188

1a REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b RESTRICTIVE MARKINGS
2a SECURITY CLASSIFICATION AUTHORITY Multiple Sources	3 DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution is unlimited.
2b DECLASSIFICATION/DOWNGRADING SCHEDULE	

4 PERFORMING ORGANIZATION REPORT NUMBER(S)	5 MONITORING ORGANIZATION REPORT NUMBER(S)

6a NAME OF PERFORMING ORGANIZATION Naval Postgraduate School	6b OFFICE SYMBOL (If applicable)	7a NAME OF MONITORING ORGANIZATION Naval Postgraduate School
6c. ADDRESS (City, State, and ZIP Code) Monterey, CA 93943-5000		7b ADDRESS (City, State, and ZIP Code) Monterey, CA 93943-5000

8a NAME OF FUNDING/SPONSORING ORGANIZATION	8b OFFICE SYMBOL (If applicable)	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c ADDRESS (City, State, and ZIP Code)		10 SOURCE OF FUNDING NUMBERS

PROGRAM ELEMENT NO	PROJECT NO	TASK NO	WORK UNIT ACCESSION NO

11 TITLE (Include Security Classification) THE SOCIAL AND BEHAVIORAL IMPACTS OF INFORMATION SYSTEMS IN THE AUTOMATED OFFICE: A LITERATURE REVIEW. (UNCLASSIFIED)

12 PERSONAL AUTHOR(S) Cavanaugh, Joseph P.

13a TYPE OF REPORT Master's Thesis	13b TIME COVERED FROM _____ TO _____	14 DATE OF REPORT (Year, Month, Day) December 1991	15 PAGE COUNT 93

16 SUPPLEMENTARY NOTATION

17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	Computers, Ergonomics, Information Systems, Office Automation, Office of the Future, Office Information Systems

19 ABSTRACT (Continue on reverse if necessary and identify by block number)

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The conclusion reached in this paper is that little in the way of empirical research has been done on this subject. By identifying, catgorizing, and reviewing these articles others will have a framework for

20 DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS	21 ABSTRACT SECURITY CLASSIFICATION Unclassified	
22a NAME OF RESPONSIBLE INDIVIDUAL William J. Haga	22b TELEPHONE (Include Area Code) (408) 646-3094	22c OFFICE SYMBOL AS/Hg

SECURITY CLASSIFICATION OF THIS PAGE

block 19 (cont.)
future research

SECURITY CLASSIFICATION OF THIS PAGE

Unclassified

ii

Approved for public release; distribution is unlimited.

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Submitted in partial fulfillment of the
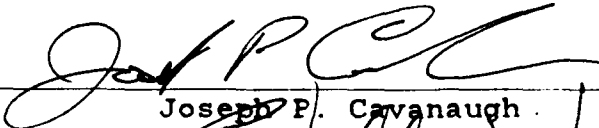requirements for the degree of

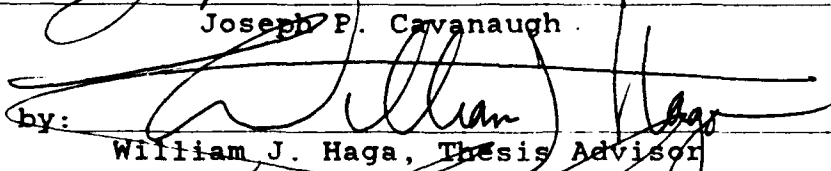MASTER OF SCIENCE IN INFORMATION SYSTEMS
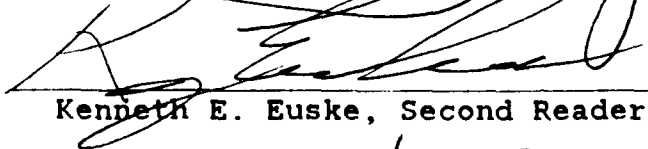
from the

NAVAL POSTGRADUATE SCHOOL

December 1991
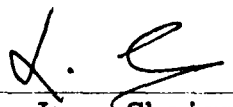
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ABSTRACT

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The articles were published in a variety of academic and non-academic journals. All of the articles reviewed were published between 1975 and 1990. The articles were divided into eight categories. The categories include communications, ethical /medical concerns, ergonomics, office automation, the office of the future, managerial / organizational aspects, social / behavioral aspects, and training.

The conclusion reached in this paper is that little in the way of empirical research has been done on this subject. By identifying, categorizing, and reviewing these articles others will have a framework for future research.

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I. INTRODUCTION

A. PURPOSE

The purpose of this thesis is to categorize and historically identify a segment of the academic and non-academic literature, which has been written on the behavioral and social impacts of information systems on the automated office. This thesis attempts to identify the current literature available on the subject and present it in a way so as to enhance future research in this area. It will also provide a platform for further research into the effects of introducing computers in the office environment.

This thesis will survey other studies in the area of the role of information systems in the automated office. By understanding what information is available on the subject, and where that information may be obtained, future researchers may have a better awareness of where to begin in understanding the effects of technology on the behavior of people and their social environs.

B. BACKGROUND

Questions concerning the effects of using computers in the workplace have arisen ever since their incorporation into the corporate organization. The topics have been many and varied. Through the evolution of data-processing and word-processing to the automated office, the cause-effect relationship of computing and its effects on the workplace has been continually questioned by researchers in the information systems field, the management field, and social scientists.

Research and topics of discussion on the effects of computers in the automated office have always included such issues as worker effectiveness, office efficiency, cost-savings and decision-making. Examples of these issues include the changes in employee performance due to the implementation of computers into the workplace and whether there is a real or perceived increase in office efficiency due to new technologies.

However, in the past decade other issues have started to surface in the work environment concerning the impacts of computers in the office which are now being discussed and researched by management and information systems experts, as well as social scientists. These issues deal with the social and behavioral effects of information technology. Topics include such diverse areas as Quality of Work (QOW),

computer anxiety, worker attitudes and behaviors, just to name a few. Examples of these topics include whether or not the quality of work life has improved with the introduction of automated systems into the office environment and the increase in stress related injuries which is believed to be caused by new technologies in the office.

The literature relating to these issues include both empirical studies and essays , but their purpose is the same: to bring about a better understanding of the impacts of computers in our society. There are over 100 journals and publications which have broached the subject of the effects of computerization on the automated office. Multiply that by the range of topics that encompass the field of information systems and it is easy to see the need for a categorization and review of the literature.

Academia and business alike have a need to understand the problems associated with the introduction of these new information technologies so as to better understand how to improve future systems and also how to deal with the human problems related to the implementation of new information system technologies.

The introduction of computers into the workplace has overlapped many different areas of study. Information systems and their implementation into the office environment

concerns not only the management information systems specialist, but also managers in organizations and social and behavioral scientists as well.

In order to fully understand the impact associated with the introduction of information systems into the automated office it is necessary to see what has been written on the subject. This thesis will attempt to bring some cohesiveness to the information that is available and at the same time determine if there are any changes related to the introduction of office information systems. By presenting the information available in this format others may have a better understanding of the implications of future information systems.

C. METHODOLOGY

1. Introduction

This section describes the literature reviewed for this thesis. Included is a listing of the publications used and a description of the classification of the publication. Also in this section is a discussion of the constraints placed on the topics included in the research.

2. Scope of Literature Review

There is a great deal of literature, available to researchers, covering the topics of computers and information systems. As was discussed earlier, there are basically three fields of study when discussing information systems and their interaction with people. For the purposes of this study, the journals used were divided into three categories:

1. organization/management

2. computers/information systems

3. social/behavioral

A comprehensive review of all literature that deals with the subject of the impacts of computers in the automated office is beyond the scope of this present paper. A selected set of journals was chosen to represent the variety of publications available. The journals chosen were selected for their availability and familiarity to the author.

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Journals in the three categories: organization /
management, computers/information systems, and social /
behavioral, published in English between 1975 and 1990, were
the source from which studies were selected for review.
These journals are accepted as appropriate professional
reading material and publishing outlets for academics
(Davis, 1980; Hamilton and Ives, 1983; Vogel and Wetherbe,
1984). The journals surveyed are listed in Appendix A.

A total of 18 journals were used in the compilation of
the results for this study. Two of the journals, *Interfaces*
and *Omega*, are considered to be operations research
journals. However, for the purposes of this paper they have
been placed in the computers / information systems category.
The following is a list of the journals used and their
categories:

Organization/Management

    Academy of Management Journal
    Accounting, Organizations and Society
    Administrative Science Quarterly
    Harvard Business Review
    Information and Management
    Journal of Management Information
    Management Review
    Sloan Management Review

Computers/ Information Systems

Communications of the ACM
DATABASE
Datamation
Infosystems
Interfaces
MIS Quarterly
Omega

Social / Behavioral

Behaviour and Information Technology
Computers in Human Behavior
Computers and People

3. Thesis Restrictions

It is the purpose of this paper to bring about a better understanding of how information systems affect the social and behavioral aspects of the automated office. As such, the necessity to include a wide topic area of discussion is relevant. However, information systems cover such a array of topics it will be necessary to also put limits on some important areas. These limits are discussed below. Future research into these and other areas will be discussed later in chapter X.

In choosing articles to be included in the research of this paper a certain number of criteria, established by the author had to be met. These criteria established a framework in which to begin.

First, as previously stated, the time frame from which articles were chosen was confined to 1975 through 1990. The

reason for this is that prior to 1975 the majority of information systems research dealt with EDP and not the automated office. Finally, the topic areas of Decision Support Systems (DSS) and Artificial Intelligence (AI) were purposely omitted from the study. Both DSS and AI are important in their own right and they could have been included in the research, but, it was determined that these two areas could be dealt with in future studies.

The arbitrariness in choosing the journals and articles which would be used for this study divulge certain biases on the part of the author. The reader should be forewarned of this fact.

D. THESIS ORGANIZATION

Chapter II reviews the effects of new communication technology on the office and the people who work in the office. Chapter III focuses on the ethical and medical issues associated with information systems. Chapter IV is a review of the problems of ergonomic design associated with the automated office. Chapter V deals with the impacts of office automation in general. Chapter VI looks at articles which have predicted what the office of the future would be like and the changes which may occur. Chapter VII reviews articles written on the managerial and organizational aspects of new office information systems. Chapter VIII looks at articles dealing specifically with the social and behavioral aspects of introducing new technology to the office. Chapter IX reviews articles written on the training and educational issues associated with office information systems. Finally, Chapter X summarizes of the articles written on the changes that take place in the automated office and makes recommendations as to future research in this area.

II. COMMUNICATIONS

A. INTRODUCTION

The automated office has evolved through the use of two distinct but very dependent technologies, computer and telecommunications technology. Together, they form part of what is currently know as office information systems. Computer technology introduced electronic mail and databases. New advances in communications technology have made it possible to perform work using computers anywhere, such as in the home, in satellite offices, or any place where a portable computer can be hooked up to a modem. Concepts such as telecommuting and teleconferencing have become a reality. As a result, the concept of work has also changed by redefining not only the work place, but also when and how work is done. This chapter reviews literature which deals with computer and telecommunications technology and their impact on the automated office.

B. REVIEW

Olsen (1983) examined behavioral and social issues of remote office work resulting from new office automation technologies. He says remote office work is work which can be performed outside of the traditional workspace and is not confined to normal work hours.

Olsen lists several remote-work options, including satellite work centers, neighborhood work centers, flexible work arrangements, and work-at-home. The majority of the article deals with the work-at-home option. Work-at-home allows employees to perform work tasks at home on a regular basis. He says that employee performance is highly dependent on how successful remote supervision is.

Olsen conducted an exploratory study of the work-at-home option was conducted. The purpose was to determine the kinds of jobs that can be performed, the type of individual who can work-at-home, and what is the best way to monitor work-at-home employees. The research method for the study was semi-structured interviews with 32 employees and managers who work-at-home on a regular basis.

The results of the study indicated that the kind of jobs amenable to work-at-home were information based, where an individual has control over his work pace, and there is a need for concentration. Individuals who succeed with this work option are highly self-motivated and self-disciplined, who require minimal supervision. The reasons for choosing the work-at-home option tended to be for family reasons or for the solitude of working alone. The reasons for not choosing the work-at-home option included the loneliness of working by oneself, not having the fortitude to

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self-discipline one's work schedule, and not being able to separate the work environment from the home environment.

Kroll (1984) discusses the advantages of telecommuting as well as management considerations in implementing a telecommuting program. She states that in 1984 less than one percent of the labor force was telecommuting but it was expected to increase by five percent in the next five years. Telecommuting would become a viable work alternative in the future.

There were advantages of telecommuting for both organizations and employees. Among the advantages for organizations were the ability to keep qualified personnel who might otherwise be unable to work and the ability to hire people who are not located in the immediate area. For employees, the benefits include a flexible work schedule and the freedom to manage their own time for other priorities, such as family.

Kroll interviewed nine managers, four who were telecommuters, to find answers to questions concerning managements role in telecommuting. The nine managers came from a variety of a work backgrounds and the telecommuting programs they had used had been in affect in their companies no more than five years.

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The results of the interviews revealed the organizations which are best suited for telecommuting are information-based, such as insurance, banking, and employment agencies. Jobs for this kind of work must be location independent and have definable and measurable goals and not require constant communication with supervisors. Managers must understand the special needs of telecommuters and help with training, setting up the work environment, and time management techniques. Managers must also improve their managerial skills, especially in the area of dealing with people who are not physically in the normal work environment.

Collins (1986) conducted an interview with Mrs. Steve Shirley, president of F International. F International is a computer consulting company which designs office information systems, evaluates hardware and software as well as providing management in setting up information systems. What set F International apart from other companies is the fact that all of the company's 1,000 or more employees, most of whom are freelance, work from home, including Mrs.Shirley.

Mrs. Shirley addresses many questions including those about the structure of the company, how work is overseen, training of employees, social aspects of the company, and communication issues.

Mrs. Shirley responds to the question of how she maintains control and oversees the work of her employees by stating that quality control is one of the most important aspects of managing a telecommuting company. Quality control is maintained by use of the computer and strict audit trails. The company is structured in a pyramid with seven layers of management between the top and the bottom, where the actual consulting is accomplished. At the consulting level employees spend about half their time with customers and half at home working.

One of the most important aspects of a company such as F International, as Mrs. Shirley points out, is the need to be flexible and disciplined at the same time.

Wilson (1988) cites requirements needed for a successful mailbox group working system. A mailbox system is one that allows communications between people via computer. The sender can leave a message in the mailbox for someone without the need for the recipient to be present. This is what is now called e-mail. Group working is defined as the undertaking of an activity by two or more people, or what is now called computer conferencing.

The primary requirement of the system, the author says, is to make the system give the illusion that the group

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members are working in close proximity to each other. They need to feel as if they were in the next office.

Owen (1989) discusses problems that may arise at a company which allows its people to telecommute (work-at-home). Most of the article deals with the legal and financial risks involved but a discussion of other problems is also included.

The discussion of potential liabilities for a company include:

Worker injuries -- These are injuries that occur while a person is functioning as an employee of a company. Increased liabilities may occur when a work-at-home employee fraudulently claims a job related injury occurred at home.

Damage to company equipment -- A telecommuting employee who has to carry portable equipment to and from work is more likely to cause damage to equipment. Risk to companies can be diminished by installing computers in the employee's home.

Damage to employee's property -- Companies need to be aware they are liable for property damages which may arise if it can be shown that the cause was related to business equipment.

Injury to third parties -- These are injuries to non-employees that are the result of business activities while using work at home equipment, such as a fire caused by home based office equipment which injures someone.

Other problems which the author discusses in less detail deal with the human aspects of telecommuting. These problems include:

Double standard of discipline -- Employees who work at the company may feel that they are scrutinized more and are subject to more rules, than the telecommuters.

Decrease in morale -- This can be on the part of the telecommuters, who feel left out of the business process, or the office employees who feel less important for having to work at the office.

Owens argues most of the problems encountered with telecommuting can be lessened or eliminated by effective management practices and advances planning.

III. ETHICAL / MEDICAL CONCERNS

A. INTRODUCTION

This chapter reviews the medical and ethical concerns of information systems in the automated office. The majority of the medical issues deal with stress caused by the introduction of new technologies into the workplace. A new phenomena has begun to appear in the workplace. It is a physical problem know as repetitive motion illness. The illness and its effects are also discussed. The other issue which is reviewed in this chapter is the ethical concerns raised by the introduction computerized performance monitors (CPM) into the office environment. These CPM have been shown to have a psychological effect on workers and in turn have affected their production output.

B. REVIEW

Grant, et al. (1988) report on a study conducted to determine the effects of computerized performance monitors on worker performance. The study compared the attitudes and behavior of monitored and unmonitored workers performing identical jobs. The focus on the study was on two questions. First, do computerized performance monitors increase the workers' perception that production is more important than customer service or teamwork?

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Second, if they do increase workers' perception, what are the effects of this perception?

The research was conducted at a major U.S. insurance firm in the group-claims-processing division. The sample included 79 non-supervisory employees, 55 of which were monitored by computers. The study also included ten unit supervisors, one department supervisor, and two department managers, who were monitored in the traditional, non-computerized manner.

The monitored employees worked at large branch offices of the firm while the unmonitored employees worked at the main office. The performed tasks were virtually identical with the exception that the unmonitored employees were required to submit weekly reports to supervisors. Data for the study consisted of responses to a 94 - item questionnaire, used to measure perceptions of work, environment, evaluation process, and motivation. Semi-structured interviews were conducted which consisted of 15 open-ended questions. Performance data were also collected from both the monitored and unmonitored employees.

The study found that 80 percent of the monitored employees said production was the most important factor in their performance ratings, while 85 percent of the unmonitored employees stressed the importance of customer service and teamwork. Monitored employees also considered customer service important, but considered ensuring that the

number of claims processed a higher priority. The perception of the monitored employees was that the reason for the monitoring was only to allow managers to check on productivity.

The author states that this area of research is relatively new and the findings should be considered preliminary.

Piturro (1989) discussed all aspects of electronic employee monitoring, including telephone and computer based monitoring systems. There are estimates, he says, which predict that up to eight million workers are monitored with the use of some form of electronic monitoring system and that number increases every year. Monitoring is used to check work pace, rank employees, record break times, and check worker productivity and performance.

Piturro points to the fact that the Communication Workers of America has tried to have the amount and type of monitoring cut back, but with the easy accessibility of electronic devices and software that has monitoring capabilities built-in, the union is having a difficult time. He says that several companies have halted the use of monitoring techniques because the monitors have become counterproductive and have increased stress related illnesses.

As computers become prolific in business, the use of monitoring systems is likely to increase. At one time monitoring was usually done on just clerical workers. This is no longer the case. Monitoring now includes managers and supervisors as well. The use of computers for e-mail, calendars, and project tracking by managers and supervisors has made it easier for their work performance to be monitored as well. It is expected that stress related illnesses will increase at these positions also.

Bloom (1984) argued that computer related illnesses are not only related to the computer equipment but also are due to the surrounding environment and the stresses caused by that environment. There is a need, he says, to make computer jobs more satisfying and emphasis needs to be placed on the human side of computer use.

According to Bloom, there are several areas which could improve the environment surrounding computer users. Some of the improvements include user friendly codes that are less impersonal, dimming lighting to decrease glare on the video display terminal, separating the keyboard from the screen, and tilting the screen to ease neck strain. Ergonomically designed workstations that are adjustable to the user are also recommended as well as sound absorbing partitions to decrease noise associated with printers.

By providing a more friendly environment, Bloom says, computer-related illnesses should decrease rapidly.

Reynolds (1989) presented the challenges that have been created for organizations and government policy makers by the proliferation of computers into the workplace. He says more people are now working in white collar type jobs (including technical, secretarial, and managerial) than ever before. With these jobs have come a rash of new related illnesses. The most widespread of these are video-display-terminal illnesses, which include eye strain, repetitive motion injuries and back strain.

These injuries are difficult to address because they are unlike traditional work illnesses. Legislation to reduce the affects of video display terminal use has been introduced for many years, he argues, but has been relatively unsuccessful. One successful attempt was on Long Island, New York. There the local government set standards for businesses with more than 20 computer terminals. Standards were set on lighting and seating as well as setting requirements for break times and training.

Unions have taken an interest in this area and have vowed to keep the topic alive. It will be a continued topic among business and government if for no other reason than the economic impact of increasing health care costs.

IV. ERGONOMICS

A. INTRODUCTION

This chapter reviews literature on the ergonomic aspects of the automated office. Ergonomics can be defined as human factors engineering or the incorporation of the individual into the design and implementation phase of building any type of new system. Ergonomic factors include such things as environment (noise, layout, temperature), hardware (furniture and video display terminal equipment), and software (user system interfaces, training, and documentation). Two areas of ergonomics have been discussed by most researchers. They are the design of office space and the design of office furniture. Both have had an impact on how work is done.

B. REVIEW

Mass (1983) dedicates a small section of his paper to the use of computers in the office. The main thrust of the article gives environmental guidelines when creating an office design. The author points out that it is important to keep people in mind when designing the office. Things such as interactional distance -- how close or far people should be to each other, adjacencies -- who should be physically next to whom, lighting, and finally human - computer interaction (HCI) are discussed.

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The section on human - computer interaction states that studies have shown the introduction of computers into the office has created hostility in office workers. This hostility is because some of the workers have become anxious and feel the computer will either replace them, or they will be monitored more or that their job will become very routine.

Maas states there is a generation gap between those who feel comfortable with computers and those who don't. As time passes, this gap will become smaller as people begin to use computers earlier in life. In the meantime it is up to office designers and ergonomist to create a healthy more friendly working environment to lessen some of the hostility in the office.

Cirillo (1983) provides some information on stress in the automated office and how ergonomics can minimize the effects of stress. Reactions to office stress can be classified into four groups that are interrelated, these groups are:

Physical symptoms -- visual and postural discomfort, headaches and nausea.

Psychological symptoms -- low self-esteem, negative attitudes towards computers, fear of the future, and depression.

<u>Motivational symptoms</u> -- low motivation, boredom,
fatigue, and   feelings of loss of control.

<u>Behavioral symptoms</u> -- incomplete work, communications
problems, and changes in work output.

Stressors, the things that cause stress, come from an
office environment which is inhospitable or unrewarding.
Some of the major office stressors are: poorly designed
office equipment (video display terminals, furniture and
lighting), work ambiguity, demand for increased work
productivity, and uncertainty concerning career goals.

Office ergonomics, Cirillo points out, is a way to help
solve these problems because the concept is to design
computer systems to the human being.

Koffler (1983) stresses the importance of incorporating
ergonomic design into the entire design process when dealing
with computer technology and the automated office.
Ergonomic design contains issues that include not only
hardware and software but also issues such as training and
documentation.

He states research has shown that improper use of
computer equipment causes temporary ailments such as muscle
fatigue and discomfort, as well as psychological problems
such as frustration and boredom.   This in turn leads to
dissatisfaction in the form of high absenteeism, high
turnover, and low productivity and morale.

Koffler says, because it is impossible to find ergonomic design rules that satisfy everyone, benchmarks need to be used. Design requirements for ergonomics should include items like consistency and familiarity, much like what is used in systems design analysis.

Proving the economic benefits of computer based ergonomics is difficult because it is difficult to measure productivity. According to Koffler, there are also too many factors that influence the performance and satisfaction of an individual. The author argues that those who don't consider the importance of ergonomics are risking losing the benefits gained by new technology, because understanding the human element of the total system is so important.

Theil (1983) attempts to show that the feeling among many managers is that ergonomics is not high on their priority list. With other economic outlays such as new office buildings and new computer systems, managers, she argues, are not willing to go to the expense of buying new furniture. Workers cannot be productive using old furniture designed for an old fashioned work environment.

The goal of ergonomics, according to Theil, is to integrate computer furniture into the design of the office. This will promote an environment rich in pride and increase job satisfaction. She quotes a study done by the Buffalo Organization for Social and Technical Innovation. In the

study, the group found that by designing offices that support office workers, using ergonomic design, savings can range from $400 to $1600 per person per year. The group also said managers must integrate four components of the automated office: the user, the task, the tools, and the environment. If the workers environment is not the best it can be, it needs to be improved not only to help the worker but also to improve productivity.

Diebold (1984) believes ergonomist must be concerned with the future of automation and not dwell so much on the present. Office and furniture ergonomics, he says, is becoming obsolete as the interaction of humans and computers changes. He points out the importance of ergonomics by stating that by the year 2000, 90 percent of the American workforce will be information workers in some way or another.

The author says the most important impact of the automated office is how it changes the way work is done. He cites three examples of human-computer interaction (HCI) that merit future attention. These are artificial intelligence, decision support systems, and image oriented user interfaces. He says it is necessary for ergonomist to learn about these so that they will understand what jobs will be like in the future. By having an idea of the future workforce , Diebold argues, ergonomists will be able

to design systems that increase productivity and at the same time promote a better work environment.

Stone and Luchetti (1984) focus on the physical design of the office environment. The premise is that with new computer technologies it is no longer necessary to have offices designed as they have been in the past. The authors have designed what they call activity settings that take the place of traditional office designs.

The majority of the article deals with the actual design of the office activity settings. This design is for large office settings where people belong to many different organizational networks. With this design each employee would have a personal cubicle that he could call his home base. There would be a telephone, a PC and a desk with book space. Outside of these home bases and easily accessible to the worker would be a public area where conferencing could take place as well as formal conference rooms. One room would be dedicated to equipment which could be shared by all. The authors contend that this type of setting would promote privacy as well as worker participation.

The whole idea of activity settings is based on the assumption that new technologies such as e-mail, telecommuting, video-conferencing and easy access to large databases changes the way office should be designed. It is

unnecessary for every worker to have his or her own office. With these new technologies the office will be considered as anywhere that work is being accomplished.

Ellis (1984) reviews research that had been conducted on organizations whose organizational structure has been affected by information technology. These changes, the author says, have affected space planning requirements, and the implications for planning and design are discussed. He then provides some insight on future designs of office buildings where new information systems will be implemented.

He points out that with the introduction of advanced information technology there will be implications for future space planning and design of office buildings. Some of these implications include the following:

1. Organizational size-- will change. With advanced information technology organizations will become smaller or be sub-divided into smaller independent entities. Offices and buildings will have to adapt to these changes in which more than one organization may occupy a building. Adaptability is the key.

2. Workgroup size -- will become smaller, thus lessening the need for open-plan areas. This will in turn lead to changes in the physical layout of offices.

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3. Forms of interaction -- will be different.

    There will be a need for communal areas with less

    emphasis on individual offices.   Office spaces

    will become smaller as more room is used for

    conferencing areas.

Finally, according to Ellis, the need will increase for
buildings suitable for multi-occupation and highly flexible
servicing for smaller organizations within the same
building.

V. OFFICE AUTOMATION

A. INTRODUCTION

This chapter reviews articles which have been specifically written on office automation (OA). The term office automation is defined by most of the authors, with some variation, as any technology which is used in the office environment. Some of these new technologies which make up the automated office include hardware such as computers, telecommunication equipment, and fax machines, as well as software such as databases, spreadsheets, and e-mail applications. The premise of the majority of these papers is that office automation has and will continue to alter how work is done in the office.

B. REVIEW

White (1977), an executive vice president at Citibank, describes the implementation of management work stations (MWS) in the offices of a dozen senior line managers. The MWS is a minicomputer-based office environment where managers can communicate with their secretaries and other managers via their computers. Included in the system is e-mail and electronic calendars. Further developments for the system include on-line access to multiple data bases and an electronic interface with international telecommunications.

The author describes five factors which have to be considered prior to the development of an automated office. The five factors are:

1. management

2. people

3. processing

4. communication

5. environmental

The people factor, is the one of most concern here. White defines the people factor as those things which should be known of the behavioral impact of technology.

At Citibank, they found by making the functions of the MWS as close to the paper-based office as possible the system was more acceptable to the users. They also found that their secretaries were much more amenable to using the MWS than the managers. White suggests, this shows that secretaries are willing to dispose of their repetitive, monotonous tasks and improve the quality of work life. He says, with office automation the secretary of the future will become an entry-level management position.

White also points out other problems of the electronic office such as employee isolation, mental and physical well being and ergonomics. He says these and other issues will need to be addressed in the future.

Telesca (1984) writes about Aetna Life & Casualty's establishment of a permanent unit within the company, which assesses the impact of technology on its employees and then developes programs and set up policies concerning those impacts. The unit is called the People / Technology Program (PTP) and consists of three permanently assigned people whose jobs were to address the issues of ergonomic and human factors issues associated with the interaction of man and machine.

At its inception, the staff of PTP was relatively uneducated in this area, they set out establishing a knowledge base by reading the current literature, monitoring government health agencies in North America and Europe, and finally by interviewing experts in the field. PTP then took this information and, through the use of written materials, presentations, counseling and consulting, provided it to the different functional areas of the company. They also surveyed Aetna employees to obtain a different perspective on the problem.

The PTP surmised that a basic reason for complications resulting from technology was in the nature of work. According to Telesca, people prefer variation in work, which makes it challenging, whereas, for machines, work needs to be broken down into the most simplest form and done the same way all the time. This has created problems when introducing computers into the workplace. Another major

problem which the PTP found at Aetna was that employees felt that technology would replace them. Although, they said, the opposite is actually true. Technology usually increases the number of positions.

These and other problems which arise due to the introduction of technology must be understood by management, according to the PTP. The goal at Aetna is to apprise management of problems they will encounter when technology is introduced. Management will then be able to better handle or at least understand these problems in the future.

Westin (1985) reports on a two year study conducted by the Education Fund for Individual Rights, entitled "The Changing Workplace". The principal researcher for the study was Dr. Alvin Westin. Participants of the study on the implementation of office automation included 110 companies and government agencies. Research was conducted by interviewing over 1,100 people as well as site visits to companies. According to Westin, the focus of the study were advanced and extensive end users of the new technologies.

The author synopsized and commented on the results of the study in one page. The results of the changing workplace study found that 75 percent of the companies experienced some problems in the implementation of OA.

Some of the problems experienced by the companies included:

1.   Training resources for new users were inadequate.

2.   Low employee involvement in the implementation of OA.

3.   The automated office work environment did not meet ergonomic standards or employee expectations.

Westin says that only ten percent of the companies studied, successfully implemented OA. By successfully he means a real increase in work productivity. He says that because of the lack of understanding of people problems, there will continue to be problems with implementing new OA.

Murljacic (1987) argues that it is important to understand the technology as well as the people using the technology to fully benefit from the effects of office automation (OA). He provides this understanding of technology by recapping the development of OA from its beginning. From electronic data processing in the '50s and '60s, through the inception of management information systems and word processing in the '70s, to the development of the "office of the future", the author describes the use of electronic medium in the workplace.

Murljacic then states office automation can be defined on two levels. The first is the mechanization of tasks. Here the tasks are performed in basically the same way but

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with new electronic tools, such as using a word processor instead of a typewriter. The second level is the implementation of electronic equipment, and the use of that equipment to redefine the way in which work is done. Changing the way work is done provides for improved efficiency and increased job satisfaction. He cites examples such as electronic mail and telecommuting, to support this. Murljacic points out that this second level produces substantive changes in both tasks and the office environment.

Mertes (1981) discusses the implementation of a new office information system at Continental Illinois National Bank and Trust Company of Chicago. He divides the article into three sections:

1. A disussion of the characteristics of the system.
2. Key projects related to the system.
3. Problems which arose at the company due to the implementation of the new system.

The system was developed in 1977 and was based upon the implementation of a large centralized database, called a central library. Four products were developed around this library. They included word processing and remote dictation, electronic mail, audio mail, and an instantaneous retrieval information system. He then discusses each in detail.

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Mertes points out that the chief concern at that time was with testing the system and the equipment. There was no active attempt to determine people or social problems. This said, he then devotes the last section of his paper on social and organizational implications. According to Mertes, Continental Illinois had developed enough information about their system that they could begin to focus on behavioral and social issues. He points to the fact that many employees could be just as effective telecommuting as working in the office. He says problems such as what type of employee makes the most effective telecommuter, as well as how to effectively manage those people, also need to be addressed in the future.

Salerno (1985) examines the computer revolution in both the office and the factory. She says the fast paced implementation of computers into the workplace has slowed as problems arise with the new technologies.

Some of the roadblocks the computer revolution has faced in the automated office, according to Salerno, include the difficulty in measuring results and the lack of knowledge (by executives) on the full capabilities of information systems with regards to measuring results. She says, most researchers have focused on using increased productivity as a measure of success. Yet, this is usually studied at the

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secretarial level, where routine office tasks are most likely to be more productive with the use of computers.

What needs to be studied is the productivity at the managerial level. As far as executive level knowledge, Salerno suggests the problem is two-fold. First, the failure of executives to try and understand new technologies. Secondly, technology has been so fast pace that executives have been unable to keep pace with all of the changes in information technology.

Salerno states, although the revolution of computer technology has slowed, the future will bring new challenges, especially in the automated office. She predicts new office technologies will eventually change the way work is done. Middle managers will be able to do most of the work secretaries once did through the use of databases, word processing, electronic calendars, etc. While computers may be able to take over some functions of the manager, such as measuring worker output and report checking (via spell checkers). This will free up the manager to do other things like spending more time with customers.

Teleconferencing and telecommuting, through the integration of computers and telecommunications technology, will change where work needs to be accomplished. All of these new approaches, in order to work, will have to be addressed in the future. Managers will need to understand

the changes which are going to take place in order to learn how to manage these situations.

Salerno says, the slowing down of the computer revolution has been a blessing in disguise. It will allow for a better understanding of the problems and how to cope with them.

VI. OFFICE OF THE FUTURE

A. INTRODUCTION

The office of the future (OOTF) is not a tangible topic
which can be explained easily.   It is a concept of the
future, not only of what the physical environs of the office
will look like, but also what work will be like in the
future.   The technology of information systems and
telecommunications has changed at such an increasing rate it
is difficult to put into perspective the changes that have
resulted.   The authors presented below have tried to
provide a vision of the OOTF.

B. REVIEW

Burns (1977) walks through the evolution of office
information systems.   He discusses where the office was 25
years ago (typewriters and shorthand) and compares it with
the present environment.   The use of mechanical word
processing, Burns argues, has not resulted in the expected
office revolution.   The blame is placed on the complex
designs of the systems and the cost of implementation.

There are driving forces ,according to the author, that
will force organizations to continue to experiment with new
information systems.   The first is that the scope of
management is broadening.   Organizations are more complex
and managers responsibilities are increasing.   Second, in
order for managers to be more effective they need complete,

accurate, and timely data. Information systems can do this. Finally, there is an increasing desire to enrich the role of the secretary's job and make it a less tedious task.

Burns then evaluates some of the future products of new information systems including new word processing hardware and software, file management, electronic mail and new communications technology. He states that the implementation of new information systems and applications must focus on the user as part of the system.

Connell (1978) argued that the greatest challenge in the future automated office will be defining the role of people and computers in the office of the future. He says the key factor for successful implementation will be to make the technologies acceptable to office personnel. People are the main ingredient in the office environment and must be considered when designing systems for the office.

Most of the systems designed for the office have been introduced to increase productivity. Office personnel desire job satisfaction and job stimulation. Technology, he says, must recognize this and respond in kind. Future technologies will not only be used to automate office functions, such as word processing and databases, but will also include things such as decision support systems and artificial intelligence.

Morgenbrod and Schwartzel (1979) use information
generated by a task force study called " The Office in
1990", to answer some questions on office technology, such
as: which jobs are suited for automation, how will the
office change, and what will new technology do to the work
environment.

The study found:

Activities suited for office information -- In order of
precedence, (1) text & data production and processing,
(2) communication of data, text and graphics, (3)
documentation and oral communication.

Changes in the office -- Job content and work
environment will always change to accommodate new
systems devices, in the same way as telephones and
typewriters changed how work was done. The introduction
of office information systems will also change the
nature of work.

Improvement in the work environment -- Anxieties based
on new systems in the office are often unfounded. New
technologies improve communication rather than promote
isolation. The use of information technology also
promotes a shift towards higher standards and
specialization. This creates higher skilled workers.

Klee, et al. (1981) discuss corporate progress in the
designing of the OOTF. At Hercules, a Delaware based

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chemical company, increasing productivity of the office worker, without disrupting the relationship between secretary and executive, was a main goal. This was accomplished through the introduction of workstations. The idea was to lighten the workload of secretaries, which would allow the boss to unload some of his simpler tasks to the secretary, allowing him/her to do the job more effectively.

The best implementation of OOTF technologies, which Klee cites, is Continental Life of Chicago. Office automation is a high priority at Continental. Through the use of word processing, e-mail, audio-mail, and easy data-base accessibility, managers have become location independent, which means they are able to perform their job not only in the office, but from anywhere there is a computer and a telephone line. This has led to increased productivity as well as increased job satisfaction. The goal at Continental is to continue to improve the quality of work life through the proper introduction of automated systems.

Plotzke (1982) discusses upcoming technologies which will mold the OOTF. He emphasizes the importance of new communication technologies in helping managers perform their managerial functions better. Most managers, he says, are communicators and future technologies will have to address this issue as well as being able to display and locate information.

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According to Plotzke, the technological developments will focus on software tools which will allow managers to accomplish tasks quickly and efficiently. Data and enhanced voice communications technologies are predicted to grow rapidly. All of the new developments will focus on increasing productivity while at the same time improving the quality of work life.

The OOTF will also include teleconferencing and electronic-mailboxing. These high-tech innovations, Plotzke predicts, will decrease lost or wasted time and increase morale, which will lead to greater productivity.

Poppel (1982) discusses a study that was conducted on knowledge workers (white collar employees) to determine how they spend their work day and whether the enhancements of the OOTF could make them more productive. The study was done to find out if performance improvements from office automation were achievable and to justify implementation costs.

The study focused on two aspects of knowledge workers. First, how they spend their time achieving business objectives and second, how would their productivity increase through the use of office automation over a five year period. Participants include 15 U.S. companies from a mix of functional areas (marketing, sales, personnel).

The methodology used was case studies, each conducted over a
12 week period, of each of the 15 participants.

Five categories of automated office systems were
considered for the study. The categories included:

1. Conferencing

2. Information transfer

3. Information retrieval

4. Personal processing

5. Activity management

Assumptions were made that the knowledge workers understood
and could use all of the new technologies.   Both
quantitative and qualitative techniques, as well as the
determination of critical success factors (CSFs) were used
by the study team during the course of each case study.

Results of the study found five areas concerning time
use that have broad managerial implications. They include:

1.   Many of the subjects spend less than half their
       work time on activities directly related to their
       functions.

2.   The subjects spend 25 percent of their work time
       on "less productive" activities.

3.   Meetings, in person and by telephone, are the
       commonest form of professional activity.

4.   Professionals spend an average of 21 percent of
       their work time in document-related activities and
       only 8 percent on analysis.

5.   Most knowledge workers would like to reshape their

      time profiles.

The study group concluded that, within five years,

knowledge workers could save an average of 15 percent of

their time through automated support. Half of that time

would be from reducing time spent on less productive

activities, while the rest would be from reductions in

meetings, analytical tasks and document handling. The

quality of output would also increase as a result of more

effective communication (both internal and external) and

more timely access to information.

VII. MANAGERIAL / ORGANIZATIONAL ASPECTS

A. INTRODUCTION

In this chapter, articles written on the affects of information systems on management and organizations, with regard to changes in behavior and social attitudes will be reviewed. Some of the important issues which the authors discuss include: new managerial roles, lines of communication changes, task performance, and organizational structure. Many of the authors agree that with advances in technology and new information systems the role of the manager and the organization will change.

B. REVIEW

Zuboff (1982) maintains that information technology will change the way employees perform their tasks. It will be the managers, he says, who will need to develop new ways to handle these changes.

The author argues, that employees for a variety of reasons will normally resist working with new information technology. Managers should heed this resistance because it is telling them something about the quality of the changes.

As information technology changes a job, Zuboff says, it also alters an individuals relationship with that job. He calls this new relationship computer-mediated. In the article, he points to many instances where this new computer-mediated work affects workers.

Some of the effects of computer-mediated work on
employees include:

Making work abstract -- Employees become isolated by
losing direct control of the job. They don't have the
personal contact with a task, as in the past.

Social interaction is affected -- New lines of
communication are formed leading to more interaction
amongst employees. This in time will alter the social
structure of the organization.

New supervision and control possibilities -- With remote
supervision, using the computer to supervise output,
managers can rely less on face-to-face supervisory
techniques. This could lead to alienation between
managers and their staff.

These changes in work and the work environment will
often be met by resistance in the organization. Zuboff
states, that managers must listen to the resistance, in
order to fully utilize new information technology.

Olson and Lucas (1982) suggest there are a number of
important issues which are raised due to the development of
automated office systems (AOS) in organizations. Their
paper provides a descriptive model and presents propositions
concerning the impacts of office automation. The
propositions are designed to peak interest and promote
further research in the area of the automated office.

The authors categorize the effects of office automation into different areas: the nature of work, individuals, organizational communications, management process, interpersonal relations, and interdepartmental relations. Under each category they make several propositions on the effects of office automation, followed by a discussion on each proposition.

The following is a summary of the categories and propositions made by the authors:

Nature of Work

1. AOS can improve the quality of written documents produced.

2. AOS permits increased specialization of skills to support administrative and clerical tasks.

3. AOS can alter the physical boundaries of work.

Individuals

4. AOS can affect the role identification and stress of office workers.

5. AOS can affect the perceived status and job satisfaction of office workers.

6. AOS can affect the worker's feelings of identity with the organization and it's goals.

Organizational Communications

7. AOS can lead to improved efficiency of communications for all office employees.

8. AOS can lead to a decrease in the amount of face to face contact between employees at all levels of the organization.

9. AOS can lead to an increase in the total volume of communications by organization members.

10. AOS can affect the total volume of communications between departments.

Management Process

11. AOS can affect managers' perceptions of the degree of rationality, flexibility, and free space of their work.

12. AOS can affect methods for monitoring and controlling work.

13. AOS can be used to help increase the span of control of managers.

Interpersonal Relationships

14. AOS can reduce the quantity and quality of social interaction and reinforcement in the office.

15. AOS can affect the volume of communications among existing communication links.

Interdepartmental Relations

16. AOS can affect the degree of interdepartmental conflict.

The authors state that the propositions discussed in their paper are meant to provide a basis for further research into the behavioral and organization impact of automated office systems.

Foster and Flynn (1984) discuss the implementation of a new management information system (MIS) at a division of General Motors and it effects on the organization. The new system was implemented at the General Motors Environmental Activities Staff, which is a policy-development, research, and regulatory compliance group consisting of about 180 employees.

Within 18 months of the implementation of the new MIS there were some notable changes within the organization. There were major changes in organizational communication, organizational hierarchies, and task performance and structure. Many of these changes, according to the authors, were the result of new lines of communications, formal and informal, which developed amongst the users of the system. The authors found that through the use of these new, more complex communication channels users became less fearful of face-to-face communication if computerized communication was first established.

Another interesting change was in the organizational protocol. It seems the users of the new MIS could communicate electronically with senior members of the

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organization without overstepping the boundaries of the chain of command.

The authors also say that along with organizational changes came changes in how tasks were performed. They point out, the attractiveness of the job is enhanced as well as job satisfaction. Users were much more inclined to enhance their job descriptions by performing data analysis, matrix manipulations, and graphic design using the available tools of the information system. The workers of the organization voluntarily took on added tasks, which increased job satisfaction. This in turn allowed managers the opportunity to redefine their job responsibilities.

Evans (1985) discusses how managers have been caught up in new technological advances, the result of which has changed the way managers perform their job. She points out that most non-technical managers use new office technology mostly to improve communications. However, she says, by becoming involved with new office automation equipment, managers may actually be gaining a wider understanding of the entire organization. More information can be retrieved faster and used more effectively than ever before. This leads to a better overall view of the organization and its mission.

Some of the managers the author interviewed suggested that management information systems have made them become

more entrepreneurial in their work. They have more
information available and can make quicker decisions based
on better, more accurate information. When managers have
too much information or not enough is when they will rely on
their intuition, according to Evans.

Sumner (1986) conducted a study to determine the impact
of a multifunction workstation (MFWS) on the way managers
work, their communications with each other, and their
relationships with superiors and subordinates. The study
was conducted at a St. Louis based defense contracting
agency. Both questionnaires and interviews were used to
collect data from two groups of managers at the agency. One
group (test group) were MFWS users while the other group
(control group) were non-MFWS users. The study was geared
to studying the effects of E-mail on managers using the
MFWS.

The author describes the results of the study by
relating the experiences of the members of both control and
test groups. The impacts of the multifunction workstation
can be summarized as follows:

The way managers work -- Overall managers who used MFWS
spent less time performing clerical type tasks than non-
MFWS managers. While at the same time performing more
of their managerial tasks with less effort, especially
with the use of electronic mail systems.

<u>Communications with each other/superiors/subordinates</u> --
The MFWS users seemed to agree that even though they
could use e-mail systems for communicating they would
still use other types of communications, such as the
telephone, a memo or letter, or personal visits for
various circumstances. Electronic mail was useful where
information on projects was required to be disseminated
in a timely manner or there was a large volume of
information. In cases of interdepartmental
communication the MFWS users still preferred the more
personal contact of meeting face to face or of a phone
call.

Assimakopoulos (1988) describes a study which was
conducted to determine the impact of new information
technologies on the work life of managers.

The methodology of the study included both interviews
and questionnaires. The sample for the study were 22 middle
managers in eight large organizations. All managers had
either directly (hands-on) or indirectly (staff used)
computer equipment.

The results of the study showed that the use of computer
equipment greatly increased the managers sense of the kind
of problems which he could solve, mainly by their perception
that they were able to take on new tasks. The study also
revealed a greater desire to delegate decisions to a lower

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organizational level. The reasoning behind this appears to be that computer technology makes more information available to lower levels of the organizations while at the same time allowing the upper levels of the organization monitor the decisions. Finally, the study indicated managerial job characteristics changed with the use of computer technology. Routine, clerical tasks of the manager could be delegated down to allow for more time to do "managerial" activities, such as decision making.

In his discussion of the results of the study, the author states that new technology seems to have an impact not only on how people make decisions, but also on the different tasks which a manager will perform as a result of the new technology. He says further research is needed to address the impact of managerial changes on the organization.

Applegate, et al. (1988) describe how future technology will affect how managers of the future perform their job. In the section of their paper detailing human resources they predict that along with new technological advances will come a change in work itself.

According to the authors, future office workers will be better trained and have higher skill levels, than those in the past. As these workers become more educated they will require a higher level of satisfaction in their jobs.

Management will be forced to allow more autonomy in the way work is done.

The authors also point out that with the use of information technology managers will be able to track the performance of their employees more thoroughly, focusing on quality as well as quantity. The ability to pay a person on his actual contribution to the organization will be much more prevalent in the future.

VIII. SOCIAL / BEHAVIORAL ASPECTS

A. INTRODUCTION

This chapter reviews articles which have focused on both the social and behavioral affects of the introduction of information systems into the office environment. Issues in this section include productivity of workers, quality of work life, social interaction amongst workers, and changes in employee behavior and attitudes.

B. REVIEW

Turner (1982) reviews and interprets 12 studies done between 1972 and 1982 on the behavioral research in information systems (IS). He points out that the objective of the paper is to organize the research and to show recurrent themes of the research.

He categorizes behavioral research in IS into four areas with key issues in each one. The categories and their issues are:

Individuals -- Understanding human behavior

Pairs -- Communications between people and methods of influencing behavior.

Small groups -- Group dynamics and decision making.

Large groups -- Promoting the organization.

Turner defines research that is based on the changes that happen in task environment, organization structure, and

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performance and attitudes of workers when they use computer based systems as consequences research. He gives examples of research in this area in all four categories, discussed above.

He concludes that if behavioral aspects of information systems are overlooked, the risk of failure is high. He also says that there is a need to adopt a people oriented approach in system implementation which will address issues like quality of work life and motivation.

Tapscott (1982) reports on a study at Bell-Northern Research, a subsidiary of Canada Bell. The study was designed to test the hypothesis that automated systems improve productivity. In the study a test group of 19 knowledge workers were given electronic workstations on an integrated office system. They were compared to a control group of 26. The research design was quasiexperimental and consisted of questionnaires and interviews as well as monitoring system use for the test group. The office information communication system (OICS) which was used was a pilot system, specifically designed for the study.

Overall, the findings of the study indicated that the pilot OICS improved communications, time use, attitudes toward office system technology, and quality of work life. Most users indicated the OICS improved their ability to do

their jobs. But the results were mixed on whether the system saved them time in performing work.

The purpose of the study was actually to determine the usefulness of implementing an information system at Canada Bell. The results, however, do show how information systems affects workers.

Bennett, et. al (1984) discussed two studies they performed to support their view that information technology impacts business communications. The authors performed two laboratory experiments. The basis of which was that word processing technology encourages a more informal, natural, or conversational style of business writing a opposed to writings composed using conventional technology.

In the first study, two groups of students in an introductory information systems course, were required to complete a written analysis of a case, one group used a word processing application, while the other used handwriting to perform the analysis.

The second study was conducted to determine the time needed to read the analyses written in the first study. The handwritten and computer generated analyses were retyped and reformatted. The subjects of the study were business professionals and they were directed to read a pair of analyses (one of each type). The time to read each analysis at a comprehensible level was recorded.

The results of the study supported the authors' hypothesis. They found that word processing changes writing style, length and complexity. This change in writing style appears to be easier, faster, and more comprehensible to read, according to the authors.

The authors argue that the results show the need for further research in the area of how managers perceive the use of computers by their subordinates.

Kanter (1986) argues that the full potential of office information systems is not being realized. She says there is presently a stalemate on the use of information systems in the office.

According to Kanter computers are being used to simplify mechanical tasks in the office and are not being used as creative tools to improve problem solving. Mechanical oriented tasks such as filing and typewriting have been made easier through the use of computers. But, creative thought and problem solving have been stifled.

She points to the fact that computers in the office have relieved secretaries and clerks from labor intensive, mind-numbing tasks, but have left a void for what their new role is. The same notion applies to managers. Managers have been able to shuffle a portion of their tasks downward. This has left them time to perform more "managerial" tasks, but they

are unsure of what these tasks entail. Therefore, managers may continue to perform some tasks which could be delegated in order to fill their time.

Bennett, et al. (1990) report on a study they conducted to determine how managers rate keyboard composed communications as opposed to communications written manually.

The methodology of the study consisted of presenting a group of 39 executives with compositions based on a case study. The compositions were a mix of both keyboard generated papers and handwritten generated papers (retyped and reformatted). Each executive was given a pair of compositions (one of each type) and told to rate each one separately using a rating scale.

The findings of the study showed that managers rated keyboard generated communications higher than traditional communication methods. According to the authors, the findings indicate that word processing technologies produce important changes in managerial perceptions of written communication. Managers would be more confident in business decisions based on this type of communication.

IX. TRAINING

A. INTRODUCTION

This chapter reviews the issues of training and
education in the era of the automated office. The major
issues discussed by authors in this section are how the
user's need for training has created changes in the software
industry and the business community and how new information
systems technology has developed faster than people who are
required to use that technology. The implications are that
erd-users need to be a major consideration in the
implementation of new technologies or the imagined benefits
of office information systems will be far less than
expected.

B. REVIEW

Rolph (1979) deals with the relationship between word
processing software vendors and their customers with respect
to training. He states vendors are aware that education and
support are vital aspects of success in word processing
sales.

According to Rolph, different forms of training have
been used by vendors. They include classroom training,
hands-on training, and self-paced instruction. Some
companies have gone so far as to customize the instruction
manual for different sections of an organization, thus
making it easier to learn a specific task. He believes the

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trend in training by vendors will be to offer self-paced instruction, by using a workbook in conjunction with the computer. By doing so, operators learn faster and retain more of what they learn.

Software vendors, he argues, have become an important part in the training of an organizations' personnel. The user is finally beginning to be seen as part of the entire information system. Rolph believes software vendors will continuously be challenged to provide education to the user.

Miller (1983) deals more with the implementation of information centers and training, rather than how information systems affect workers. However, there is some information within the article which deals with training at the executive level.

First, Miller says, executives have some particular phobias towards the use of computers. One is the keyboard and the other is unfriendly software. Executives are afraid of the keyboard because they fear it puts them on the same level as clerks and secretaries. It is difficult for some executives to get used to using what to them is basically a typewriter. As far as software is concerned, executives who have had no previous dealings with computers find it extremely frustrating to work within the DOS command structure in order to accomplish some simple tasks.

Miller mentions a training program established at the University of Chicago. There it was found that proper training led to increased use of the computer by executives. With proper training executives, on their own, began to use word processing, spreadsheets and database applications because it was faster and the end product was better.

Gibson and Kosinar (1985) believe senior executives in corporations are being asked to understand and use the powerful tools of information technology without proper introductory education. Many executives are anxious about using computers. This comes from a variety of reasons including the fear of becoming a typist and not performing managerial duties. The author explains that it should be the goal of senior executives to understand the usefulness of information technology in order to help their organizations obtain their goals.

In order to do this executives must become information technology literate. According to the author, the best way to do this is to develop an internal training program designed for that particular organization. There are five key elements for a successful in-house training program:

1.   Proper preparation and tailoring

2.   Selection of appropriate subject matter

3.   Hands on training

4.   Appropriate teaching skills

5.   Dedicated sponsors

The author says executives need to understand the importance of information technology and information technology education. Training, he says, is the means to achieve this.

Miller (1986) points out that new technologies have created a demand for a different kind of worker, one that is computer literate. The problem is that a time when highly educated people are in high demand, the new generation of workers is less educated and less literate than ever before.

The author cites examples of temporary service agencies which have been growing at an increasing rate, in part to accommodate the growing number of businesses that are using new technologies. These temporary service agencies have recognized the problem of a less literate work force and have developed their own training programs to teach the proper use of computers and their software applications. The agencies usually provide this training for free. This is only a temporary solution to the problem.   What is needed, says the author, is proper education of the nations' younger generation.

Mruk (1987) discusses four areas where psychology and computing interface with each other. The author reviews literature in these areas and discusses the core issues in each area. The areas are artificial intelligence, human computer interaction, clinical/educational applications, and the impact on human identity. He stresses the importance of realizing this psychological-computer interface.

The area on human computer interaction is concentrated on for this review. Mruk states, the introduction of large scale information systems and applications has brought about a need to train a great deal of people on the use of computers. These people have varying degrees of computer literacy. In response to this demand, literature concerning the subject of the psychology of computers began to appear beginning in the late sixties. Studies included such topics as computing and personality, methods of teaching programmers and studies of the non-technical user as well.

Nelson and Cheney (1987) contend companies are not meeting the training needs of their computer end-user employees. They say most companies are leaving the training up to the end user. Training is not considered a high priority in organizations when it comes to the introduction of new technologies.

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In order to meet the needs of the employee, the needs have to be known. Approaches to assess the end-user needs include surveying of employees, using outside consultants, and brainstorming sessions in which managers discuss problems of end-users.

According to the authors, management needs to know how important training is to the success of the company. But, when training is less than 2 percent of the total information systems budget it is a clearly seen as not important.

In a survey the authors conducted of 100 end-users in 20 corporations, self-training was the most prevalent type of training which used. Even though tutorial type training was perceived, by the end-users, to be the best type. The survey also found that training increased the abilities of managers as well by making it more satisfying to use computers after being adequately trained.

X. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

A. SUMMARY

The purpose of this thesis was to identify and categorize a segment of the available literature on the topic of the behavioral and social impacts of information systems on the automated office. Accordingly, this thesis has provided a review of 46 articles taken from 18 different journals. The journals were subsequently divided into three categories.

The journal categories are:

1. organization/management

2. computers/information systems

3. social/behavioral

Each article was reviewed and categorized into one of eight different topic areas. Each topic area was presented as a chapter of the thesis. Although many of the articles which were reviewed covered moré than one of the topic areas, it was necessary to place the article in the most appropriate one. The topic areas were divided as follows:

1. Communications

2. Ethical/Medical

3. Ergonomics   ·

4. Office Automation

5. Office of the Future

6. Managerial/Organizational

7.   Social/Behavioral

8.   Training

A total of 150 articles were used in conducting the initial research for this thesis. Certain criteria for the inclusion of articles into the final review were established by the author.   These criteria included:

1.   The time frame when the articles were written.

2.   The exclusion of articles dealing with decision.

     support systems and artificial intelligence.

3.   Using articles which dealt specifically with the

     impacts of information systems in the automated

     office.

After applying the above criteria 46 articles were chosen for final review and use in this thesis.

The following is a breakdown of the 46 articles reviewed in this paper:

Journal Category

Articles from organization/management journals   48%

Articles from computer/information systems journals 44%

Articles from social/behavioral journals   8%

Article Type

Topical discussions   83%

Empirical studies   ·   17%

A summary of all the articles reviewed, including the
journal category, the article category, and the type of
article (whether it was an empirical study or a topical
discussion) is presented in Appendices B and C.

B. CONCLUSIONS AND RECOMMENDATIONS

As seen by the variety of different topics discussed in
the articles written and reviewed in this paper, it is clear
that the subject of the social and behavioral impacts of
information systems in the automated office is important.
Topics such as self-esteem, quality of work life, changes in
how we communicate with each other, job satisfaction, and
the myriad of other social and behavioral impacts of the
automated office, which have been addressed in this paper,
are of great importance. They are important not only to the
MIS professional, but also to managers, executives,
scholars, and especially to those who make up the majority
of today's workforce, the office worker.

Why does there seem to be so little written on the
subject of the social and behavioral impacts of information
systems in the automated office?   Why are there so few
conclusive results on the subject?   How can one conduct
research or bring about changes in this area if information
is scarce and inconsistent? These are some of the questions
which have arisen from conducting a review of the current
literature of the subject.

As shown through the analysis of the available literature in the summary section of this chapter and Appendices B and C, very little in the way of empirical research has been conducted into the cause-effect relationship of office information systems and social and behavioral impacts. Of the articles surveyed and reviewed for this paper 83 percent were topical discussions. These were based not on statistical data, but on inferences made from hands on experience or expertise in a particular area.

It is not at all the author's contention that articles written, which do not use statistics and empirical research, are useless. Quite the contrary, these types of articles lay a basic framework for the understanding of any subject of study. However, it is necessary to conduct studies and empirical research in order to supplement and further understand any topic.

With this in mind, it is clear that future studies in the area of the impact of information systems must include more statistical research in order to support or refute what others have written.

A review of the literature shows that very little research has been generated by social/behavioral researchers in this area. The majority of the articles reviewed were published either in organization/management journals (48%) or computer/information systems journals (44%). Two factors could have contributed to these results. First, fewer

social/behavioral journals were used as sources for articles than the two other types of journals. Second, this may be attributed to the fact that the literature reviewed focused only on the impacts of information systems in the automated office, and not on the impacts of information systems on a grander scale. However, the latter reason can be applied to the two other journal categories as well.

It should be emphasized that the scope of the research for this paper was kept to the narrow confines of the automated office. While conducting the initial research for this paper, the author found a multitude of articles which dealt with the impacts of new technologies and automation on organizations, factories, people, and society. However, it appeared that very little research was being conducted on the how new information systems affect those who work in the automated office.

The basic premise behind this paper was to find out how much research has been done on how the introduction of new technologies into the office environment changes the people who work in that environment. For example, does a secretary do more or less in the office today than she did 20 years ago? Is what she does more complex and challenging or has it become more mundane? Has a manager's responsibilities increased or decreased with the introduction of computers and information systems? Does an executive have more or less control over the organization as computer and

telecommunication technologies allow others to have access to the same information which he was once privy to. These are some of the questions which researchers should have been focusing on.

The literature reviewed offers important lessons for future inquiry. Especially in the relationship between office information systems and human behavior. The author suspects that transformations in social and human behavior due to the implementation of new information systems in the automated workplace is so widespread that the very nature of work has changed. One might expect that changes due to the implementation of information systems are no different than changes that occur whenever any new type of technology is introduced into the workplace.

More empirical research in this area is needed to fully understand how much office work and office workers are affected by the introduction of new information systems. Future research issues should focus less on job productivity and focus on such things as employee self-esteem and job satisfaction, telecommuting and its implications (on both the individual and the organization), and on the changes in communication behavior of individuals as a result of new technologies.

Issues which were not discussed in this paper but which deserve further investigation include: decision support systems and their role in the office environment, artificial

intelligence and its affects on how work will be done in the future and who will be needed in the office of the future, and the affects of organizational change on employees due to the implementation of new technologies.

The social and behavioral impacts of office information systems are infinite. As long as researchers continue to study the effects of new technologies they will also continue to discover how complex human behavior and social interaction really is. There is ultimately more to improving job productivity and job satisfaction than just adding the latest technological developments to the inventory of an organization.

It is not expected that through a review of the literature the problems associated with the implementation of information systems in the office environment will be solved. But, it is hoped that by reviewing a portion of the research which has done, and in the format presented, future researchers in this field may have an easier time in understanding the literature which is available. The essential thing is that continued research in this area is of vital importance in order to cultivate a clearer understanding of how behavior and social attitudes are affected by the implementation of new technologies.

APPENDIX A

List of Reviewed Articles

Applegate, L.M., "Information Technology and Tomorrow's Manager", *Harvard Business Review*, Vol. 66, No. 6, pp. 128-136, Nov-Dec 1988

Assimakopoulos, N., "The Influence of New Technology in Organization and Management", *Information & Management*, Vol. 14, pp. 195-202, Jan 1, 1988

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APPENDIX B

Reviewed Articles and Associated Journal Category

Article	Year	Journal Category		
		org/ mgr	comp/ IS	social/ behavioral
Olson	1983		x	
Kroll	1984	x		
Collins	1986		x	
Wilson	1988			x
Owen	1989		x	
Grant, et al.	1988	x		
Piturro	1989	x		
Bloom	1984		x	
Reynolds	1989	x		
Maas	1983	x		
Cirillo	1983	x		
Koffler	1983		x	
Theil	1983		x	
Diebold	1984	x		
Stone & Luchetti	1984	x		
Ellis	1984		x	
White	1977		x	
Telesca	1984		x	
Westin	1985		x	
Murljacic	1987		x	
Mertes	1981	x		
Salerno	1985	x		
Burns	1977		x	
Connell	1978		x	
Morgenbrod & Schwartzel	1979	x		
Klee, et al.	1981		x	
Plotzke	1982	x		
Poppel	1982	x		

Reviewed Articles and Associated Journal Category

Article	Year	org/ mgr	comp/ IS	social/ behavioral
Zuboff	1982	x		
Olson & Lucas	1982		x	
Foster & Flynn	1984		x	
Evans	1985	x		
Sumner	1986		x	
Assimakopolous	1988	x		
Applegate, et al.	1988	x		
Turner	1982	x		
Tapscott	1982		x	
Bennett, et al.	1984	x		
Kanter	1986	x		
Bennett, et al.	1990	x		
Rolph	1979		x	
Miller	1983		x	
Gibson & Kosinar	1985	x		
Miller	1986		x	
Mruk	1987			x
Nelson & Cheney	1987		x	

APPENDIX C

Reviewed Articles and Associated Article Type and Category

Article	Year	Study	Discussion	Article Category
Olson	1983		x	Communications
Kroll	1984		x	"
Collins	1986		x	"
Wilson	1988		x	"
Owen	1989		x	"
Grant, et al.	1988	x		Ethical /
Piturro	1989		x	Medical
Bloom	1984		x	"
Reynolds	1989		x	"
Maas	1983		x	Ergonomics
Cirillo	1983		x	"
Koffler	1983		x	"
Theil	1983		x	"
Diebold	1984		x	"
Stone & Luchetti	1984		x	"
Ellis	1984		x	"
White	1977		x	Office
Telesca	1984		x	Automation
Westin	1985	x		"
Murljacic	1987		x	"
Mertes	1981		x	"
Salerno	1985		x	"
Burns	1977		x	Office of
Connell	1978		x	the Future
Morgenbrod				
& Schwartzel	1979		x	"
Klee, et al.	1981		x	"
Plotzke	1982		x	"
Poppel	1982	x		"

Reviewed Articles and Associated Article Type and Category

Article	Year	Study	Discussion	Article Category
Zuboff	1982		x	Managerial /
Olson & Lucas	1982		x	Organization
Foster & Flynn	1984		x	"
Evans	1985		x	"
Sumner	1986	x		"
Assimakopolous	1988	x		"
Applegate, et al.	1988		x	"
Turner	1982		x	Social /
Tapscott	1982	x		Behavioral
Bennett, et al.	1984		x	"
Kanter	1986		x	"
Bennett, et al.	1990	x		"
Rolph	1979		x	Training
Miller	1983		x	"
Gibson & Kosinar	1985		x	"
Miller	1986		x	"
Mruk	1987		x	"
Nelson & Cheney	1987		x	"

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