University of San Diego

Digital USD

Dissertations   Theses and Dissertations

1983

The Transition Process in Office Automation and Its Impact on Clerical Workers: A Case Study

Judith Turnbull Green EdD
University of San Diego

Follow this and additional works at: https://digital.sandiego.edu/dissertations

Part of the Leadership Studies Commons

THE TRANSITION PROCESS IN OFFICE AUTOMATION AND ITS IMPACT
ON CLERICAL WORKERS: A CASE STUDY

GREEN, JUDITH TURNBULL, Ed.D.,
University of San Diego, 1983.
Director: William P. Foster, Ed.D.

The purpose of this research was to study the
transition process of office automation and its impact on
clerical workers. The objective was to provide computer-
naive managers with recommendations on factors to consider
when managing the office automation change process.

The topic was investigated using a case study approach.
The setting was a large, multi-function, research-oriented,
urban university on the west coast. Data were gathered
through interviews, observations and examination of
documents. Twenty-five clerical workers (representing
different segments of the campus and having experience using
different types of computer-assisted office equipment), who
had experienced the transition process of office automation,
were interviewed in depth. Ten of those subjects were
additionally interviewed in group settings. Administrative
personnel who had responsibility for managing computing

resources were interviewed for background data.

Information was gathered from the subjects concerning their experiences with and perceptions of the automation change process, and the impact of automation on their jobs. The data were analyzed by the following categories: (a) factors affecting the transition process, (b) factors impacting on efficient use of computer-assisted equipment, (c) job changes resulting from office automation, and (d) factors associated with the use of different types of computer-assisted equipment. Key findings were that (a) the prospect of office automation can be anxiety-producing for potential users, (b) most users did not receive adequate training, (c) lack of training may result in under-utilization of computer-assisted equipment, (d) there was no indication that automation diminished communication among users, and (e) most of the subjects reported high job satisfaction after automation.

It was the researcher's conclusion that the significant issue of office automation is how the automation change process is managed, not the automation per se. It is recommended that managers include users in office automation decision-making in order to minimize problems associated with user anxiety, training, job design and efficient use of the equipment.

DEDICATION

To my mother, Emily Gardner Turnbull, a model of personal strength, who has always provided a constant source of support and encouragement for any task I have undertaken.

ACKNOWLEDGEMENTS

I would like to thank my Committee members, Dr. William Foster, Dr. Paul Croft and Dr. Susan Zgliczynski for their insight, assistance and encouragement. Appreciation is also expressed to my program advisor, Dr. Edward DeRoche.

Thank you to my family and friends for their understanding and support.

I want to acknowledge Henry Coker because he insisted, and Daniel Muñoz for his nutritional and emotional nuturance.

A special thank you to Marsha Fanshier for her skill in manipulating the amazing VAX word processing equipment.

iii

TABLE OF CONTENTS

v

CHAPTER I

INTRODUCTION

Statement of the Issue

Technological change in the American office started in the last half of the 19th century when the quill pen was replaced by the steel point. By 1900 the American office had several mechanical devices such as the telegraph, telephone, dictation machine and typewriter. As early as the 1890's several companies were producing typewriters and by the early 1900's more than 100,000 had been sold and production averaged 20,000 per year. That introduction of the typewriter was one of the first significant changes with major impact on the American office. More clerks were used and the structure and social atmosphere of the office changed as women were admitted into the office workforce.

During the first half of the 20th century further refinements such as the electric typewriter, duplicating machines, adding machines and calculators continued to change office technology. By the 1960's the largest American companies had computers perform payroll, timekeeping, inventory and other routine functions. With the advent of micro-electronics in the late 1960's and 1970's came cheaper copiers and minicomputers, and today we

1

see the vast expansion in the use of microcomputers. And it is projected that by 1990 40-50% of all American workers will be making daily use of electronic-terminal equipment, with the prediction of the need for 38 million terminal-based work stations (Guilino, 1982).

So we see that automation is growing in the American office and changing the working life of both clerical and managerial personnel. Office workers are seeing a change in the type of work they do, the equipment they use, and the information flow and communication systems. The increase in the use of computers in all areas of our society has been phenomenal in the past decade. Office automation was one of the fastest growing areas of the computer market place in the last decade (Williams, 1977) and is continuing that growth.

The goal of office automation is to create a working environment in which managerial productivity is increased by greater business efficiency. The intent is to increase the output of relatively low skilled office workers (secretaries and clerks) while increasing support for relatively high level workers (managers and professionals). Automation of the office is viewed as inevitable ("The Automated Office," 1978). Most managers do not face the question of whether to automate, but when to automate. Office automation is viewed as inevitable because it is estimated (Butler, 1980) that managers and professional staff represent 42% of the office

population by number, but 60% by cost, and that computer-assistance is necessary to increase efficiency and productivity.

As a group, the number of office workers has expanded rapidly over the last 10 years, and the U.S. Department of Labor (1980) projects that by 1985 20% of the labor force, over twenty million workers, will be made up of clerical workers. And it is this large group of workers who also will be, and have been, greatly affected by office automation.

There is common concern that office automation can cause clerical workers' jobs to become more routine or repetitive or eliminate them altogether. This concern is spread by the popular media and through oral history in the work place. It is not unreasonable for employees facing automation to feel anxious, because it is a normal human reaction to be concerned about the unknown consequences of change. And as Whisler (1970) pointed out, technological change has all the general problems of organizational change compounded by novelty. So managers facing the transition to office automation must deal not only with the decisions concerning hardware and software, but also with their own and their employees' anxieties over how computers might change the quality of their working lives.

Specific technological change must be viewed in the context of organizational change. The area of

organizational change looks at how and why organizations change; how they respond to external and internal stimuli. It examines factors that impact on successful change such as leadership, technology, the environment and how those factors interrelate. Even though Goodman and Kurke (1982) suggested that at this time there is no clearly defined theory of organizational change, there is in the literature both research and postulation about change in organizations and its effect on employees.

Nadler (1981) proposed a congruence model for organizational change. He suggested that organizational change will be successful when all inputs, transformational process and outputs are congruent. A broad set of variables must be examined when considering change. For example, a manager considering office automation should not just examine the hardware and software required, but also such variables as work groups, work setting, information flow, supervision, autonomy and so on. Hage (1980) stated that change should be divided into four categories; evaluation, initiation, implementation and routinization. Many managers go about change in a rather haphazard manner with often disastrous results. If a manager approaches change in a more systematic manner as suggested by Hage, then the results may be more productive.

Hackman, Pearce and Wolfe (1978) found that changes in clerical jobs can impact on general job satisfaction, growth

satisfaction and employee motivation. Therefore when changing the structure of jobs, managers should keep in mind how those changes might result in changes in employee satisfaction. Hall (1979) suggested that change that begins from the top down will have a greater negative impact on employees attitude than change that includes employee participation. This would suggest that managers contemplating automation should include users in the decision making.

Purpose and Objective

There is no question that there is a technological revolution occurring in the American work place and that office automation (by which I mean the use of computer-assisted office equipment) is with us now and will continue to be a wave of the future. There is some question about how automation changes jobs, and there is some evidence that office automation is perceived by some clerical workers as impacting negatively on the quality of working life, and there is some resistance to, and anxiety associated with potential automation. This concern over office automation has been a familiar topic in the popular media. (See Japenga, 1982; Sweeney, 1980; Time Magazine, 1982).

The goal of this research was to describe the transition process of office automation: to look at the factors that effect user anxiety and efficiency of office automation, and to make recommendations to administrators

who must manage the automation process.

In response to the lack of research covering the application of the office automation as it relates to organizational change, and having personal experience with some of the problems inherent in the transition to office automation, the researcher conducted a case study of the office automation process in a university setting.

Twenty-five clerical employees who had experienced the office automation process were interviewed in depth to explore their perceptions of the automation process. These subjects were interviewed individually and ten of them were re-interviewed in two groups of five each.

Background information was gathered through interviews with administrators who were involved with automation, and the examination of University documents.

The specific objectives of the research were:

1. To interview select categories of office clerical workers who have experienced office automation.

2. To identify those factors which may affect the success of the process, e.g. level of training provided, level of user awareness of computer capability.

3. To document user problems which may be traced to office automation and result in less efficient use of computer-assisted office equipment.

4. To explore the differential effects of micro, mini

and mainframe computers on user problems.

5. To provide through the case study method
recommendations to computer-naive managers for the effective
transition to automation and efficient use of computer-
assisted office equipment.

The data were analyzed by the following categories:
factors effecting the transition process, factors impacting
the efficient use of computer-assisted equipment, changes
associated with the use of computer-assisted equipment,
factors associated with different types of computer-assisted
equipment; and recommendations were presented for use by
computer-naive managers on how to go about managing the
change process. It was the conclusion of the researcher
that it is not automation, per se, that can bring about
negative changes in the quality of working life, but how the
change is managed.

Need for the Study

There is a paucity of research in the entire area of
office automation, and little mention of the human factors
involved in the transition process. A manager can find a
lot of advice on the selection of hardware and software, but
human resources are usually glossed over with comments about
remembering to take them into account, but with little
information about how to do so.

Word processing is one of the larger areas of office

automation and Taylor (1980) made the following comments:

> A search for literature discussing the quality of
> working life for word processing specialists revealed
> that few surveys or studies of keyboard employees have
> been made. However, the assertion has been made that
> word processing employees are not happy in their work,
> are subject to physical and mental strain, have high
> absenteeism and turnover, and are a potential force for
> labor union organization (p. 26).

Taylor (1979) found only 40 articles with reference to
word processing jobs in a review of the literature conducted
in 1979. Most references found related to productivity and
error, with only slight mention of workers satisfaction or
dissatisfaction.

In discussing the research on how to go about the
office automation process an article in the EDP Analyzer
("The Automated Office," 1978) stated the problem
succinctly, "No one really knows how to do it [office
automation] to cause the least 'upheaval' in the office" (p.
11). There has been a call for research in the area of the
impact of office automation on the quality of working life,
especially with emphasis on worker involved in-depth
research (Taylor, 1977). However, there has been little
response to this call. Moran (1982) stated that there was
"very little research literature specific to office
automation" (p. 6).

The settings of most research which focused on office automation have been in the banking and insurance industries. This researcher found no citations in the literature concerning office automation in colleges and universities. Robert Gillespie ("University Supermini Network," 1982), Vice Provost for Computing at the University of Washington, likens the computer movement to an industrial revolution. But he suggested that in higher education office automation is an accidental revolution because many university administrators have been slow to respond to the technological change because they are unsure what it means. That could be one explanation for the apparent lack of research on this topic in higher education. Current and future leaders in higher education will surely experience the transition to office automation, and this study provides recommendations for the management of that process.

Delimitations

The setting of the research was limited to one institution of higher education. The research was limited to one organization with which the researcher was familiar to allow for an indepth study. The topic of office automation elicits strong feelings from people, and the researcher wanted to tap those feelings and explore the richness and texture of the topic.

The interviews were limited to 25 clerical workers who had experienced the transition process to office automation, since that was the focus of the research. Therefore clerical workers who learned to use computer-assisted equipment in a department whose automation conversion predated them, were excluded from the study.

Much of the data collected was limited to the subjects perceptions of what happened to them. Therefore most of the findings must be interpreted within that framework.

Whereas some administrative personnel were interviewed to collect background data, this research did not attempt to study the impact of office automation on any employees other than clericals.

This study was also limited by the lack of a clear theoretical framework from which to study the transition process of office automation. There were no theories to test, to compare, or to expand. Organizational change has been studied, but as Goodman and Kurke (1982) state, there is no clearly defined theory of organizational change. Office automation is a relatively new and lightly researched topic of investigation. Studies of office automation are still in the impressionistic observation state as described by Blau, Falbe, McKinley and Tracy in 1976.

Definition of Terms

    1. APPLICATION PROGRAMS -- Those programs used to

perform user requests.

2. AUTOMATED OFFICE EQUIPMENT -- Units consisting of micro- or minicomputer, or tied into a large mainframe, equipped with a video display terminal (VDT), a memory and a keyboard. May also have a printer. Also referred to as computer-assisted office equipment.

3. CLASSIFICATION -- Refers to the payroll title of a University position; how much a position is paid.

4. CLERICAL WORKER -- Employees who provide administrative assistance through typing, filing, word processing, reception, bookkeeping, accounting duties, etc. For this study are defined as University employees with the payroll titles of Secretary I, II and III, Senior and Principal Typist Clerk, Administrative Assistant I, II and III, and Senior and Principal Word Processing Specialist.

5. ERGONOMICS -- Biotechnology. The study of the relationship of biology and technology; how technical equipment should be physically designed for human use.

6. HARDWARE -- The mechanical and electrical components of a computer.

7. MSO -- Management Services Officer; A University payroll title for staff departmental managers.

8. MAINFRAME -- The largest capacity and historically oldest computer. Can support 65-125 workstations, with a memory capacity of over 32 million characters. Has the most complex peripheral equipment, cost in excess of $500,000. Also called a general purpose computer.

9. MICROCOMPUTER -- The smallest general use computer. Supports 1-15 workstations with 1/2 million character memory capacity. Costs range from $1,000 to $50,000 depending on the peripheral equipment. It is frequently used for office support purposes.

10. MINICOMPUTER -- A general use computer which can support 15-65 workstations with a memory capacity of 1/2 to 32 million characters. Costs range from $50,000 to $500,000.

11. OFFICE AUTOMATION -- The process of converting an office to the use of computer-assisted equipment.

12. PROGRAMMER -- A person who develops user application programs.

13. SOFTWARE -- The systems and applications programs used to operate the computer.

14. SYSTEMS ANALYST -- A person who develops and maintains systems programs.

15. SYSTEMS PROGRAMS -- Those programs which run the computer itself.

16. TERMINAL -- A cathode ray tube (CRT) with which the user interfaces with the computer by use of a keyboard.

17. USER -- A clerical worker who directly uses computer-assisted equipment to complete job tasks.

18. WORD PROCESSING -- The capability of any micro, mini or mainframe computer to produce memos, letters, manuscripts, etc. The computer-assisted equivalent to typewriting.

CHAPTER II

REVIEW OF THE LITERATURE

Office automation is an area in which there has been little research. In 1979 Taylor (1979) reviewed the literature and found only 40 articles which referenced word processing jobs. Moran (1982) also conducted a review of the literature and found "very little research specific to office automation" (p. 6). This researcher conducted electronic searches of ERIC, Dissertation Abstracts International, ABI/Inform and Management Contents Data Base, using descriptors related to office automation which yielded 51 citations, and reviewed an unpublished annotated bibliography of Human Factors in the Design and the Automated Office, Institute of Industrial Relations, University of California, Los Angeles, 1981.

Connell (1979) attributed the lack of research in the area of office automation to the following: "The principle of funding research to explore unknowns is an accepted practice in every phase of business except the office" (p. 3-4). Even though clerical workers constitute one of the largest occupational work groups in the United States there has traditionally been little research concerning the quality of their working life. Clerical workers have been a

13

"low profile" group (they are mainly female, their
contribution to our society has not been highly regarded,
they have not been active in union organizing or work
stoppages) and therefore have not been a group to attract
the attention of researchers.

Whereas office automation may not have attracted the
attention of scholarly researchers there has been what
Kasurak, Tan and Wolchuk (1982) describe as an "avalanche of
paper" on the topic. It is difficult to pick up a magazine
or newspaper today and not find an article related to
computers. This avalanche is made up of documents as
diverse as theoretical papers on the effects of technology
on workers to articles in trade magazines along the lines of
"how I automated my office".

> Blau, Falbe, McKinley and Tracy (1976) suggested that,

> Studies of the impact of computers on organizational
> structure and decision making are following a course
> similar to that taken by research on production
> technologies, with impressionistic observations
> preceding more systematic comparative efforts... (p.
> 12).

In 1970 Whisler (1970) described the literature in
technology and organizational change as speculative and with
little systematic knowledge. Today, that would still be a
good description of the literature on office automation.

The lack of research on office automation is also due to the fact that office automation is a relatively new and fast changing phenomena. This discussion of the review of the literature will be limited to office automation, but other areas of organizational change research will be brought into the discussions of the findings of this study.

As stated before, the literature consists of two types: opinion papers on the real and perceived impact of automation on office workers, and research studies which suggest factors to consider when automating. The first type is by far the larger. The literature will be discussed in two broad categories -- the impact of automation on clerical workers and the automation process.

The Impact of Automation

The literature suggests concerns about the impact of automation on several levels: the person, the job structure and the organization.

The Person. Many comments are found in the current literature concerning the need to consider the human element when automating the office. Williams (1977) pointed out,

> Perhaps foremost [priority] is the requirement that we keep consideration of human factors in the forefront...the interface between the individual and the machine must receive increased emphasis if the full

potential of the automated office is to be achieved (p. 85).

Connell (1978) writing in <u>Datamation</u>, suggested that the greatest challenge facing people in the computer field is a people challenge; how to interface machines and people. And Monson Hays (1979), President of Northern Telecom, Inc., stated the following when discussing the use of computer-assisted equipment:

> Now let me make a modest observation on an aspect of this mushrooming technology that has not been discussed at all...the major problem... is going to be psychological and sociological--the ability of office workers, managers and top executives to work with, understand and handle a whole different world of devices... (p. 10).

McKendrick (1982) agreed that the challenge of the 1990's is to introduce the human factor into the design of machines. He suggested that the fear of automation, which must be overcome, is based upon (a) the view of automation as a threat to job security, (b) that people tend to bring their own low self image to work and are afraid computers will reveal that their own worst fears about their inability to function are true, and (c) it has always been socially acceptable in the United States to dislike machines.

Writing in an industrial magazine on the human factors

of office automation Manginelli (1983) discussed managers'
expectations of office automation:

> People expect to plug in machines and that all kinds of
> productivity will result. Unfortunately, life isn't
> that easy...you need to analyze the system you are
> using.... I think that [employees' needs] is something
> that is completely overlooked in systems analysis....
> People often don't even attempt to have a good
> understanding of what the real plusses and minuses are
> for the people who are affected (p. 19).

Kutie's (1977) dissertation is one of few research
projects on office automation. Using the Minnesota
Satisfaction Questionnaire (MSQ), Kutie found that
traditional secretaries were more satisfied than word
processing operators on four factors of the MSQ -- Ability
Utilization, Achievement, Company Policies and Practices and
Supervision. Kutie interpreted the results to suggest to
business educators that differing clerical positions may
require differing skills and personality types. The results
might also suggest that office managers should be aware that
word processing jobs might be too narrow and repetitive and
not as satisfying to some employees as broader traditional
secretarial jobs. However, any conclusions drawn on the
basis of job satisfaction instruments should be interpreted
cautiously due to the low validity of such measures.

Mitchell (1982) did a survey of 61 word processing

operators in 22 locations in Dallas and Houston, Texas on job satisfaction. The subjects had operated a word processing system for at least six months and their systems had been in operation for at least one year. The data were collected through interviews with operators and supervisors. Mitchell reported that turnover was directly related to job satisfaction, since he found that the turnover rate was 26% for those employees who were reported to be satisfied, and 36% for those who were not satisfied. He also reported that the biggest impact on job satisfaction was supervision. Those employees who where identified as being satisfied described their supervision to be supportive, but not restrictive.

There is also a concern for possible physical problems associated with video display screen usage. A report from the National Institute for Occupational Safety and Health (NIOSH, 1980) indicated that video display terminal operators reported higher levels of stress and health ailments than control group subjects. In the study, 250 VDT operators and 150 control subjects answered a questionnaire on job demands, on-the-job stress factors, psychological stress levels, psychological moods, health complaints and working conditions.

Concern for the physical and emotional impact of computer-assisted office equipment must be looked at within the totality of health hazards for office workers. The

Working Women Education Fund (1981) reported the following:

    1. Clerical and secretarial women developed coronary disease at nearly twice the rate of other women workers.

    2. Clericals ranked second only to unskilled laborers in occurrences of stress related diseases.

    3. Clerical VDT operators showed higher stress ratings than any other group of workers studied by NIOSH, including air traffic controllers.

They suggested that heavy work load, rapid pace, monotonous work, lack of recognition/respect, lack of control over work and low pay are factors associated with clerical work which can be stress producing. Poor lighting, poorly designed work stations and visual strain are added stressors for clericals using computer-assisted equipment.

In response to the controversy over video display terminals (VDT) and their relationship to health hazards and job security, Schwartz (1981) reported the following: (a) no research has disclosed significant levels of radiation emitted from VDT's, (b) eyestrain and fatigue can be impacted by lighting, glare and distance from the terminal, and (c) there is no evidence of large scale staff reductions associated with office automation, and that in the long run word processing tends to show growth patterns.

Cronberg (1982) has speculated on how technology might change the life of many working women. Since the large

majority of clerical workers in the United States are female, the change in clerical jobs will impact mostly on women. Automated equipment can provide the technology for workers to do their jobs at home. It has been speculated that this could be a big advantage for women due to the convenience of working at home. Women could operate home appliances while doing their clerical work and would be saved the time and expense involved in travel to work. However, Cronberg expressed concern that such an arrangement could isolate women and impact negatively on their social and personal development. She suggested that neighborhood centers could be developed where clerical workers from different employers could work together. Such an arrangement could provide for geographic convenience while still allowing for social interaction in the work place.

There is some reported reluctance from managers and clerical workers to move towards automation. Sometimes employers experience the hesitancy of staff to learn to use computers and computer-assisted equipment and/or to accept positions which require its use. McLellan (1983) stated that, "For many who have not joined the computer age, the very idea of a computer conjures up an Orwellian version of a cold, heartless machine" (p. 21). Some of the causes of that resistance are explained in the previous literature citations. In the popular media one can find articles on how computers cause physical and emotional problems, and change jobs and lives. For example, A La Jolla psychiatrist

Thomas McDonald was quoted in the <u>Los Angeles Times</u> (Japenga, 1982) about how computers cause stress by, "the plopping down of a highly technological things in the lives of people who are unprepared for it." In an earlier <u>Los Angeles Times</u> article, Sweeney (1980) discussed how the use of computer-assisted office equipment is viewed as routinizing and downgrading clerical work and thus negatively impacting job satisfaction. <u>Time Magazine</u> (July 19, 1982) discussed the reluctance of managers and executives to use computers because of fears associated with the use of machines and the possible loss of status associated with their use. Also there were indications that managers did not "trust" information that came from computers. One executive indicated that he would not read anything that was written on green and white computer paper!

However, Olsten (1982) found evidence that the new technology was eradicating many repetitive jobs and enhancing career potential. Buchanan and Boddy (1982) discussed the same contradiction of findings concerning the effects of advanced technology.

> There is evidence that advanced technology alleviates the traditional hardships of work, such as dirt, noise and danger, and requires higher order skills from those who operate it. However, there is evidence that advanced technology creates boring, routine, lonely unskilled work (references omitted)" (p. 1).

These contradictions might be explained by the fact that the studies did not differentiate by the type of technology. However, Bucannan and Boddy found (in a study of the effects of word processing technology on typists) that the measurable effects of the change were only weakly and indirectly related to the technology, but strongly and directly related to the management decisions specific to the change.

There is also a lot of speculation in the popular media that the use of computers decreases the communication among employees. However Conrath and Blair (1981) reported findings which show that while a decrease in some face-to-face interaction may occur, the overall communications increase through the additional mode of office automation (electronic mail systems). In addition, they found that face-to-face interaction between peers in the same work group, with workspace in close proximity, did not suffer a significant decrease as a result of automation. Therefore they concluded that office automation had a positive impact on communications.

The EDP Analyzer ("The Automated Office," 1978) suggested that trauma is experienced in association with automation when the work relationships and supervisory relationships change. It further suggests that managers fear the use of computers because (a) their work will become more visible, (b) they might lose their secretaries, (c)

they fear machines and (d) they have a fear of change in general.

Cullen (1982) has called for the development of a taxonomy of the effects of technology on human life. There is speculation on its impact (user isolation, boredom, decreased/increased communication, increased monitoring of individuals, routinized work) but no definitive research.

Job Structure. Others writing in the field express opinions on how automation is changing the structure of jobs. John Thackray (1980) described a social malady in the office today that is, "inchoate, barely on the fringes of current perception, diagnostically confusing, for which no consoling remedies exist" (p. 95). Some would argue with Thackray that the problem does have prominence, but would agree that automation is a problem if it causes employees to have less control over their working lives. He states that,

> The console-operating clerk is shorn of the ancillary
> activities, sideways perception and interactions of the
> previously manual job-things not only worthwhile in
> themselves, as adding richness to life, but necessary
> for personal growth and development (p. 101).

Thackray also suggests that the Opinion Research Corporation employee opinion polls conducted in 1960 and 1980 which showed a change from 2/3's of clerical workers responding that they were treated fairly to only 1/5 responding that

way can be attributed to office automation.

Schlefer (1983) has also written on the effects of automation on clerical jobs. He reviewed office automation in several banking and insurance institutions, and found that automation often decreased the efficiency and increased the bureaucracy of an organization. He found that as clerical jobs became more routinized that errors increased. He suggested that jobs that used computer-assisted equipment be structured so that the workers dealt with a "whole" product. Such an arrangement could enhance worker understanding of and commitment to their job.

Glenn and Feldberg (1972) argued that as clerical work loses its special characteristics and becomes organized around manual rather than mental activities that tasks become more externally structured and relationships become more depersonalized. They also suggested that clerical automation increases fragmentation of jobs, decreases autonomy, and leads to worker alienation. Kirsch and Lengerman (1972) agreed that meaninglessness and isolation in jobs, which might be exacerbated by automation, contribute to worker feelings of self-estrangement.

Beer (1976) and Krois and Benson (1980) have written on the topic of office automation and job design. Beer stated that word processing systems can be designed in a variety of ways. Determining which design is best for a given organization requires the consideration of each design for

its impact on employee motivation and productivity. Krois
and Benson suggested that there are three general designs
for word processing systems. Those designs are: a
satellite system where executives and managers keep
secretaries who are equipped with word processing equipment;
a word processing pool, under one supervisor, oriented
towards production; and word processing teams which deal
directly with their "clients". They did not recommend any
one design.

The Organization. There have also been investigations
into the impact of automation on organizational structure.
Rico (1967) did an indepth study of the impact of automation
on a specific organization. He found that increasing
automation forces more rigid formalization of the work
process. Rules and regulations are substituted for
individual decision making, and the freedom and flexibility
to adopt workers' own methods is decreased. Mann and
Williams' (1962) research using a sample of 168 employees in
a public power company supported Rico's findings. They
reported that automation brought higher risk to the employee
because mistakes often proved to be more costly, and that
employees reported a concern for the tightening of
performance standards and for potential reductions in force.

Taylor (1982) compared the design of office automation
in a government office processing social benefit claims and
a private insurance company. Using the case study method

and interviewing managers, supervisors, technicians and clericals he looked at the technology used, the flow of work and the design of individual jobs. He concluded that the private insurance company should look at the social systems requirements of its employees, while the government organization should alleviate the job monotony and try to improve work interest.

Whisler (1970) suggested that information technology (computerization) has the following impact on organizational structure: (a) departments are consolidated, (b) the span of control is reduced, (c) control becomes more centralized and (d) technology becomes part of the control structure. Information technology makes its greatest contribution in improving coordination and control because that is where its greatest impact lies.

Summary. The review of the literature suggests that automation (a) impacts the office by changing the relationship of workers with their jobs, supervisors and coworkers; that (b) there is concern about the influence of computers on the physical and emotional health of users and the ability of humans to adjust to technology and a resultant reluctance of employees and managers to use computers; that (c) computers are changing the control functions in organizations; and (d) there are contradictory findings and opinions on how computers impact on communication and whether they broaden or narrow jobs.

The Automation Process

As stated earlier, there is little systematic knowledge available on human factors to consider when automating an office. The factors mentioned in the literature are user attitude toward automation, user participation in the decision making process, and user age.

User Attitude. Long, Hammond, Barnard, Morton and Clark (1982) used a case study approach to examine users' views on the usability of an interactive computer system. They collected data from sixteen professionals working in one organization in Great Britain. The subjects were formed into two groups of eight each to discuss their opinions on the usability of their computer system. The researchers assumed that the users' attitudes would affect the usability of the system. They were mainly looking at technological problems, but found some other interesting results. Many employees had negative attitudes toward the system and that, combined with cognitive difficulties in understanding the system, resulted in an underutilization of the system. That finding supported previous statements concerning the underutilization of interactive systems (Bennett, 1976). Their conclusions also suggested some factors to consider when introducing an interactive system, such as: (a) the recommendation that users should be involved from the beginning, (b) users should be listened to closely because they often have a better understanding of the system's

problems than do the analysts, (c) user manuals should be jargon free, and that (d) pre-training can be significant in influencing user understanding and utilization. Users also reported individual and group relationship changes as a result of the computer adoption, and that supervisors often had unrealistic expectations of response times.

Kennedy (1975) did a study of computer-naive clerical workers in a hospital setting in Great Britain. Testing was done to determine the employees' attitudes towards computers in order to study the relationship between attitude and learning to use the computer. Kennedy suggested that the training method should be one that does not further antagonize the negative bent of employees towards computers, and that self learning through an interactive terminal might be the best approach.

Participation. James Driscoll (1982) believes that office automation has been a failure so far because of the neglect of the human elements. He recommended that the human potential be maximized by managers organizing offices to deal with automation rather than just reacting to it. Driscoll (1979) has also suggested that user reluctance can be reduced by letting users participate in the selection and implementation of the system.

The concept of user participation was also the topic of a case study done in the purchasing department of Rolls-Royce Limited in England (Munfort & Henshall, 1979). The

case study presented a detailed account of how users assisted in the design of the conversion to automation. Donna Williams (1977) in writing about the process of office automation pointed out the importance of training. But as in most articles on the topic of office automation, no specific suggestions were made.

Kasurak, Tan and Wolchuk (1982) conducted a research project on the organizational and human-factor impacts of the electronic office. They agreed that workers should be involved in the design and development of new office systems. Users can make a positive contribution by helping to prevent design blunders, and their involvement can also promote enthusiasm for the change. They found that staff relations might be termed the "forgotten issue insofar as management's view of the impact of the electronic office is concerned", and that stress is heightened by the presence of computers which are still regarded as "somewhat mysterious and threatening" by a significant minority of employees studied. They concluded that management can use computers to create a more effective and productive organization or they can create a white collar assembly line. This last conclusion supported those of Bucannan and Boddy (1982) cited earlier.

Butteriss and Clark (1977) agreed that little thought is given by management on the consequences of introducing technology to the clerical sector. Their study of British

clericals indicated a high rate of turnover, absenteeism and low morale; and that the use of computer-assisted equipment in many cases resulted in de-skilled jobs. They suggested that employees should be asked about their individual needs, and that jobs should be designed to include respect from the work community, making a contribution to that community, with set standards for quality and quantity with a feedback system to the employee. Jobs should also be a meaningful set of tasks which contribute to the whole job and those tasks should have a minimum of variety.

Morton, Barnard and Hammond (1978) agreed that the human-computer interaction is computer-centric. They found that analysts often spoke jargon and that manuals were inadequate and difficult to understand. They found that those conditions contributed to the non-use or inefficient use of the computers. They suggest that interactive systems be designed for the naive user.

Age. Porat and Vaughan (1967) found that the young view the computer more positively than the old, except for older men occupying top managerial positions. Their findings would suggest that older employees might need to be treated in a more careful manner when exposing them to the use of computers.

Automation Management. Penfield's (1982) article in The Office is typical of articles concerning how to go about automation (the "Avalanche of Paper" referred to by Kasurak,

Tan and Wolchuk). Penfield related her experience of
automating an office as first being frustrating because
managers were reluctant to try automation because they did
not want to give up personal secretaries or specialized
departmental clerical staff. They were evidently persuaded
because most of the article explains the selection process
for the word processing system. The recommendations are
that clerical workers be allowed to use computer-assisted
equipment when they desire and that they not be put into a
pool. The only result discussed was that clerical overtime
was reduced by 65%.

Another common type of article on office automation is
that by Miller (1982). In this paper Miller presents an
opinion on the criteria for selecting word processing
operators and personality traits associated with successful
operators. While providing no criteria for success or basis
for the conclusions, Miller suggests the following selection
criteria: (a) above average intelligence, (b) proficiency
with general coordination skills, (c) familiarity with the
use of the typewriter, (d) familiarity with office
procedures, and (e) broad experience with office work.
Recommended personality traits are: (a) good organizational
skills, (b) ambition to succeed, (c) sense of discipline and
concentration, (d) emotional stability, (e) pride in work,
(f) ability to work with others, and (g) pleasant
personality.

Summary. The literature suggests the following when considering the automation process:

1. Many people have negative attitudes towards computers that might impact on their learning to use them properly. This may be especially true for older employees.

2. Computers need to be more human oriented to maximize their effective use. Manuals should be jargon free and complete enough to support self-learning.

3. Users should be involved in the initial planning sessions of any automation transition process.

4. The state of the art in researching the office automation process is in the embryonic stage. There is a need for information concerning the planning, implementation and evaluation of the office automation process from the quality of working life perspective.

CHAPTER III

METHODOLOGY

The purpose of this research is to describe the transition process of office automation -- to look at the factors that affect user anxiety and the efficiency of office automation. This is a new area of research, without a theory to test; an area of study just now being explored. The researcher was particularly interested in investigating the thoughts and feelings of clerical workers who had experienced the automation process. The case study approach allows for this indepth look at an organization and its people. The richness and texture that can come from a narrative description is lost when reduced to numbers for theoretical analysis, and that is why a quantitative approach was undesirable.

Qualitative Research

Research in the social sciences has traditionally followed the models developed in the sciences -- experimental design requiring quantitative analysis. However, that type of research has often not been helpful to policy makers and behavioral scientists who have therefore explored the value of qualitative research.

Qualitative research is often defined as that research which has a more interpretative, nonmathematical approach. Its techniques include surveys, questionnaires, observations and other data collection methods (Hartman & Heldblom, 1979). It is defined as being different from quantitative research which employs strict experimental designs. Qualitative research is sometimes criticized as collecting data without a thorough consideration of a theory or framework for analysis.

Goode and Hatte (1952) suggested that the issue of qualitative vs. quantitative research is a false dichotomy. They stated that what is important in any research is that the observations are accurate, can be replicated, and that they can demonstrate the conclusions.

The Case Study

The case study approach to research examines one example in detail to learn more about the whole. In the case study the story is the data. The researcher describes the situation -- the behavior. It does not require the data to be forced into pre-set variables for explanation.

Jackson and Morgan (1978) described the case study as observations by a researcher of an organization or specific organizational variables, and a written description of those observations. The observations may be made in a variety of ways, including questionnaires, interviews and personal

observations. The writing style is usually informal, often
narrative, with the liberal use of verbatim quotations
(Stake, 1970).

The case study approach has been criticized for its
lack of measurability and generalizability. Observations
about one organization may not necessarily apply or be
useful in describing other organizations. However, as
Jackson and Morgan (1978) pointed out, a great deal of
information has been gathered about organizations using the
case study approach, and it is particularly useful in
studying organizational processes and change. And they
stated, "In many instances in newly developed theories or
impressions about organizations, it's the only method that
fits" (p. 38). Franklin and Osborne (1971) agreed that the
case study is useful when researching areas where there are
no guidelines for the organization of the research problem.
Filstead (1970) urged researchers to use qualitative
methodologies that are appropriate to their areas of
investigation. He questioned the use of highly complex
measuring techniques which can become ends in themselves and
therefore obscure organizational understanding. He thinks
it is inappropriate to force a research problem into an a
priori scheme when empirical observation can provide better
understanding.

The case study approach is widely used in the social
sciences and business administration to study certain

phenomena in organizations and institutions. It was an appropriate methodology for this research because the literature on office automation reflects mostly opinions and there is no body of theory to test. An experimental design, while controlling for variables, would not provide for the depth of information that can be collected by a case study. Also as Selltiz, Jahoda, Deutsch and Cook (1963) wrote,

> "Social scientists who work with this approach have frequently found that the study of a few instances may produce a wealth of new insights, whereas a host of others will yield a few new ideas" (p. 61).

They go on to say that the case study is particularly appropriate for studying groups in transition.

Stake (1970) believes that the disadvantages of the case study approach disappear when the objectives of the research are understanding and an extension of experience. He thinks that case study research is similar to how people naturally learn and therefore enhances the probability of understanding. He stated:

> It is widely believed that case studies are useful in the study of human affairs because they are down-to-earth and attention-holding but that they are not a suitable basis for generalization.... I claim that case studies will often be the preferred method of research because they may be epistemologically in harmony with

the reader's experience and thus to that person a natural basis for generalization.

I believe that it is reasonable to conclude that one of the more effective means of adding to understanding for all readers will be by approximating through the words and illustrations of our reports, the natural experience acquired in ordinary personal involvement (p. 5).

Since the intent of this research was to investigate a new phenomena (without a theory to test) by studying a transition process, with the goal of understanding and learning, the researcher thinks that the case study is the most appropriate methodological approach for this investigation.

The Setting.

Taylor (1977) and Davis (1971) both suggested that the best manner in which to research the quality of working life is through indepth research by investigators who are trusted by the employees and are knowledgeable of the organization that they are studying. Researchers who flit in and out of an organization collecting quick survey data can often gain merely superficial information. For those reasons, this research was conducted at a university with which the researcher was quite familiar. The researcher has been an administrator with the University for over six years, has

held several positions and is familiar with and known to all administrative areas of its campus.

The University. The University is part of a multi-campus public university system on the west coast. At the time this research was conducted, it had an employee population of 11,018. Of those, 60 were management, 8,018 were staff, and 2,940 were academic. The student population was 13,108.

The University employs representatives of virtually every occupational group found in a major coastal metropolitan area. Not only does it employ the traditional clerical, administrative, maintenance, engineering, and laboratory occupations found at a major research institution, but also the full range of health care, maritime, and aircraft operations occupations.

The University admitted its first undergraduate students in 1964, and despite its youth, has for some years been ranked among the top five universities in the nation in the amount of Federal research dollars it receives. Four out of every five staff employees are supported directly by research contracts and grants or self-supporting activities; only one out of five is supported by state funds.

The University has 30 academic departments on its main campus, a school of medicine, and numerous organized research units. It is headed by a chancellor who is

assisted by seven vice-chancellors (academic affairs, undergraduate affairs, business and finance, resource management, health sciences, medical center, graduate studies). The campus is located on 1,200 acres in a metropolitan area, 12 miles from the center of a major city.

The organizational units within the University are diverse, and because of the large support from outside funding relatively independent. The University could probably be more accurately described as a confederation of organizations, rather than as just one organization. This diversity and complexity could mitigate the generalizability problems associated with researching an issue within one organization.

The Organizational Environment. Cohen and March (1974) described universities not as bureaucracies, but as organized anarchies. The setting for this research appears to meet that description. As stated before, the independence of funding combined with the stature of the faculty gives the academic areas of the University a great deal of autonomy in operation. The implied management practices of collegiality and decision making by consensus pervades the campus. There is a distinct class difference between faculty and staff, but the lack of hierarchical structure and decentralized decision-making is evident in staff operations as well.

As part of a large system, the University has a mass of

detailed administrative policies and procedures. Many
administrators appear to operate without any knowledge of
these restrictions, and little concern for their lack of
knowledge concerning the system's operating procedures.
Many departmental personnel appear to identify only with
their department. Decisions are often made within this
provincial attitude with minimal concern for their impact on
other departments or the University as a whole. The
University's administration appears to put little emphasis
on compliance with its policies and procedures.

Given this rather laissez-faire environment it is not
surprising that automation came to the campus by means of a
decentralized and sometimes difficult route.

The Development of Automation. In 1965 the University
bought its first computer. It was purchased by a group of
researchers housed in an off-campus location. In 1970 that
original computer was replaced by a larger one and moved
onto the main campus. Thus was established the University's
computer center. It was used only for academic purposes
because all administrative computing (payroll, ledgers,
student transcripts and grades) was done at the systemwide
level.

In the early 1970's systemwide administration decided
to decentralize its administrative computing, so the
University had to develop its own computing resource. The
computers purchased for research purposes had some

capability for administrative use, but they were not the most effective for those needs. It is reported that the decision to decentralize administrative computing was traumatic for the campus. There was a conflict among administrators as to who should be responsible for computing. This lack of leadership (as described by administrators responsible for providing campus computer resources) resulted in some poor planning and bad decision making. Some hardware was used that was more expensive than was needed, incompatible software was purchased, and the costs and time frame necessary for the automation was underestimated.

At the time that this research was conducted the University was still in the process of deciding how its computing needs would be met and how those resources would be organized. It was without a major computing needs long range plan. At that time it had in place a Computer Center, with 45 employees, which housed a Bourroughs mainframe computer dedicated to academic needs, and an Administrative Systems department, with 23 employees, using Prime and Vax minicomputers to furnish administrative computer needs.

It is not surprising that many departments went their independent ways when they began to automate. Many departments were able to purchase minicomputers with their research dollars and other departments were provided microcomputers through state funds. Thus, without proper

staff for consultation and with few administrative controls, the University today finds itself with a mishmash of computer support. Some departments have state of the art automation which they are using effectively, while other departments have not automated at all, or have done so but have hardware which they barely use. There have been many purchasing mistakes which have resulted in a myriad of computer systems many of which are incompatible and most of which are underutilized. Some managers have estimated that the University is currently effectively using only 10% of its automation capabilities.

The description of the University's progress may sound unusually disorganized and poorly planned. However from discussions with administrators at other institutions of higher learning and in the private sector, it appears to the researcher that automation conversion is an activity that is often not well managed. Planning for automation is frequently a new task for managers -- one for which they are often poorly prepared. Robert Gillespie (1982) noted that university administrators are often slow to respond to automation because they are unsure what it means, and are not prepared for its management.

The Sample

Sample Selection. Twenty-five clerical workers were selected to be interviewed who had experienced the conversion process to automation. They were representative

of different units on campus and of experience in using different types of computer-assisted equipment. They were interviewed individually, and ten of these subjects were selected for group interviews.

The criteria for subject selection were as follows:

1. Must be office clerical workers using micro, mini or mainframe computer-assisted equipment.

2. Must have experienced the automation transition process within the last three years in their current department. Employees who came to a department after it was automated were excluded from the subject population.

3. Must be a representative sample of the type of computer-assisted equipment used.

4. Must be restricted to primary use of one type of computer-assisted equipment.

5. Departments in which subjects work must be representative of the organizational structure of the campus.

6. Subjects must use computer-assisted equipment for a significant portion of their job assignments. (Approximately 30% of the time.)

The process for selection of subjects was as follows:

1. Departments were contacted and given a brief introduction about the research. The criteria for the subjects were presented and the departments were asked to identify any employees who met the criteria. All

departments contacted were cooperative in providing names of employees (if any) who met the requirements.

2. From the names provided, 25 employees were selected for a stratified sample to meet the representational requirements by department and type of equipment used.

3. Employees were contacted, given a brief explanation of the research and asked if they would be willing to be interviewed. All of the employees contacted agreed to be interviewed, so there was not a problem of having a volunteer sample. In fact, all of the supervisors and subjects contacted showed great interest in the research, and indicated that they thought it was an important, and long overlooked, topic of study.

After the individual interviews were conducted, two groups of five subjects each were formed for a group interview. The criteria for the composition of the groups were:

1. Representation from different departments.

2. Representation of using the three types of computer-assisted equipment.

3. Representation of different opinions of experience with the transition process.

Best estimates from the University's personnel office suggest that no more than 100 employees met the criteria for subject selection for this study. Therefore a sample size of 25 was well justified as a large percentage of the

subject population. Twenty-five subjects provided for the necessary representation while keeping the amount of data collected to a manageable size.

The Subjects. The University has approximately 1,600 clerical employees. They are 90% female, 12.6% black, 12.7% hispanic, 5.7% asian and .9% native american. Of subjects interviewed 100% were female, 8% were black, 12% were hispanic and none were asian or native american. The under-representation of males can be explained by the fact that the 10% of clerical workers who are male tend to be clustered in the positions of stock clerks, storekeepers, and mailclerks, positions not used in this research. The researcher found that clerical workers who met the subject selection criteria tended to be longer term employees. That might account for the under representation of some ethnic categories.

The working environment for most of the subjects was described by them as being pleasant; 20 (80%) have private offices. Only one of the subjects complained about the working environment. That person shared an interior office space, having no windows, with four other employees.

All of the subjects interviewed work without close supervision. They indicated that most of the time they were free to organize their work as they saw fit. This work style is common at the University, but the subjects' independence was augmented by the fact that most of their

supervisors were not highly knowledgeable of the equipment the subjects use.

The subjects appeared to personally identify with their jobs. This was evidenced by their enthusiasm in talking about their jobs with the researcher. When first approached about the interview, all of the subjects indicated a willingness to be interviewed and that they felt the topic was significant. During the interviews they were eager to explore the impact of automation on their jobs.

Even those few subjects who did not like working with computer-assisted equipment showed some pride in working with a computer. They described their equipment as "the computer", and always referenced their job as working with the computer.

Data Gathering

Interviews. Data was gathered through both individual and group interviews, with the researcher serving as the interviewer. The interviews were conducted between January and June, 1983.

The individual interviews lasted up to two hours and were semi-structured. The interviews gathered descriptive data (age, sex, department, type of equipment, education, length of time with University and department, classification), and focused on the areas of pre-automation consultation, training, interaction with programmers and

analysts, general experience with the transition process, job changes, and attitudes and feelings towards automation and the use of automated office equipment (see Appendix A for Interview Data Sheet). The subjects were encouraged to relate their experiences with the conversion process, and to offer suggestions they might have for managers facing the transition process.

Ten subjects were further interviewed in group settings (two groups of five each). The group interviews were relaxed and casual with the researcher acting as a discussion leader/facilitator. The purpose of the group interviews was to generate discussion of variables which might impact on the transition process that did not surface in individual interviews, and to determine if there was a commonality of experience. The group interviews covered the following topics:

1. Suggestions for training programs.
2. Changes in communication patterns.
3. Significance of user involvement in transition planning.
4. Changing relationships with faculty and staff.
5. Suggestions for improving the transition process.

All of the subjects agreed to have the interviews taped. The interviewer also took notes during the interview process (see Appendix B for example) and the tapes were used for verification purposes.

The research was reviewed by the University's Office of

Institutional Research and Analytical Studies, and the anonymity of the interviewees was protected.

The intensive interview technique which was used has its strengths and weaknesses. Intensive interviews can provide for less misunderstanding between the interviewer and the interviewee, for more accurate responses, and for a more complete and in depth picture. The weaknesses lie in the skill needed by the interviewer and for the possibility of interviewer bias (Williamson, Karp & Daphin, 1977). The researcher/interviewer is a professionally trained counselor with extensive experience in interviewing. The professionally developed skills of sensitivity, awareness of biases and active listening skills which the interviewer possesses provided the ability to undertake a study based on intensive interviews. Additionally, every fifth tape was reviewed by an independent party (a psychologist trained in clinical observation, see Appendix C) as a cross check that the researcher had accurately summarized and recorded the interviewees' comments.

The interviewer had the advantage of being known in the organization. However, the interviewer did not have the type of dual relationship with any of the subjects that could negatively impact the authenticity of their responses. Since all of the subjects provided at least a few critical comments, it can be assumed that they felt comfortable being candid.

When people are asked to recall past events, experiences, thoughts and feelings the phenomena of selective memory comes into play. This human behavior cannot be controlled, but the number of subjects used in this study should partly balance out the biases in either direction.

The reliability of the data can be influenced by the interviewer's ability to collect and analyze the data in an unbiased manner. As stated earlier in this chapter, the researcher/interviewer was trained at the graduate level in interviewing skills and has years of experience in conducting interviews. Tapes of the interviews were reviewed by a psychologist trained in clinical observations. There was consistent agreement between the researcher and reviewer on what the subjects said in the interviews. An example of the researcher's analysis of data can be found on page 81.

Observations. All individual interviews were conducted on the subject's job site. For those few subjects who did not have a private office, interviews were held in departmental conference rooms. While conducting the interviews the researcher also observed the work setting and working conditions. Those data were used to provide a background setting for the study by analyzing the organizational setting. Background information was also gathered from interviews with supervisors and administrators

familiar with the general automation history of the University.

Instrumentation. The researcher developed a semi-structured interview form which was used for all individually interviewed subjects. The form (see Appendix A) was used to probe for the following substantive information:

1. Functional job changes related to the use of computer-assisted equipment.

2. Relationship changes with other employees due to the installation of computer-assisted equipment.

3. Changes in communication patterns.

4. The user's role in the decision making process in determining automation.

5. The type and amount of contact the user had with programmers/systems analysts.

6. The type and amount of training received by the users.

The literature suggests that the factors chosen to be analyzed are indeed significant in the transition process. Kirsch and Lengerman (1972) expressed concern that automation might cause workers to feel more isolated from other co-workers. Williams (1977) and Munford and Henshall (1979) pointed out that user training prior to the conversion to computer-assisted equipment might make it easier for employees to adjust to the equipment. Long,

Hammond, Barnard, Morton and Clark (1982) discussed the importance of user participation in the decision making process. Participation enhances their knowledge of automation and commitment to the change.

Data Analysis

The case study is, by common definition, a description of an observation of an organization. The data for this study are then primarily presentations of employees' reactions to and thoughts about the automation process.

Based upon suggestions from the literature and information gained from the interviews, the following categories for analysis became apparent. The categories were:

Factors affecting the transition process

    User involvement in decision making

    User interaction with programmers

    Level of user training

    User anxiety

    Supervisor knowledge

Factors which impact on efficient use

    User knowledge of equipment

    User age

    Computer functioning

Changes associated with the use of equipment

    Communications

    Relationships with supervisors and peers

General job satisfaction

Factors associated with different types of equipment

The data were analyzed by these categories to look for commonalities reflected in the users' perception of the transition process, and to identify issues of office automation and their impact on the quality of working life of clerical workers. Glaser and Strauss (1967) have noted that in this type of qualitative research data collection and its analysis are concurrent; or as Agar (1980) said, "The process is dialectical, not linear" (p. 9).

Limitations of the Methodology

The most common criticism of the case study approach is its limited generalizability -- data gathered from one organization may not be useful in explaining another. There are several factors in this study that mitigate the generalizability problem.

The University is a large complex organization, consisting of both large and small departments, and employing a wide range of occupations. It's heterogeneous quality provides for the inclusion of many types of people, organizational styles, managerial approaches and so on. It could be referred to as a confederation of organizations.

This study looked at office automation within the broader category of organizational change. The literature suggests that problems associated with change are common

along a broad range of organizations -- large or small, private or public. Therefore the suggestions for managing change which come from observations of one organization might be applicable to other organizations.

The purpose of this research was to explain the office automation process in order to assist administrators in managing its change. Stake (1970) suggests that the case study is the appropriate method when the purpose of research is explanation and learning.

Data were collected using intensive interviews. This type of collection approach is open to problems of validity and reliability. The data gathered were mostly in the form of subjects' perceptions. The researcher wanted to learn about feelings associated with automation transition, but perceptions are just that, there is no guarantee of what is "truth" or "fact".

CHAPTER IV

FINDINGS OF THE STUDY

The purpose of this study was to identify factors that
impact the transition process of automation, to identify how
office automation changes the jobs of clerical workers, and
to identify any differentiation of the above by type of
computer-assisted equipment used. The findings will be
presented and discussed in the following order:

Factors impacting the transition process

 User involvement in decision making

 User interaction with programmers

 Level of user training

 User anxiety

 Supervisor knowledge

Factors impacting on efficient use of equipment

 User knowledge of equipment

 User age

 Computer functioning

Changes associated with the use of equipment

 Communications

 Relationships with supervisors and peers

 Job changes

 General job satisfaction

54

Factors associated with different types of
computer-assisted equipment

Factors Impacting the Transition Process

User involvement in decision making. With the
exception of one administrative assistant in an academic
department, the subjects unanimously reported little or no
involvement in the decision to automate. The decision to
automate was typically made by the unit or department head
in conjunction with that person's supervisor. Supervisors
and managers were not interviewed as subjects of this case
study, but some employees interviewed did speculate on how
the decisions were made.

Many of the employees interviewed had little direct
information on how or why the decision was made to automate
their office. All reported that they thought the decision
to automate was appropriate, however many were surprised
that they were even asked about their involvement in the
decision. This lead the researcher to conclude that those
subjects' supervisors did not exercise a participatory style
of decision making. Some of the subjects viewed their
supervisors as being knowledgeable of office automation and
of making an informed decision, while others thought that
their supervisors knew very little and were just going along
with a popular movement in order to be viewed as a trendy
administrator. (The supervisors' knowledge of computer-

assisted equipment capabilities and its impact on the effectiveness of automation will be discussed later.)

There is common agreement among behavioral scientists that employee involvement in decision making can enhance the quality of the decision while improving employee satisfaction and motivation. Employee involvement is also consistent with our society's beliefs in democracy and equality (Strauss, 1977). Employee participation can increase the employee's acceptance of the decision, especially if the employee is threatened by its consequences, and commitment to carrying out the decision (Strauss, 1963). Participation also helps meet employees' needs for autonomy, achievement and self-identity (McGregor, 1960). Also employees often have information and knowledge not available to the supervisor, and accessing that resource can result in better decisions (Vroom & Yetton, 1973).

Whereas not all of the subjects expressed concern over not being involved in the over-all decision to automate, they did express concern over not being involved in some of the more specific decisions involving automation. Employees felt they had a lot to offer concerning the choice of software packages, which functions should be automated, the format necessary for the different functions, the choice of hardware, and so on. The employees' comments were consistent with the literature of employee participation in decision making cited above. The availability for employee

involvement was impacted by several factors including the
size of the department and the type of hardware used.
Employees in smaller departments which used micro-computers
potentially had more opportunities to be involved, whether
or not the supervisor chose to allow it.

The employees expressed differing degrees of
disappointment in not being involved, the researcher equated
disappointment with their need to be involved in the
decision making process. Those needs could be explained by
McGregor's (1960) theory concerning autonomy, achievement
and self-identity. Being involved in critical decisions
relating to their jobs can increase employees' feelings of
self-worth and achievement; make them feel better about
themselves and their jobs. Conversely, being excluded from
such activities can decrease employees' needs for autonomy
and self-worth, which was described by the subjects as
feelings of disappointment.

The subjects unanimously recommended that in future
automation, users should be involved in decisions regarding
automation. They made statements that they thought
employees would feel better, feel more involved, and had a
lot to contribute.

The exception to lack of involvement was an
administrative assistant in one of the smaller academic
departments. Her almost total control over the decision to
automate her job is not atypical of how some decisions are

made at the University. A faculty member, who used a personal computer for manuscript writing, convinced the employee that she could use a computer to automate the books she kept. The employee researched the use, got permission from her supervisor to obtain the computer and decided what to put on it, and even trained herself.

The following are some comments about the subjects' involvement in the decision to automate:

I don't know exactly why the department decided to automate, but I wasn't surprised about it. The History department was using computers and it seemed to work well for them -- their administrative assistant was doing the books on the computer.

Well, the MSO just came in one day and told me that she was getting a micro computer and that we would start using it for bookkeeping and stuff. That sort of scared me because I'd read about computers and didn't know what was going to happen.

I guess that the MSO didn't have to ask my opinion about getting a computer, but I would have been happier if she'd asked me how I thought I could best use it!

What would I do if I were responsible for automating an office? Well, the most important thing is asking the administrative assistant what she wants. How she does her job, how the computer could help her. I'd want to

know how she felt about computers, what she wanted them to do for her. And then I'd let her go with me to look at the equipment and software packages. I'd figure that she knew more about it than I did.

My MSO was terrific! She took us around to look at the equipment, and salesmen came and talked to us. We first decided what we wanted the computer to help us do, then we tried to find the equipment that would best serve our needs. I think what we got was great, I don't know why other departments didn't get the same thing.

User interaction with programmers. Few of the subjects reported having interaction with computer programmers or systems analysts. The lack of involvement was due to one of two factors: the supervisors chose not to allow the interaction, or the department was not using the type of computer which required interaction with programmers or analysts. Of the employees who had interaction, two felt very positive and two initially felt very negative about the experience.

Not surprisingly, the two employees who had considerable interaction with the programmers and felt it was helpful were also the two subjects who had the most involvement in the decision to automate and how to automate. One was the subject mentioned earlier, and the other considers herself one of the "pioneers" of office automation

at the University.

The two subjects who had negative feelings about their interactions with programmers both worked in large departments which were heavily automated and which had experienced many problems with the conversion process. One of these subjects stated that, "the programmers didn't want to deal with our input because it would cause them too much conflict". Both subjects agreed that the programmers initially paid little attention to them and treated them like objects. One of the subjects gave the following account:

> The programmers would stand behind me as I sat at the terminal and discuss the problems we were having. They literally talked over me and down to me. They kept referring to me as the "user". I hate the term user, it makes me feel like a machine -- an object. Finally the programmers realized that I knew what I was talking about -- that I understood the problems and they started listening to me and treating me like a person.

This same subject also had some thoughts about how to improve the relationship with programmers:

> They come in here with all the power and all the mystique of those who know so much more than we do. We don't see them as people and they don't see us as people. I think they should be brought in first as

just people, so we can get to know them and trust them
and feel like they like us and don't look down on us.
Also it would help if we had a class in their language.
If we could speak their language then maybe we could
communicate better with them and they wouldn't think
we're so stupid.

Even though many of the subjects had not had direct
experience with programmers/analysts they felt that it would
be important for the users to be able to interact with and
communicate with them.

Level of user training. Five of the subjects stated
that they received good, thorough training prior to using
the computer-assisted equipment; five described receiving
"in-house" training from their supervisor or another
employee; one said that she had previous training elsewhere;
and 14 subjects or 56% received what they called "seat of
the pants" training -- they trained themselves using manuals
and asking other people for advice. As would be expected,
these employees felt very negatively about this lack of
preparation, and had many concerns and suggestions on how
training should be carried out. Some of their suggestions
are as follows:

People learn differently -- they need a lot of space,
no pressure to learn. Fear comes from lack of control.
I've seem employees in tears because they couldn't fix
an error.

People need time to learn the total capacity of the machine. They need to be freed up from mundane duties so that they can have time to be creative with it.

We need a good teacher. One who is positive and doesn't make people feel stupid.

Training should be as stress free as possible. People should work at their own speed, there should be no deadlines. I feel very strongly about this.

However, other subjects with less of a human relations approach to supervision thought that people needed to be pushed or that they would not learn.

Potential users have to be forced to use the computer. If they aren't forced then when something gets tough, they'll just go back to doing it by hand, and then they will never learn. It's hard to learn and the job goes much slower at first, so if you're not forced you slide back into the old ways.

This contrast points out that individuals learn in different ways, and supervisors must be aware of individual differences. The subjects did agree on other ideas on training. It was felt that both the supervisor and trainer had to be enthusiastic about the conversion and sell the employees on how it was going to improve their jobs. And there was almost total agreement that readable, clear, and usable manuals should be developed.

User Anxiety. All of the subjects reported some degree of anxiety associated with the transition process. Most of this anxiety was associated with the concern for the unknown. Harvey (1975) states that people are not fearful of change itself, people seek change, but fear the negative consequences of change they do not understand. The subjects all expressed some fear of the unknown -- how their jobs might change. All reported reading or hearing about how computers impacted negatively on clerical jobs, which exacerbated their own concerns about automation. The most commonly expressed concerns were that their jobs would become too tedious or that their jobs would be eliminated.

The following are examples of the anxiety and concern that was aroused by the prospect of automation:

I don't know about computers. They tell me that it won't change my job for the worse, and it hasn't, but I don't know what's going to happen next. Before we got it, I heard from others how computers were hard to learn and messed up your work. It hasn't been bad yet.

When I learned that we were going to get computers, my stomach dropped. I had this image that I would sit at a terminal all day and that my work would be watched real closely, and worse than that if I made a mistake, or the computer shut down that all my work would be lost [laughing]. I didn't exactly have nightmares

about it, but I did lay in bed and think about
computers some times. It's been hard, but the computer
has really made my job better. Now if I talk to some
one who is going to get a computer, I tell them that it
isn't all that bad!

One of the subjects had access to personnel records,
and reported doing a review of the reasons provided why
employees had been laid off. In three years' worth of
records she did not find any evidence of automation causing
a reduction in force, and that information allayed her
fears.

The subjects also reported concern about the physical
dangers involved in working with a terminal (eyestrain,
backstrain, radiation exposure). They also indicated
concern that computers would cause them a loss of control
over their jobs, and loss of prestige. One of the subjects
stated that she had a great deal of fear that she would lose
data once it was put into the machine. She reported feeling
very frustrated by this and wished that her supervisor had
been more understanding. Another subject reported that she
did not like to type and that the terminal keyboard looked
too much like a typewriter and therefore she was put off by
it. Another reported that she had read that it didn't take
any brains to use computer-assisted equipment, and for that
reason she did not want to be associated with the equipment.
One subject showed a great deal of insight into her own

personal functioning as she described her reluctance to use the computer-assisted equipment.

> I really haven't learned to use the equipment efficiently. My excuse is that I don't have the time to do it. No one is here to help me -- to give me a break so I can spend time learning to use it. My phone isn't by the terminal, so if I have a question I have to get up go to the phone then come back. It's most inconvenient. But the real reason is that I don't like it, I'm afraid of it -- afraid that I'll lose data. Also I'm not sure that the computer can really help me, I have only a few small accounts. I have a computer because it was unavoidable, and I want to use it so I can be viewed as progressive.

People are often not capable of insight into their own complex functioning and/or not willing to share their personal concerns and motivations with other people. Therefore it is difficult for the researcher to report all of the feelings of fear and anxiety associated with the use of computers. McKendrick (1982) postulates that the reluctance to use computers besides, being viewed as a threat to job security, is that being faced with using a computer will reinforce people's worst fears that they are really not very capable. There was some evidence to support his assumptions.

   Supervisor Knowledge. There was agreement among the

subjects that the supervisor's knowledge of the transition process could greatly impact on the smoothness of that process. A majority of the subjects reported that their supervisors were not very knowledgeable and some interpreted that to mean that additionally the supervisors did not care about them.

Office automation is a relatively new activity at the University, and therefore many of the supervisors were not experienced with the transition process. Many of the supervisors experienced the same situation that employees complained of -- the decision was made above them and they were not prepared for the automation process. A few supervisors were prepared. Either they had experience with automation in previous employment, or they did a lot of study and investigation on their own.

The subjects stated that knowledgeable supervisors could have helped in the following ways:

My supervisor just doesn't understand how difficult it is to learn or how long it takes before I can do my job as fast as I did before automation.

Our supervisor didn't know enough to buy the right equipment. She didn't spend enough money to get a full system.

If our supervisor had understood that it would take so long to automate, that there would be so many problems,

that there would be double work for us, then he could have planned the transition process better.

Factors Impacting on Efficient Use of Computer-Assisted Equipment

User Knowledge of Equipment. There was a wide range in how the users described their knowledge of the equipment that they used. But even the most knowledgeable stated that they wished they had more time to study the equipment, experiment with it and develop ways to use it more creatively. There were feelings that they had just begun to explore the uses of the machines. Those with less knowledge and skill were only using a fraction of the equipment's capabilities.

The subjects cited the lack of initial training, and the lack of time for further training as concerns. They felt the lack of a centralized campus resource on computer-assisted equipment hindered the development of its use. Subjects also stated that it took a long time, at least a year, to become fully confident of their ability to use the equipment.

On the whole learning to use the equipment has been wonderful. But at times, wow, it was really difficult. I think that I know how to use the equipment as well as anyone, but I'm certain that there is so much more I could do. I wish I had the time, say two or three

weeks, to do nothing but experiment with it, or maybe go off for a training program somewhere. I look at the computer sometimes and think about all it can do that I don't even know about.

University administrators have expressed concern over the lack of coordination of the procurement of computer-assisted equipment and low usage and efficiency rate. The University has committed a great deal of financial resources towards the development of information systems and computer support for research and administration, and it is estimated that most departments are only using 10-15% of the capability of their equipment.

Long, Hammond, Barnard, Morton and Clark (1982) found that lack of employee understanding can result in underutilization of automated systems.

Employees in their study who did not fully understand how to use automated systems, or had negative attitudes towards automation, used the equipment less frequently and for fewer applications. The researcher found similar circumstances at the University.

User Age. The sample of older clerical workers (defined as over 50 years of age) was too small to draw any substantial conclusions, but there were some interesting findings. Of the 25 subjects interviewed seven were over 50 years of age. Only two of the older subjects expressed

negative feelings towards using the computer. One of those two talked in terms of her age as being a factor in her reluctance to learn to use the computer-assisted equipment. The only subject interviewed who expressed extremely negative feelings towards the use of computer-assisted equipment was one of the older subjects interviewed. However, several of the subjects who were the most enthusiastic about their learning to use the equipment were in the older group. They expressed views about how wonderful it was to learn new skills which they anticipated they would use in self employment after they retired from the university. The oldest subject interviewed was 67 and she found the computer fascinating and expressed her feelings of envy when some of the younger clerks in her department got to use the computer before she did.

In the job classifications used for this research, approximately 18% of the employees are over the age of 50. However 28% of the subjects interviewed were over 50 years old. Given that the subjects interviewed were a valid sample of the subject population, then one could conclude that older clerical workers were over represented among those clerical workers who use computer-assisted equipment. These results would not support Porat and Vaughan's (1967) findings that older workers are less inclined to want to use computers. The over representation of older clerical workers using computer-assisted equipment at the University could be due to the fact that many supervisors tend to

assign new duties, or provide the opportunity for new duties, based on seniority. In that case older workers, if they had long University tenure, would have a higher incidence of being selected to use computer-assisted equipment. However, as stated earlier these conclusions are based on a very small number of older clerical workers.

Computer functioning. It is a rather obvious finding that the effectiveness of the use of the computer-assisted equipment is directly related to the amount of time that the computer is functioning properly. The amount of time that the computer is not available for use, or down-time, is very frustrating to the user. The amount of down-time is influenced by three factors: heavy usage (this is down-time to a specific employee if she can not access the computer because of a long queue), problems with phone lines that access the computer, and the actual time the computer is not available due to maintenance or reprogramming. The down-time differs widely by type of computer, which will be discussed in another section, and it was difficult to get consistent answers in the amount of time the users could not use their terminals. Two subjects in the same department gave widely varying estimates. Using information from the subjects and other University administrators it is probably an accurate estimate that subjects using the mainframe computer will not be able to use their terminals between 10-20% of the time. There was agreement that there were always problems when it rained. Evidently moisture affects

the phone lines which connect the terminals to the computer.

The amount of down-time must be taken into account when organizing work. Some jobs (those which have functions that do not use the computer and are not on a tight time schedule) are more easily accommodated to the down-time than others. The subjects with heavy use on tight schedules found the situation the most difficult to work with. Problems occur not only when the equipment can not be used, but when it is operating inaccurately. Sometimes errors are not detected for months. All of which contributes to the frustration level of users, as described by one of them.

> It seems to me that I can't use the terminal about 30% of the time. And of course it always seems to be down when I need it the most [laughing]. But what's worse is when its up but not functioning properly and you don't find that out until much later. When I find some terrible mistake I think did it rain that day [the day the data was entered] and then I go back and check on other data entered the same day. All of this causes a great deal more work of course, and then you never feel easy that it isn't going to go down again and cause some serious mistakes -- usually the deletion of data.

Changes Associated with the Use of Computer-Assisted Equipment

Communications. One of the common concerns of

employees facing automation is that they are going to interface with the machines all day long and lose contact with people. That was not the case of the subjects interviewed for this study. Because most of the subjects used terminals for only a portion of their jobs, they still had the opportunity to interact with other employees. Therefore most of the subjects reported no change in their communication patterns. There was agreement that other workers tended to interrupt them less frequently when they were working at the terminal. They believed that others saw their work at the terminal as more difficult and more important and therefore that the users should not be disturbed when on-line. For some departments employee on-line time is expensive, other employees know this and do not waste their time.

One department initiated a log-in system where faculty would just log their work in and a secretary in word processing would pick up the material. The faculty disliked this decrease in personal communication and looked for ways to circumvent the system. Departments which have the electronic mail capacity reported an increase in the flow of information in their department. Information that might not get shared by word of mouth (not only work news, but information such as a recommendation of a restaurant) now gets shared with every one. Several of the subjects said that their "communication world" had been expanded because of their involvement with automation. They described having

contacts with people at the computer center and other departments which they did not have prior to automation.

The findings of this study would support those of Conrath and Blair (1981) that automation does not necessarily decrease the amount of communication, although it might cause the mode of communication to change, i.e., by electronic mail rather than by memo or word-of-mouth.

Relationships with supervisors and peers. Because the subjects interviewed did not spend 100% of their time working at the terminal they did not report a lot of change in their relationships with others. The changes that were reported were in a positive direction because they tended to increase the users' feelings of self esteem through a perceived increase in prestige and status. The following are examples of the perceived ed changes:

I feel I get a lot of acknowledgement because I'm special -- I can do things that others can't do. I feel that I'm on a more middle ground with the faculty.

I have a lot more status with the faculty than I used to have. It's funny, these faculty are electrical engineers and computer scientists and yet they still see the computer -- or at least what I do as a mystery.

I now have a special status in my department because I know more than others. I can train others and they look up to me. I get more respect from the faculty

because I can turn out a better product for them. I
know my specialness may change as others gain the same
skills I have, but for now I'm really enjoying it.

Learning the computer has really been fun for me. I
love it when people call me up from other departments
and ask me to help them solve a problem. It makes me
feel important.

One employee who worked in a large department which had
experienced a lot of problems with the transition process
said that the mutual problems caused the work group to feel
closer. The sharing of mutual concerns had a team building
effect.

The findings of this study would suggest that the
effect of automation on work relationships depends on how
the job is structured and how automation is experienced by
the employee.

Job changes. Butteriss and Clark (1977) suggested that
the introduction of computer-assisted office equipment could
result in jobs becoming de-skilled i.e., less complex,
requiring fewer skills. The findings of this study do not
support those of Butteriss and Clark. All of the subjects
interviewed stated that their jobs had changed considerably
due to the introduction of automation, and only three
thought their jobs had changed in a negative direction.
None of the three saw their jobs as becoming de-skilled,

only that they liked their jobs less. (This topic will be explored more thoroughly in the next section.)

One pre-automation concern was that automation would result in a decrease of jobs. That was not the case in the departments reviewed in this study. Many subjects reported that they thought automation increased jobs because management became aware of more functions they wanted performed.

The most commonly reported positive changes were a better product and a decrease in mundane clerical tasks. These changes were closely related to the type of clerical work performed. Subjects who were faculty secretaries and therefore mainly did manuscript typing were highly pleased with the quality of the work they could turn out. They were able to produce type-set quality work, with justified margins, perfectly spaced equations, perfectly detailed charts and graphs which they were not capable of doing prior to automation. These employees expressed a great deal of pride in the product they were able to produce. Computer-assisted equipment also saved them from tedious retyping chores.

Clerical workers using the computer for bookkeeping and other administrative functions were relieved of tedious data reproduction. Reports which might take days to generate could be done in a few hours or less. And data could be analyzed easily in ways that had not been considered prior

to automation.

For some positions automation slows down part of the work. For example, bookkeepers using the computer reported that it took longer to enter data into the computer than it did to do ledgers by hand. And sometimes it took longer to retrieve information. Opening a ledger and looking at a balance sheet is quicker than logging on to a computer and accessing a file. But of course the trade off was evidenced in report generation.

Many of the subjects did report some negative job changes associated with automation. Some felt that supervisors had unrealistic expectations in both the quality and quantity of work produced. They thought their supervisors saw the computer as some sort of magic machine that could produce miracles, and they experienced an increase in work load demands. A faculty secretary using word processing equipment can produce a better product faster, but assigning additional individuals to do work for can increase other problems for the secretary such as dealing with eight demanding personalities rather than six.

One employee reported a concern over the consequences of errors with the new computer and information system. Before, data stayed in the department and could be reviewed for accuracy before being released to other departments. With automation the other departments had immediate access to data, including that which might be inaccurate.

General job satisfaction. Twenty-two of the 25 employees interviewed expressed that they were more satisfied with their jobs after automation than before. They found their jobs to be more interesting and challenging, with a reduction in mundane work and an increase in self-esteem and prestige. The following are some comments the subjects made concerning their jobs:

> My work is easier and more of a challenge. I feel more in control of my work. I have less routine work to do and I feel more confident.

> I can do my work much more efficiently, and I like the idea that computers are more economical.

> Until I learned to use the computer I thought my career was deadended. Now I have a lot of job growth.

> I like my job better for two reasons. One, it eases the routine work. And two, the faculty likes the product better, complain less and that makes my job a lot better.

> I feel like I've been given a whole new world. I have learned so much. Eventually I'd like to take my skills into the publishing world.

> I like my job better. It is less routine and less manual. My job has expanded, we've all become specialists.

I really appreciate the non-computer parts of my job. The computer frees me up to be able to spend time on the things I like better.

My job is less tedious now. I used to spend eight hours a day coding invoices, now I can do it in less time so I can do other more interesting parts of my job.

Our office is so much more relaxed now, there is less tension because we can get our work out faster and with fewer errors. The people we serve complain less and that makes me feel a lot better. I'm proud now of the service we give.

The three employees who like their job less, associate working with computer-assisted equipment as lowering their prestige and increasing the frustration level of their jobs.

I like my job less, I feel less like a professional and more like a typist. I hate it when I'm referred to as one of those guys who work with the machine.

I like working with the computer, but the faculty have become more demanding on what the product looks like. They think we're in a damn publishing company!

We have to do our bookkeeping with a program that doesn't work well, but we're not allowed to change it. We're not treated with respect at all -- in a

department of 11, we've had 13 turnovers in 18 months.

Factors Associated with Different Types of Computer- Assisted Equipment

Computer-assisted office equipment can be categorized in two groups: that supported by a mainframe or minicomputer, and that which consists of a stand-alone microcomputer. At the University, departments access the mainframe and minicomputers with terminals connected by phone line. Microcomputers are self contained at the work station. The principal difference in the two types of equipment has to do with the complexity and capabilities of the software, and memory capacity.

In this study 17 subjects used equipment supported by mainframe or minicomputers and 8 used microcomputers. The study did discover some transition and utilization problems differentiated by the category of computer. (For the user at the University, there is no appreciable difference between a mainframe or minicomputer. The users of both know that their terminal is connected to a computer somewhere, but many of the users did not know if they were using a mainframe or minicomputer.)

Subjects using microcomputers reported fewer problems with the transition process than did subjects using equipment supported by more powerful computers. This difference might be explained by the fact that the users and

their departments have more control over the microcomputers, and that the automation process was less complex. Departments using microcomputers tended to automate at a slower rate and experiment more with the computer's capabilities. Offices using the mainframe and minicomputers often had to adapt their automation schedules to the availability of Computer Center or Administrative Systems personnel.

Different training problems were associated with the two types of equipment. Microcomputers were reported to be easier to initially learn to use, but the University does not provide training on their use. The lack of available training appears to be a common problem for users of microcomputers. Larson (1983) reported on a proprietary school that has based its operation on the provision of microcomputer training. The University provides some limited courses on the use of packages available on its mainframe and minicomputers.

Problems associated with utilization were also differentially reported by type of equipment used. Users of microcomputers reported few instances of the computers not functioning properly, which was contrasted by a higher than desirable down-time rate associated with the more powerful computers.

Users of microcomputers reported the problem of the absence of University consultants to assist them in the

selection of hardware and software, and the adaptation of packages. Potentially, microcomputers are more adaptable to departmental needs, but they will be underutilized if they do not have usable software. Those departments which were able to best utilize their equipment had someone associated with the department (faculty member, graduate students, or more commonly the husband of one of the users) who was available to do the needed programming. Departments which did not have that assistance tended to underutilize their equipment.

The main problem reported to be associated with the use of the more powerful computers was that the user departments had to use the programs provided by the University. That diminished the flexibility of departments to have software packages adapted to their unique needs. Although the Computer Center and Administrative Systems departments did have consultants many of the users reported that their availability was limited.

The Researcher in Action

The following is an excerpt from one of the interviews. Following the interview is a discussion of how the interview data were analyzed for the findings section.

After first asking the subject to describe her job, the type of equipment used, for what purposes and for how long a time, the researcher asked: Could you describe your

involvement in your department's decision to automate?

Subject: None what so ever. We got, during that period, after the fact we got the result of the decision that had been made at another level. _____ designed the screen because her background was evaluation and we were distressed actually with that information because of the programming that was done without consultation with the users.

Researcher: Did you have any interaction with programmers or analysts?

Subject: We were assigned some specific people. There was a lot of distance from them when they were initially training us and dealing with the programs. It was pretty difficult, the feelings were difficult at the time. Because there was a lot of their [programmers] standing around our terminals and having a conversation going on over your head. You became a piece of equipment. There was a lot of resentment and a lot of frustration. When that was happening we felt like bums. We also felt that we had some information that would have been valuable, but nobody wanted to listen to us.

Researcher: Did your job change during the transition process?

Subject: In the beginning it doubled our work load.

Researcher: So, were all of you working overtime then?

Subject: We worked some overtime. And we really worked with a kind of desperation.

Researcher: It was double work because you were doing everything by hand plus entering your data into the computer?

Subject: Yes. We didn't trust the system and it wasn't completely trustworthy in the beginning. There would be times when everything would have to be re-entered and all of those usual calamities, but the fact was that we didn't trust the programs and that meant we did a lot of checking. It's hard to describe how really awful that entire time was!

From the above interview data the researcher concluded the following: (a) The subject reported no involvement in the decision to automate and frustration over that exclusion. (b) The subject reported feeling that she and others had valuable information that was overlooked in the decision to automate. (c) The subject reported loss of feelings of esteem from her association with the programmers. Those feelings were the result of the programmers appearing to not value her expertize and knowledge. (d) The subject reported that the transition process was difficult from both a workload and personal frustration standpoint. (e) The subject reported problems with the computer programs which resulted in a lack of trust

and therefore extra work involved in manually entering and verifying the entered data.

An Indepth Look at Three Subjects

The following is a more detailed description of three subjects. These subjects are examples of a clerical worker who was (a) very enthusiastic over automation, (b) somewhat neutral towards automation, and (c) displeased with the impact of automation.

A. Subject #12 is a well groomed, neat appearing 29 year old white female who works in a social sciences department. She greeted me and escorted me into her office in a very professional manner. She asked other staff that she not be disturbed by telephone calls during our interview. I was struck by the crisp organization of her office and desk, and by her articulateness in discussing the topic. Office automation was obviously a concept to which she had given a lot of thought.

We began the interview with the subject telling me about her history with the University. She was pleased with the progress she had made and the support she had received from the University. She had worked for the University for five years, and during that time she has completed her Bachelor of Arts degree, and progressed from a Secretary I to an Administrative Assistant III, which is an unusually fast promotional rate within the University. The subject

credits her rapid rise to the use of the computer, and hence
her enthusiasm over office automation. However, this
subject is also a hard working, intelligent and ambitious
young woman, who has accomplished a great deal of
professional growth while additionally being a single
parent.

Here is how she described her role in the automation of
her office:

> One of our faculty members had his own microcomputer
> which he was using to write his manuscript. He was
> always talking about it with me, and I became
> interested in all that it could do. So one day he
> suggested to me that I might use it to assist me with
> bookkeeping. So he and I got brochures on the
> equipment and did some research on what they could do.
> Then I talked to my MSO about getting a computer. She
> had been talking to some other MSO's about automation,
> so she said fine, check it out. So then I really
> looked into it, and made the choice of equipment. The
> MSO let me make the choices.

> Then the hard part started. Being able to use the
> equipment was harder and slower than I expected, it was
> frustrating at times, but I'm really glad that I was
> able to be one of the pioneers of office automation at
> the University.

Since this subject was able to design the automation system, she has used the computer to enhance her job. Here is what she had to say about how automation changed her job:

I am so pleased that we were able to automate, I've learned so much and gained respect from the faculty and staff. If I hadn't had the computer I know I wouldn't have gotten reclassified like I did. You see, I'm responsible for the fiscal matters for my department, but I hate to do books [laughing] and I'm not very accurate. Well, the computer is always accurate -- without the computer I couldn't be the financial person -- and if I weren't the financial person I wouldn't have gotten re-classified.

Also like I said, I get more respect from the faculty because I can do something they can't do. And of course I'm the computer expert in my office, so all of the staff ask my advice -- I train them. I want to continue working with computers, and I hope that I can move into a consultant position -- maybe here, maybe for a company.

Like most of the subjects interviewed, this subject had some strong feelings about training:

I worked hard at learning to use the computer, but most of the secretaries just won't work that hard. They get upset when something doesn't go right and they revert

back to doing it by hand. But you can't learn that
way. They have to be forced to use it, and use it for
difficult problems too, not just lists and simple
manuscripts. Of course, it takes a long time to learn,
so you have to give them time to learn, but they have
to keep at it.

B. The first subject I interviewed was a 36 year old black
female. She has worked for the University for 12 years,
nine of them in her current department and position.

Subject #1 works in an administrative department which
is responsible for inventory. The department is located in
an older, smaller building (a former military barracks) that
receives very little traffic. The office space is neat and
pleasant, and has a calm ambiance. The subject seems to
reflect her surroundings; she is pleasant, friendly and
apparently stress-free.

As contrasted to Subject #12 who has made fast
promotional progress in the University, this subject has
been classified as a Secretary I for 12 years. (After the
research was completed, I discussed this subject's
classification level with her supervisor, and subsequently
she has been reclassified to a Secretary II.) Her job
consists mainly of keeping track of inventory information.
When new equipment is purchased, information on that
equipment must get into the inventory system.

This subject is somewhat neutral about office automation; here are some of her thoughts on the subject:

> Well, what I do is keep track of information on purchases. I use the computer to enter data. I don't do anything else with it, that's all.... Learning wasn't hard, there wasn't too much to learn.... Using the computer is no big deal. It doesn't bother me when it is down, I can always do something else. Maybe I use the computer for, say, about 30% of my job.... No, I'm not under any time pressures, if I don't get something entered today I can always do it tomorrow.... I'm glad I learned something new, I like my job now, but I liked it O.K. before. I don't expect there to be much change, I don't expect much from the University.

It appears that automation did not change this subject's job too much, and that might account for her neutral feelings toward automation. Also since she is using the computer-assisted equipment for a simple process, data entry, training did not appear to be an issue for her.

C. When I first contacted Subject #3, she told me in no uncertain terms that she did not like computers. But if I wanted to talk with her anyway that would be all right. This subject did not keep her first appointment with me, but the second time I arrived at her office she was present. This subject's office is extremely cluttered, she had to move books off of a chair in order to provide a place for me

to sit. Her office is cluttered with books, manuscripts, papers, plants, old food, and a variety of other items. This subject is a 63 year old white female who has worked in the same academic department for the last 15 years. Her appearance is as noteworthy as her office. She has gray hair, cut in a 1920's flapper style, wears an abundance of make-up, and on that day, and on subsequent days when I have seen her on campus, she was attired in a rather short skirt. She described herself as a "character", a description with which I would agree. Her sense of individuality seems to extend to her relationship to the computer terminal (which stood covered with dust under a pile of books). This subject liked to talk, and here are some of her comments:

> I don't like the damn thing [computer-assisted equipment] one bit, and I'm not going to use it! They'll probably fire me or make me retire early because I don' use it.... I read in a New Yorker cartoon that computers were for stupid people, and I'm not stupid and I don't want anyone to think I am, and besides, it can't do what I can do with my typewriter anyway. I can do equations, or anything that needs to be done, and they look good. That [pointing at the terminal] can't make things look as good as I can. I don't think it can really replace me, but I know that she [departmental MSO] wants us all to use the equipment.

My job consists of typing manuscripts... see this one,
doesn't it look just fine? And of course I type exams
and other course work, and journal articles and grant
proposals, and I make travel arrangements and generally
take care of my professors [four senior faculty in a
science department].

Well, maybe the computer can make things look better,
or maybe a little easier, but I can't do it, maybe if I
spent more time to learn. But I'm so busy, my
professors need me, I don't have time! And you can't
teach an old dog new tricks!

In the interview this subject also told me something
about her life style. She lives alone in a downtown
apartment building especially for older people. She uses
the city bus system for transportation, has never been
married and apparently has no close family in this area.
Her life style seems to be one of solitude (she has no
friends in her department), and she appears to be somewhat
lonely, hostile and concerned over the future.

Given my knowledge of the University, I would say that
she will not be forced to retire or be terminated because
she refuses to use the computer-assisted equipment. She has
the support of several influential faculty members which
should assure her security of employment.

I could not probe deeply into her reluctance about the

use of computer-assisted equipment, but she appears to be
the type of person about whom McKendrick (1982) was
referring in his statement that some people fear automation
because it will reveal that their own worst fears about
their inability to function are true.

A Look at the Group Interview

My main reason for re-interviewing some of the subjects
in groups was to see if the interaction would reveal any new
data, and to check for the commonality of experiences,
perceptions and feelings.

Most of the employees interviewed were highly motivated
and enthusiastic, and these characteristics were again
evident in the group interview. I had some concern that the
subjects might be reluctant to spend more time in a group
interview, but all of those I asked responded affirmatively.

The group interviews took place in a departmental
conference room at mid morning. Coffee was served, and the
atmosphere was informal and relaxed. Some of the subjects
knew each other, but all were introduced and name plates
were provided.

I served the function of facilitator, but once we got
going, the subjects were very enthusiastic and interested in
the topic. There was no question that they had thought a
lot about how automation impacted their jobs and they
relished a chance to talk about it.

The following is an example of a discussion of training:

Subject #12:   Like I told Judith earlier, I taught myself mostly. [Subjects #15, 10 and 7 nodded in agreement.]

Subject #2:   Our department had some training for us, and now I train others.

Subject #21:   We had very complete training. We spent a couple of weeks at it, but you know how compulsive librarians are [laughing].

Researcher: What type of training should new users receive?

Subject #15:   A lot! [all laughing] We should get information on how the equipment works, what the whole purpose is so we get the big picture. And we need a lot of time to experiment, and...

Subject #2:   [interrupting] And our supervisors should understand the equipment! [Again, nodding in agreement.]

Subject #15:   [continuing] And to really get to know the equipment. There is so much I don't know, and I'd really like to know it, I'm sure the equipment has all sorts of capabilities that I know nothing about. I pretty much taught myself, but others should be taught more systematically. In classes, and also given

time to work at it. You can't learn just from a class you have to spend a lot of time at it. I'm considered an expert, but I know there is a lot I have to learn.

Subject #10: Well, I'm not an expert [laughing], but I wish I were. I sort of resent it that it takes so long to learn, and I have to do all of my work too. It's like double work and sometimes my supervisor doesn't understand or acknowledge it. [Others agree] Oh, so I'm not the only one, well, that's good!

Subject #7: My husband is a graduate student in our department, and he helps me. He's modified some of our packages, and he helps me learn how to use the equipment for more things. We even work at it at home, and you're right, it takes a lot of time!

Subject #2: Our department moved into word processing slowly, and we just learned as we went along, but I've heard that in other departments that are following us that the MSO expects them to know a lot right away, and there's a lot of confusion, and what do you call it, anxiety.

Subject #12: Getting back to your question, it mainly takes a lot of time to learn. Supervisors need to know that, and I guess that people have to learn their own way.

Researcher: What about manuals?

               [Most respond negatively]

Subject #12:   I mostly learned using a manual, but it was

               hard. I hear about user-friendly manuals, but

               I haven't seen one yet! [agreement]

The discussion continued and covered the topics of
communication, user involvement in the transition process,
changing relatonships with faculty and staff and suggestions
for improving the transition process.

At the end of the session the subjects thanked the
interviewer for the chance to get together, and the subjects
indicated that they would like to get together again. I do
not know if they have gotten together as a group, but I know
that there has been some communication between some of the
subjects.

The group interaction appeared to be a positive
experience for the subjects. It gave them a chance to share
information, and get support for some of their feelings and
experiences. Office automation appears to be a potentially
anxiety-producing situation for some users. Using groups
could be helpful in discussions prior to automation as a
preparation stage, as a format for training, and as a
support group for users -- a way to vent their frustration
with the automation process.

CHAPTER V

SUMMARY AND RECOMMENDATIONS

Summary of the Study

The purpose of this study was to explore and explain the transition process of automation and its impact on clerical workers, with the objective to provide recommendations to computer-naive managers on factors to consider when managing the change process. Office automation is a relatively new phenomena, and it has been lightly researched. The literature suggests that (a) automation may impact the office by changing relationships, (b) there is concern that computers may negatively impact the physical and emotional health of users, (c) there are conflicting opinions on whether computers broaden or narrow clerical jobs, (d) initial negative attitudes held by employees towards automation may impact their ability to learn to use automated office equipment, and (e) users should be involved in decision relating to how their jobs will be automated.

This dissertation reports the findings of a case study, conducted in a university setting, of clerical workers who had experienced the transition to office automation. Twenty-five subjects were interviewed in depth to obtain

95

data on their experiences with and perceptions of the change process. Additional background data were collected by interviews with administrators and by examination of documents.

The data collected were analyzed by the following categories: (a) factors affecting the transition process, (b) factors impacting on the efficient use of computer-assisted equipment, (c) job changes resulting from office automation, and (d) factors associated with the use of different types of computer-assisted equipment.

This study found that even though the transition process was frustrating for many of the subjects, most of the subjects felt that automation enhanced their jobs. It was the researcher's conclusion that the significant issue is how the automation change process is handled. Recommendations are made on how to manage the change process considering such factors as employee participation in decisions concerning automation, training, efficient use of equipment, dealing with user anxiety and job design.

Key Findings

Twenty-five clerical employees who had experienced office automation were interviewed in depth. The subjects were asked to respond to questions relating to the type of equipment used and experience with it, involvement with pre-automation consultation, interaction with programmers

and systems analysts, training, perceived changes in their jobs, thoughts and recommendations regarding the automation process. Ten of the subjects were interviewed again in two groups of five each. The purpose of the group interviews was to determine if the interaction would provide any new data and to look for commonalities.

The researcher also gathered background information through interviews with campus administrators who were involved with automation, and by examining University records.

The data were analyzed by the following categories:

Factors impacting the success of the transition process

Factors impacting on efficient use of computer-assisted equipment

Changes associated with the use of computer-assisted equipment

Factors associated with different types of computer-assisted equipment

The findings of the researcher were:

1. The majority of subjects reported little or no involvement in the decision to automate.

2. All of the subjects recommended that users should be involved in the decisions concerning the automation process.

3. The subjects reported limited involvement with

programmers and systems analysts.

4. It was recommended that the users should have interaction with programmers/analysts.

5. Fifty-six per cent of the subjects reported that they received inadequate training on the use of automated office equipment.

6. It was recommended that user training should be a high priority and is essential in effective and efficient use of the equipment.

7. Lack of employee understanding can result in under utilization of computer-assisted equipment.

8. All of the subjects reported anxiety associated with the transition process.

9. A majority of the subjects reported that their supervisors were not experienced in and knowledgeable of the transition process.

10. It was recommended that knowledgeable supervisors could facilitate a smooth transition.

11. There was no indication that user age impacted on the user's willingness to use computer-assisted equipment.

12. All of the subjects reported that computer down-time impacted on the effectiveness of its use and their frustration level associated with its use.

13. There was no indication that the use of computer-assisted equipment negatively impacted on the amount of communication among users.

14. A majority of the users reported that the use of

computer-assisted equipment increased their status.

15. The most commonly reported positive job changes were a better product and a decrease in mundane tasks.

16. The most commonly reported negative changes were supervisor's unrealistic expectations of both the quality and quantity of work produced.

17. Eighty-eight per cent of the subjects reported higher job satisfaction after automation.

18. Differential transition problems were associated with different types of computer-assisted equipment.

19. None of the subjects reported eyestrain or any other physical discomforts associated with the use of computer-assisted equipment.

20. The researcher found no evidence that automation eliminated clerical positions. These findings agree with those of Schwartz (1981).

21. The re-interviewing of subjects in groups did not generate any new data that had not been revealed in the individual interviews.

It is the researcher's conclusion that it is not automation per se that can be a problem for managers, but how that automation process is managed. Office automation can impact differentially on the quality of working life for clerical users depending on how it is implemented. The transition to an automated office is a vortex around which swirl many streams laden with potential contextual problems: employee and supervisor fear of change and the unknown,

employee lack of knowledge of computer-assisted equipment, supervisor lack of experience with automation management, common human dislike of machines, employee concerns of displacement, common acceptance of the myths of office automation being negative for clerical workers. It is a situation ripe with discord which requires knowledgeable and reasoned leadership.

Recommendations to Managers of Office Automation

There is a consensus among behavioral scientists on the essential factors to consider for employee satisfaction when looking at job design. These factors are:

1. The job is reasonably demanding in mental terms and provides some variety.

2. The employee should be able to learn the job and keep on learning.

3. There should be some job responsibility; some area where the employee can be in control and make decisions.

4. There should be some minimal degree of social support and recognition in the work place.

5. The employee should feel some degree of significance and meaning associated with the work.

6. The employee should feel that the job has some sort of desirable future. That could be promotional opportunities or stability and security.

Organizational change theorists suggest that when

managing change those in charge should involve employees as much as possible. Their involvement and knowledge can provide information and commitment which can enhance and cement the change.

John Naisbitt (1980) suggested that every introduction of a new technology must be accompanied by a compensating human touch or the technology will be rejected. The computer must be introduced in such a manner so that it is seen by the users as a liberator; a machine that will humanize their jobs by releasing them from details and allowing them to spend more time on the more complex tasks.

It appears that the above happened at the University, although probably not by design of the administrators in charge. Even though most of the users were excluded from the initial decisions and implementation of automation they were often given minimal supervision in the day to day use of the computer-assisted equipment in integrating it into their work routines. This allowed some of the users to use the equipment in a manner they felt would enhance their jobs. One of the recommendations for managers is that they allow for the necessity of humanizing office technology.

Other recommendations for managers, based upon theories discussed above and suggested by the findings of this study are as follows:

1. It is recommended that potential users be involved in the automation process from the earliest possible moment.

This involvement can facilitate their commitment and increase the information base on which decisions can be made.

2. McKendrick (1982) suggested that people commonly fear automation mainly because of the unknown and general human dislike of machines. This anxiety associated with potential automation was found in this study. It is recommended that those managing the automation process educate employees prior to automation on how computer-assisted equipment works, how the change will come about, and the expected changes in the users' jobs. Employees should be introduced to computers in a friendly setting, and learn how to use keyboards in a non-threatening way, possibly by game playing.

3. Users should have the opportunity to communicate with the personnel (programmers/analysts) who will be developing the operating programs. Users need to know the "language" so that they can communicate with the automation professionals. They can provide information which might not be otherwise available, while feeling involved in the process.

4. Driscoll (1980) defines the humanistic approach to management as being based on the assumption that office personnel are highly motivated, trustworthy and capable of working with minimal control. It is recommended that the humanistic approach be applied when managing office automation.

5. Adequate user training is essential. Lack of training impacts on user anxiety and efficient use of the equipment. When designing training programs managers must keep in mind that individuals learn at differing speeds and by different modes.

6. Supervisors should be knowledgeable of automation capabilities, the equipment used and principles and practices of supervision and organizational change.

7. Managers should be knowledgeable of the computing resources in their organization. Generally, microcomputers are easier to introduce to employees and easier to learn. However, there may not be the support available for program adaptation. Organizations using mainframe or minicomputers should have support staff available, but usually the programs will be less adaptable to individual needs.

8. Adequate planning should be done. Many factors must be considered such as the timeframe, costs, training needs, etc. This study found that most managers tended to underestimate most of their resource needs.

9. Grafiti (1981) stated that if office automation is not managed correctly it will result in increased employ e turnover. This study found supporting evidence for that contention, and supervisors should be cognizant of that consequence of poor automation management.

10. Ergonomics must be considered when designing the work station. Proper lighting and equipment can help prevent eyestrain and fatigue.

As stated before, the researcher thinks that the problems associated with office automation are not so much technological as managerial. The problems identified in this study of automation are consistent with general principles of human resource management. Therefore, even though the above stated recommendations are based on a study in one institution of higher education, they should be useful considerations for any manager contemplating office automation.

Suggestions for Further Research

This research was exploratory in looking at an area concerning clerical occupations. The researcher wanted to get a "feel" for office automation by looking closely at one organization. There are many areas of office automation which could be more fully explored. This research studied a variety of clerical positions. This breadth of occupations may have obscured differences by distinct clerical occupations. Further research could explore automation problems associated with specific clerical jobs.

There has been some interest in how office automation affects communication. This study found few changes, but communication was just one of many topics studied. Other studies (Porat & Vaughan, 1967) have suggested that age was related to effective use of the computer. This study did not find age to be a significant factor, but since the

American work force is aging and will increasingly interact with computers, this topic might require further research.

Harvey (1973) found that people best suited for word processing jobs were production oriented and measured achievement by their output. This researcher observed that those subjects who were successful in working with computer-assisted equipment appeared to be patient, detail oriented and well organized. The relationship between personality characteristics and automated clerical work was beyond the scope of this research, but it might be a topic worthy of further investigation.

This research primarily focused on the impact of office automation on clerical workers, and their perception of the change process. Managerial and professional positions can also be influenced by automation. Two areas of research relating to these positions might be investigated. One would be the training and knowledge necessary for administrators to manage the automation process. This research indicated that a lack of knowledge on the part of management can be detrimental to the automation process. The other area would focus on attitudes of executives and professionals towards automation and its direct impact on their management techniques.

There has been discussion in the literature on job design and automation (Beer, 1976; Krois & Benson, 1980; Taylor, 1982), but there is a need for applied research.

Managers need to know the best mix of job functions that will meet the social system needs of employees while maximizing efficient use of computer-assisted equipment.

Even though most employees studied in this research indicated that they were pleased with how automation changed their jobs, there are employees who react differently. Whereas it was the conclusion of this researcher that it is how automation is managed not automation, per se, that is significant, it might be of interest to investigate further employee attitudes and experiences with automation.

Training, or the lack of it, was revealed to be a consistent source of frustration for the users of automated office equipment. Educators and psychologists continue to study the whys and hows of learning as it is one of the most complex and interesting human functions. Knowing how to most effectively teach people to operate computer-assisted equipment would be of significance to managers.

Productivity is the primary goal of office automation, yet there has been little or no research to measure the productivity of clerical users. This research looked at some factors that appear to influence productivity, but did not attempt to measure it. Most managers assume, based upon logic and or experience with other systems, that computer-assisted office equipment will increase worker productivity, but there is no definitive research which supports that assumption. There has been a traditional taboo of setting

productivity standards for white collar workers. However, such defined and quantifiable standards should be developed for a research project on how office automation impacts on worker productivity.

This research was limited to clerical workers in one organizational setting. The issue of the transition to office automation was studied by the case study method because little research has been done on the topic and the researcher wanted to gather detailed information on employees' perceptions of the change process. It is recommended that similar research be done in other organizations on some of the areas delineated (factors affecting success, factors impacting on efficiency, job changes) to further assess the impact of office automation on the quality of working life.

APPENDICES

APPENDIX A

INTERVIEW DATA SHEET

SUBJECT #_____   DATE OF INTERVIEW _____

AGE_____   SEX _____   YRS. AT UCSD _____

EDUCATION LEVEL _____   JOB CLASSIFICATION _____

DEPARTMENT _____

TYPES OF COMPUTERS USED AND LENGTH OF TIME _____

_____

_____

JOB FUNCTIONS _____

_____

_____

PRE-AUTOMATION CONSULTATION _____

_____

_____

INTERACTION WITH PROGRAMMERS AND ANALYSTS _____

_____

_____

_____

TRAINING _____

_____

_____

_____

CHANGES IN JOB FUNCTIONS _____

_____

_____

_____

CHANGES IN WORK RELATIONSHIPS _____

_____

_____

_____

_____

CHANGES IN COMMUNICATIONS _____

_____

_____

_____

_____

THOUGHTS ABOUT THE TRANSISITION PROCESS _____

_____

_____

_____

_____

_____

PROBLEMS AND CONCERNS WITH THE PROCESS _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

RECOMMENDATIONS

OTHER COMMENTS

Completed INTERVIEW DATA SHEET

SUBJECT # _2_   DATE OF INTERVIEW _1-14'83_

AGE _28_   SEX _F_   YRS. AT UCSD _4½ – 2 pres job._

EDUCATION LEVEL _14 CC_   JOB CLASSIFICATION _PR. W P Spec_

DEPARTMENT _BIO_

TYPES OF COMPUTERS USED AND LENGTH OF TIME _____

mainframe – CRT – 2 yrs.
uses abt 20% of time

JOB FUNCTIONS _in centralized wood process center –_
100% time using the computer

PRE-AUTOMATION CONSULTATION _mgr. determined that_
WPC. would be started – not involved
–None –

INTERACTION WITH PROGRAMMERS AND ANALYSTS _____
–None –

TRAINING _trained self – got some help_
from supervisor – talked with other users –
used manuals – very slow – frustrated

CHANGES IN JOB FUNCTIONS _changed totally from_
using a standard typewriter to using
the W.P. term – job functions the
same

CHANGES IN WORK RELATIONSHIPS moved from being a Sec. to CWPS — get more respect from P.I. — have valuable input and skill they don't have — can produce better product quicker — PI's can change mind — can

CHANGES IN COMMUNICATIONS special status — may or may not last you is the future removed the relationship bcn PI's was better for me.

THOUGHTS ABOUT THE TRANSISITION PROCESS should work out bugs before moving to master — type of positive and training — people must be sold as merits — Enthusiasm and positive attitude from separately to select people who are entrusted User input must be solicited

PROBLEMS AND CONCERNS WITH THE PROCESS process went smoothly because all were committed to change — selected people who wanted to be included. change was slowly — also knew that outcome and assistance so occurred slowly — but knew it was going to happen — they didn't want to get it all fixed knew that they would have to change — they had some functional needs

(left margin, written vertically) Radui limited infuriated is people Are really why — is a people-people

RECOMMENDATIONS *lessen emphasis* for people — this manual — is so much to memorize — have to use it.

Should provide for independence — work can be stressful and frustrating — so need the independence and flexibility — to off set the pressure

OTHER COMMENTS

liked the challenge — the detailed work — the independence

need special personality — must be ambitious, special time

Automation is going to happen — *smr* — people are threatened with the prospect of change.

Many are comfortable and don't like the computer. — Many change when they realize how good the computer can be.

Successful workers should be *detailed oriented* and well organized.
Must be open to change.

Letter from Review of Data

NORTH COUNTY PSYCHIATRY AND PSYCHOLOGY ASSOCIATES

2755 Jefferson Street • Suite 9 • Carlsbad, California 92008 • (619) 729-9219

October 24, 1983

Dear Judith:

As we discussed earlier, upon reviewing the tapes of your interviews, I concur that you have accurately captured and summarized the data presented by subjects.

Best of luck with your research.

Daniel G. Munoz
Psychologist

DGM/vs

REFERENCES

Adams, R. N., & Preiss, J. J. (Eds.) (1960). Human
   organization research. Homewood, IL: Dorsey Press.

Agar, M. H. (1980). The professional stranger: An informal
   introduction to ethnography. New York: Academic Press.

The Automated Office--Part I (1978). EDP Analyzer, 16(9),
   1-12.

The Automated Office--Part II (1978). EDP Analyzer, 16(10),
   1-13.

Beer, M. (1976). The technology of organizational
   development. In M. D. Dunette (Ed.) Handbook of
   industrial and oranizational psychology. Chicago: Rand
   McNally.

Bennett, J. L. (1976). Integrating users and decision
   support systems. In J. D. White (Ed.) Proceedings of 6th
   and 7th annual conference. Chicago: Society for
   Management Information Systems.

Blau, P. M., Falbe, C. M., McKinley, J. B. & Tracy, P. K.
   Technology and organization in manufacturing.   ·
   Administrative Science Quarterly, 21, 20-40.

Buchanan, D. A., & Boddy, D. (1982). Advanced technology
   and the quality of working life: The effects of word
   processing on video typists. Journal of Occupational
   Psychology, 55, 1-11.

Butler, D. (1980). Office automation. Data Processing, 22(15) 14-16.

Butteriss, M., & Clark, A. (1977). Giving word processing a new meaning. Personnel Management, 9(1), 31-35.

Cohen, M., & March, J. (1974). Leadership and ambiguity. Berkeley, CA: Carnegie Comission on Higher Education.

Connell, J. J. (1978). The challenge. Datamation, 24(12), 162, 163-165.

Connell, J. J. (1979). The need for new office research. Impact: InformationTechnology, 2(7), 3-4.

Conrath, D. W. & Blair, J. H. (1981). The computer as an interpersonal communication device: A study of augumentaton technology and it's apparent impact on organizational communication. Paper presented at ORSA/TIMS Conference, Toronto, Canada.

Cronberg, T. (1982). A word processor in her living room? The impact of information technology on the way of life and work of women. In L. Bannon, U. Barry., & O. Holst (Eds.). Information technology: Impact on the way of life. (pp. 253-257). Dublin, Ireland: Tycooly International Publishers.

Cullen, J. (1982). The impact of information technology on human well being. I. L. Bannon, U. Barry, & O. Holst (Eds.). Information technology: Impact on the way of life. (pp. 73-77). Dublin, Ireland: Tycooly International Publishers.

Dealing with terminal phobia. (1983). Time, p. 82.

Driscoll, J. W. (1979). People and the automated office. Datamation, 25(12), 106-112.

Driscoll, J. W. (1980). Office automation: The dynamics of a technological boondoogle. Boston: Industrial Liaison Program, MIT.

Driscoll, J. W. (1982). How to humanize office automation. Unpublished manuscript, Sloan School of Management, MIT.

Filstead, W. J. (1970). Qualitative methodology: Firsthand involvement in the social world. Chicago: Markham Publishing.

Franklin, B. J., & Osborne, H. W. (1971). Research methods: Issues and insights. Belmont, Ca.: Wadsworth.

Giulino, V. E. (1982). The mechanization of office work. Scientific American, 247(3), 148-164.

Glaser, B., & Strauss, A. (1967). The discovery of grounded theory. Chicago: Aldine.

Glenn, E. N., & Feldberg, R. L. (1977). Degraded and deskilled: The proletarianization of clerical work. Social Problems, 25, 52-63.

Goode, W. J., & Hatt, P. K. (1952). Methods in social research, New York: McGraw Hill.

Goodman, P.S., & Kurke, L. B. (1982). Studies of change in organization: A status report. In P. S. Goodman (Ed.) Changes in Organizations. San Francisco: Jossey-Bass.

Grafitti, R. (1981). Creative problem-solving minimizes employee turnover at UCB. Words, 9, 56-57.

Hackman, J., Pearce, J. L., & Wolfe, J.C. (1978). Effects

of changes in job characteristics on work attitudes and behaviors: A naturally ocurring quasi-experiment. Organizational Behavior and Human Performance, 21, 289-304.

Hage, J. (1980). Theories of organizations: Form, process and transformation. New York: Wiley-Interscience.

Hall, D. T. (1978). Effects of top-down departmental job changes upon perceived employee behavior and attitudes: A natural field experiment. Journal of Applied Psychology, 63, 62-72.

Hartmen, J. J. & Hedblom, J. H. (1979). Methods for the social sciences. Westport, CT: Greenwood Press.

Harvey, J. B. (1973). Choose the right people for a word processing center. Management World, 2(3), 4-5, 28.

Harvey, J. B. (1975). Eight myths OD consultants believe in... and die by. OD Practitioner, 7(1), 1-5.

Hayes, M. H. (1979). The psychological barrier to technology. Dun's Review, 114(2), 100; 112-114

Hull, F. M., Friedman, N. S. & Rogers, T. F. (1982). The effect of technology on alienation from work. Sociology of Work and Occupations. 9(1), 31-57.

Jackson, J. H. & Morgan, C. P. (1978). Organization theory. Englewood Cliffs, N.J.: Prentice-Hall.

Japenga, A. (1982, May 27). Stresses that are caused by computers. Los Angeles Times, p. 1, 10.

Kasurak, P. C., Tan, C. & Wolchuk, R. (1982). Management and the human resource impact of the electronic office.

Optimum, 13(1), 57-68.

Kennedy, T. (1975). Some behavioral factors affecting the training of naive users of an interactive computer system. International Journal of Man-Machine Studies, 7, 817-834.

Kirsch, B. A & Lengerman, J. J. (1972) An empirical test of Robert Blauner's ideas of alienation in work as applied to different type jobs in a white collar setting. Sociology and Social Research, 56 180-194.

Krois, P. A., & Benson, P. G. (1980). Word processing and personnel. Personnel Journal, 992-995.

Kutie, R. C. (1977). An analysis of the job dimensions of word processing secretaries, administrative support secretaries, and traditional secretaries and the correlation of those job dimensions with job satisfaction factors. Abstracts International, 38, 5202A. (Universty Microfilms No. 78-00350.)

Larson, C. (1983, July 6). Training people to use computers. San Diego Tribune.

Long, J., Hammon, N., Barnard, P., Morton, J., & Clark, I. (1982). Introducing the interactive computer at work: The user's views. Winchester, Hampshire, England: IBM United Kindom Laboratories, Ltd.

Manginelli, M. (1983). Recognizing human factors. In On human factors. Lowell, MA: Wang Laboratories.

Mann, F. C., & Williams, C. K. (1962). Some effects of the changing work environment in the office. Journal of Social Issues, 18, 90-101.

McGregor, D. (1960). The human side of enterprise. New York: McGraw-Hill.

McKendrick, J. (1982). The office of 1990. Management World, 1(1), 14-17.

McLellan, D. (1983, September 21). Networking: Computer as a social tool. The Los Angeles Times, p. 1, 22, 23.

Miller, L. H. (1982). Criteria for selecting WP operators. Unpublished manuscript, Administrative Management Society, Willow Grove, PA.

Mitchell, R. B. (1982). Exploring operators satisfaction. Unpublished manuscript, Administrative Management Society, Willow Grove, PA.

Moran, L. N. (1982). Office automation: Debunking the myths concerning its impact on the individual and the organization, a case study. Dissertation Abstracts International, 43, 1833B. (University Microfilms No. 52-25981.)

Morton, J., Barnard, P. Hammond, N., & Long, J. B. (1979). Interacting with the computer: A framework. In E. Butmy, & A. Danthine, (Eds.) Teleformatics '79. Amsterdam, Holland: North-Holland Publishing.

Mumford, E., & Henshall, D. (1979). A participative approach to computer system design. New York: John Wiley & Sons.

NIOSH studies possible VDT effects. (1980). Viewpoint, 7, 1-2.

Nadler, D. A. (1981). Managing organizational change: An

integrative perspective. Journal of Applied Behavioral Science, 17, 191-211.

Naisbitt, J. (1980, April). The new economic and political order of the 1980's. Paper presented at the Foresight Group, Stockholm, Sweeden.

Olsten, W. (1982). Secretaries and the new technology. Supervisory Management, 27(10), 31-35.

Penfield, N. M. (1982). Decentralized word processing offers the best of two worlds. The Office, 95(6), 158, 160.

Porat, A. M., & Vaughan, J. A. (1967). Managerial views on the impact of computers. Banking, 60(1), 97-98.

Rico, L. (1967). The advance against paperwork. Ann Arbor, MI: University of Michigan.

Schlefer, J. (1983). Office automation and bureaucracy. Technology Review, 86(5), 32-40.

Schwartz, B. (1981). The video display terminal controversy: Smoke or fire. Words, 35-38.

Selltiz, C., Jahoda, J., Deutsch, M., & Cook, S. W. (1963). Research methods in social relations. New York: Holt, Rinehart and Winston.

Stake, R. (1978). The case study method in social inquiry. Educational Researcher, 7(2), 5-8.

Strauss, F. (1977). Maagerial practices. In J. R. Hackman, & J. L. Suttle (Eds.) Improving life at work. Santa Monica, CA: Goodyear.

Strauss, G. (1963). Some notes on power equalization. In

H. J. Leavitt (Ed.) The social science of organizations. Englewood Cliffs, NJ: Prentice Hall.

Sweeny, J. (1980, November 16). Does automated office dehumanize jobs? Los Angeles Times, p. 1.

Taylor, J. C. (1977). Job satisfaction and the quality of working life: A reassessment. Journal of Occupational Psychology, 50, 243-252.

Taylor, J. C. (1979). Fragmented office jobs and the computer. Unpublished manuscript, Institute of Industrial Relations, University of California, Los Angeles.

Taylor, J. C. (1980) Words, February-March, 26-28, 32.

Taylor, J. C. (1982). Quality of working life and white collar automation: A socio-technical case.

Thackary, J. (1980). White collar blues. Management Today, March, 95-101.

U. S. Department of Labor, Bureau of Labor Statistics. (1981). Employment and earnings. Washington, DC: Author.

UCSD pocket statistics. (1982). Preparedthe Office of Planning and Analytical Studies.

University supermini network. (1982). Telcommunication, 16(8), 51-52.

Vroom, V. H. & Yetton, P. W. (1973). Leadership and decision making. Pittsburgh: University of Pittsburgh Press.

Whisler, T. L. (1970). Information technology and organizational change, Belmont, CA: Wadsworth.

Williams, D. J. (1977). General Dynamics' program of

administrative assistance emphasizes word processing. <u>The Office</u>, <u>85</u>(2), 26, 40, 42, 44.

Williams, T. J. (1977). The responsibilities for automating the office. <u>The Office</u>, <u>85</u>(1), 84-85.

Williamson, J. B., Karp, P. A., & Dalphin, J. R. (1977). <u>The research craft</u>. Boston: Little, Brown & Co.

Working Women Educational Fund. (1981). <u>Warning: Health hazards for office workers</u>. Cleveland: Author.