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ABSTRACT

Several factors must be considered when implementing office automation. Included among these are whether or not to automate at all, the effects of automation on employees, requirements imposed by automation on the physical environment, effects of automation on the total organization, and effects on clientele. The reasons behind the success or failure of a computerized office system are many. Some key reasons are the following: failure of top management to back the concept and provide leadership, infighting and questions over turf and control, workers who fear job loss and workers who reject the new technology, incompetence in planning and implementing the system, lack of justification for the system, and failure to apply positive managerial skills. To be successful in implementing office automation, management must base any decision to automate on need, resolve the effects of automation on employees, revise the existing physical environment of the office, study and come to terms with the effects of automation on the total organization, and address the effects of office automation on the office clientele. (MN)

MANAGEMENT PLANNING

for

WORKPLACE AUTOMATION

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INTRODUCTION

Recent advances in microprocessor based technology and equipment have brought about the automatic control of many traditional functions and processes in the workplace and school. When automation is introduced, managers, administrators, and teachers must maintain normal operations while concurrently dealing with change, including: rapid and sometimes radical changes in technology; physical changes in the workplace; the need to upgrade employee skills; changing employee attitudes; and a restructured management hierarchy. In schools, this change to automation can occur at the administrative level as well as in the classroom. Changes in the administrative structure are similar to changes which occur in the business/industrial environment. Changes in the teaching program include the replacement of traditional teaching programs and laboratories with new technology transfer systems and sophisticated laboratories. For example, the change to a Computer Aided Design (CAD) program from the traditional drafting program.

The purpose of this paper is to provide managers, administrators, and teachers with a list of factors to be considered during the change to new technologies and automation. Note, however, that the basic concepts of managing for change apply -- whether it is a change to automation or not. For teachers and their students, the effects of change will be most pronounced for the teachers as they must replace skills and attitudes. The students, in most cases, are learning for the first time.

In education and business there is one given: That change is inevitable. For an organization to fail to plan for change, is to encourage stagnation and ultimate failure. However, organizations cannot merely accept change; it must anticipate the need for change and prepare for it. Automation represents a major change in the operational structure.

Automation is very much on the minds of management today. It is touted as THE means of increasing worker productivity, controlling and/or lowering operating costs, controlling production, and enhancing learning. Automation, as used here, refers to the equipment and processes which are controlled by microprocessors or computers. (In this paper, the concepts of computerization and automation will be used interchangeably, as most automated equipment today is computer controlled). There are many systems available -- for a price -- which are claimed to achieve this goal.

To be successful in implementing automation, however, there are several factors, beyond the obvious one of "which system", that must be considered. These factors include: making a rational choice of whether to automate or not; the effects of automation on the employees; the requirements of the physical environment; the effects on the total organization; the effects on the clientele (including students). Failure to address these factors and to work out solutions in advance of implementation can compromise the project, jeopardize implementation, and negate any benefits the system may yield.

Automation and the devices necessary to achieve automation are not new. Every mechanical, semi-automatic and/or automatic procedure is a step toward the same goal -- that of increasing the efficiency of operations. Typewriting is faster than longhand, and word processing/electronic communications speeds the process even more. However, the speed and efficiency of the emerging technologies, namely computer-based technology, can place new demands upon the working environment.

TO AUTOMATE OR NOT?

In arriving at the decision of whether to automate or not, consider that, while the computer and computer controlled equipment may seem revolutionary, they are but another of the tools available for increasing productivity. Automation is a system, just as any group of processes, whether manual or automatic, is a system. In the change to automation, a new group of processes replaces an existing group of processes. The difference is that the automated system reduces the need for manual labor and enhances the process and/or product. Therefore, the success of any automation system is found in the answers to these questions -- Does the department need the tool? Will it provide the needed increase in productivity, hence, efficiency? Or is it simply a fancy embellishment which will yield gains in status but not in productivity. Any decision affecting the company must be made consistent with the goals of the company and the long range plans. Automation is no exception.

This new tool (automation or computerization) can do several things for a business. Provided there is a need, automation may result in the following:

1. Improved product/service quality through increased accuracy and consistency, as data handling is reduced.

2. Shorter response time, thus, yielding quick answers to questions.

3. Better coordination of programs and tasks among departments through sharing information from a common data base.

4. Less manual data handling, as data keyed in once is remembered. It is not necessary to re-key data each time.

5. Faster communications through electronic mail, message handling, electronic filing, telecommunications, etc.

6. Increased productivity without loss of job flexibility, as electronic equipment is a capital (non-reoccurring) cost. Thus, reserve production capacity can be available without additional labor (reoccurring) costs.

7. Increased management information through the ability to monitor processes and to produce reports quickly and efficiently.

8. Reduced operating costs, particularly, in labor costs.

However, with any machine or automated system a work stoppage may result. This stoppage may be caused by one of several reasons, including: equipment failure; periodic maintenance schedules; the absence of key operational personnel; power and/or communications failure. Back-up records and manual procedures are a must so that production can continue during system downtimes. Plans for both anticipated and unexpected work flow stoppage must be included in both the budget and production time.

On the other hand, automation may <u>not</u> yield benefits of a significant magnitude to warrant the expense of time and energy necessary to install and operate the system. Work of an original nature, which is not to be duplicated or reproduced, may best be done by other than automatic processes. Computerized equipment is best at repetitive tasks. Therefore, the typing of original letters on a wordprocessor may be no faster than typing by conventional means. However, if the same letter is to be addressed to several different people, considerable time savings can be realized along with increased accuracy by using a wordprocessor.

EFFECTS ON EMPLOYEES

Once the decision to automate has been made, other factors must be considered. The impending use of computers or automation will have an effect on employees. These effects are not unlike those faced when implementing any new system. Employees are anxious, not knowing what the future may hold. They may also be suspicious of the motivations of management. Thus, communications to and training of employees are required at an early stage in the process of implementing any system. Employees' knowledge of and input into the automation process can help ease the transition and make the management task easier.

The introduction of automation will result in an altered work environment and task structure. Employees will be performing new jobs as certain tasks will be taken over or eliminated by automation. There may be a fear of lay-off or job transfer (impending or perceived) by some employees. Counseling and re-training are mandatory to allay these problems. Training is also necessary to insure the proper operation of the equipment. A positive commitment and approach by management will reassure employees that management does indeed care about its employees, and that the employees understand the changes. In many automated facilities, traditional career paths will be altered or eliminated. Employees need to be aware of the new paths and know how to climb the ladder.

Expect a slowdown in productivity during the change-over process. This slowdown is natural as employees learn and apply new skills and habits. There is a natural reluctance to change, and change takes time.

If the needs of the employees are not considered, there will be mistrust of management on the part of the employees and the "system" will become the "scape goat". A loss of management control can result. There may be considerable employee resistance (to the point of sabotage) and a determination on the part of the employees to do everything within their power to have the "system" fail. The maintenance of a positive support atmosphere including information, communication, and shared decision making can ease the transition. The use of "THEORY Y" (participatory) management techniques is very helpful.

Management also needs to be aware that the social structure of the office will change. Employee work

stations, break times, working hours, interpersonal relationships, etc. may be altered, thus, disrupting "infomal" working arrangements. Management must be sensitive to the informal social needs and desires of the workers and consider them along with other, more formal employee needs.

There may be changes necessary in the work rules to accommodate the new equipment, procedures, and technology. The introduction of the computer makes it possible to monitor more closely the work habits and productivity of employees by generating management information and employee records. The employees may fear retaliation based on this new work/productivity measurement capability. Such fears are well founded and have been documented in the Media.

There are health issues associated with those who use electronic equipment, computers and their peripherals including: micro-computers; key input devices; video-display terminals, etc. Problems include: (1) Visual -- eye strain, visual fatigue, altered depth perception, etc.; (2) Muscle -- strain, fatigue; (3) Radiation; (4) Occupational stress; and (5) Effects on pregnancy. These problems are largely unstudied and, hence, undocumented. Steps can be taken to counter some of the problems by using proper seating, desks, lighting, etc. Still a lot remains unknown and steps must be taken to explain the system and to reassure employees.

REQUIREMENTS OF THE PHYSICAL ENVIRONMENT .

In addition to the changes affecting the employee's tasks, changes may also be necessary in the workplace. Depending upon the type of system installed, the alterations to the physical environment (work space) may be minimal or extensive. If a central computer system is used, for example, only the size of the paper may be affected (ie. computer print-out size paper), necessitating a change in work surfaces and/or storage spaces. If hardware (terminals and/or other stand-alone equipment) is implemented, the changes necessary may be minor or radical, including:

1. Special electrical circuits as loss of electrical power is devastating (the data is lost). Electrical transients (abrupt changes in voltage) can interrupt the operation and/or introduce unwanted signals into the data or control process.

2. Noise control is necessary as electronic equipment can be noisy -- particularly computer printers.

3. Temperature/humidity control is required as electronic equipment is temperature sensitive and suffers if excess heat is present. Air conditioning, humidification and/or ventilation may be required to maintain a proper operating environment.

4. Special anti-static floor covering may be necessary as static electricity is fatal to electronic equipment and magnetic storage medium.

5. Controlled lighting reduces glare, as eye strain is a major problem with video displays.

6. Storage facilities will be required to accommodate different size paper and/or magnetic media.

7. Hardware security requires special precautions as theft and abuse can become problems.

8. Restrictions on food, smoking, etc. are mandatory. Smoke particles, for example, are large enough to cause equipment malfunction.

9. New furniture/work stations, designed especially for the equipment, may be required.

10. Equipment operating requirements place restrictions on the location of furniture in the work area.

11. Rest/relaxation facilities must be provided since concentrated and continued use of some electronic equipment (particularly video display terminals) can lead to fatigue. Companies sometimes include games or other diversions on the computer to break-up the tension created by computerized work sessions.

Ignoring problems or potential problems in the physical environment can cause hardware failure, system malfunctions, and people problems.

EFFECT ON THE TOTAL ORGANIZATION .

Automation (computerization) of one portion of an organization is likely to have a ripple effect on the total organization, as no one department realizes complete

autonomy within the organization. As one fisherman put it -- rock the back of the boat and you also rock the front. To be successful, the decision to automate must be a decision made by top management in concert with the entire organization. All phases of the process need not be implemented simultaneously within the organization, but the total system must be planned. To plan a system piece-meal results in the non-optimal utilization of resources, and may, in the long run, produce an automated system little more efficient than the manual system it replaced.

Automation requires a total commitment from, and the unwavering support of, top management. Automation (computerization) affects work flow in many departments -- now or in the future. Thus, affected departments must work closely together and all departments must be considered in the planning. If organization-wide planning occurs, the new equipment and procedures will be optimized for high efficiency.

For example, several departments may qualify for stand-alone computers because of specialized work. However, common elements are shared by all departments. If the entire system is to work, all computing facilities must be capable of communicating with each other in an optimal manner for high efficiency. Modern computer technology is barely thirty years old, and the micro-computer is just over 5 years old. At present there are many manufacturers of computers, most of whose systems are incompatible with those of other manufacturers. Even some systems from within the same manufacturer are incompatible with others carrying the same brand name. The problems are just as great with programming languages. There are over 300 dialects of the popular computer language BASIC. Programs written for IBM will not work on Apple, etc. If central control is lacking in the acquisition of computers and their support systems, a hodge-podge will result which will be expensively difficult or impossible to untangle. Therefore, the use of a management task force (perhaps a temporary oversight committee) is recommended to: assure equal input from all departments; maintain continuity throughout the organization; approve equipment acquisitions to assure compatability; and combat "turf" problems.

Computerization and automation carries with it one serious problem -- that of status of the department and department head within the organization. In many organizations, the traditional measures of management status

are the size of the budget and the number of subordinates and workers. Automation has the power to replace workers through increased productivity; hence, there exists the potential for loss of the traditional "status" measures within the organization. For example, a change to central word processing eliminates the need for secretaries in a department and shifts the control of typing scheduling and production to another department. Because of the productivity gains possible with automation, the department may experience a growth in work performed but without the traditional increase in personnel and budget. The net effect is a loss of traditional "status". This issue is difficult to address -- but one of the most basic challenges facing the changing organization. In very turf-bound organzations, creating an environment of cooperation and mutual trust is a key to the success of computerization.

EFFECTS ON THE CLIENTELE .

Computerization and automation have effects on the clientele served by the department and the organization. Antagonism caused by having to deal with an impersonal computer is a very real problem. The computer does not listen. It can only respond to what has been previously programmed. Special cases and requests are rejected if they don't fit the "model". Steps must be taken to assure that contact can be made with an individual who has the power and knowledge to resolve the problem. Sensitivity to the needs of people served by the system is needed -- but often overlooked.

FAILURE OR SUCCESS?

The reasons for the failure of a computerized system or of an automated facility are many and varied. However, some of the key reasons are:

1. A failure of top management to back the concept and provide leadership. A lack of complete support will be felt at every level, resulting in the attitude "If the boss doesn't care or support the system, why should we?"

2. Infighting and questions over turf and control. Who should control the system? Who should not? Watch out for status problems here. The Data Processing Department may not be the best "owner" for the system.

3. Workers who fear job loss and workers who reject the new technology. Replacement by a machine is not unique or unknown.

4. Incompetence in planning and implementing the system. The system won't work because it was designed not to.

5. A lack of justification for the system. A computer is not a cure-all. The system is only as good as its data and programs. "GIGO" -- "garbage in" still equals "garbage out". Some operations are best done by people.

6. A failure to apply positive managerial skills. The skills needed to manage an automated office are the same skills required to manage any office.

To be successful in implementing office automation, five points must be addressed. They are:

1. The decision to automate must be based on need. The computer is but a tool.

2. The effects on the employees must be resolved.

3. The physical environment must be revised.

4. The effects on the total organization must be studied and understood.

5. The effects on the clientele must be met.

CONCLUSION .

Failure to consider these issues in the planning and implementation of a system of automation will result in less than optimal utilization of the resources. With careful planning, however, most of the impediments to automation can be overcome.

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