INFLUENCE OF TECHNOLOGICAL CHANGE ON HOSPITAL FOOD SERVICE PERSONNEL

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ABSTRACT

INFLUENCE OF TECHNOLOGICAL CHANGE ON
HOSPITAL FOOD SERVICE PERSONNEL

By

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A survey of the recent adaptations of industrial technology to hospital food service and a review of current and developing effects of technological innovations on production methods and managerial processes is made in an effort to provide a tangible basis for improving the relevancy of existing manpower planning programs.

Factors that may effect changes in manpower requirements, both numerically and qualitatively, are the influence of research and development, use of data processing equipment, changes in volume of production or business, changes in materials and supplies, and product and process changes. These changes and influences are presently being felt in hospital food service systems. They will affect skill requirements and job structures, hence the total manpower planning program. Internal changes in the organization require careful consideration in developing criteria for the selection of personnel, and for determining training programs.

Further research is needed to determine the extent of the effects of technological change on personnel requirements in hospital food service and to provide information of the specific nature needed for effective manpower planning.

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TABLE OF CONTENTS

Although most of us appreciate the individual creations of science for what they permit us to do, we do not fully comprehend the fundamental change that the scientific revolution has brought about. We fail to realize that we have actually entered into a new era of evolutionary history--one in which rapid change based on technological innovation is a dominant consequence. Neither resenting this situation, as many humanists do, nor blindly fearing it, as some others may, will do any good. Our only hope lies in understanding the forces at work and then trying to guide the evolutionary process more to our liking.

Jerome B. Wiesner
The Challenge of Technology

The National Industrial Conference Board, Annual Conference on Science and Humanities: The Challenge of Technology (New York: The National Industrial Conference Board, 1967), p. 4.

INTRODUCTION

Rapid growth and accelerating technological change create a demand for more effective manpower planning in any organization or industry. This is particularly true of medical care which has grown so rapidly in the last thirty years that it has evolved into a major industry in the American economy (56).

As a growth industry, medical care is beset with many pressures created by an increase in numbers of patients and in the number and type of services necessary to provide high quality medical care; by the increased and changing expectations of patients; and by a critical shortage of manpower in every area of medical care (44).

The phenomenal rise in the cost of medical care has created widespread demands on the Federal Government to effect methods to control these costs and more effectively utilize medical manpower, whose wages account for a major portion of hospital operating costs (34).

Although wages are a significant factor in hospital costs, operational efficiency and effective manpower utilization are probably equally as important (44). Unit labor costs need not necessarily expand at the same rate as wages,

even in a labor intensive service industry such as hospitals. Careful planning and engineering of jobs can significantly offset the cost of wages. Low wages have probably caused considerable waste and failure to attract better quality personnel, inefficient use of workers, poor morale, high turnover, and a failure to explore adequate labor saving measures.

As demand exceeds the capacity of available manpower to provide services in traditional ways and as performance standards increase, tasks and responsibilities will need redefinition. Analysis must be made of all tasks performed by highly qualified personnel to identify those which truly demand their competence. Tasks that do not call for a high degree of competence must be reassigned to individuals with lesser but sufficient qualifications for these tasks. Effective utilization of modern technology and labor saving methods must be mastered to alleviate the severity of the manpower situation.

Food service operations account for a significant portion of hospital manpower costs. To survive against the rising cost of labor these operations must become systematized and utilize modern technology of management and production to the utmost. Dietitians, as managers, cannot afford ignorance of the technology made available in other industries, but must learn to use the concepts of work

design, automation, and mechanization as basic tools of operation and planning (4).

To fully capitalize on the wealth of technology available and to facilitate the transition to modern technological methods of operation, dietitians of today must become cognizant of the effects of technology on manpower planning. Coleman defines manpower planning as

> . . . the process of determining manpower requirements for carrying out the integrated plans of an organization. It encompasses types of skills and capabilities, numbers of people, and location and timing of manpower needs. It is a part of the total process of manpower management which includes, in addition to planning, administering action programs for the acquisition, development, utilization and maintenance of the work force of the organization.[1]

Therefore, the question of concern is: How does the introduction and adoption of modern technology into the operation of a food service system affect the total manpower program of that system? The concern should not only be with how much the numerical requirement is reduced, but also with the effects on the jobs of those remaining. What new jobs are created? How does technology affect skill requirements of the various managerial and supervisory levels in hospital food service? How does it affect those of the cook or the baker? What is its effect on job structures and role

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[1]Bruce Pumphrey Coleman, An Exploratory Study of Information for Manpower Planning (unpublished Ph.D. dissertation, Indiana University, 1966), p. 4.

relationships within the operation? If skill requirements are affected, what are the concomitant needs of the education, training, and development aspects of the manpower program? How does technology influence the potential for growth, development, and job satisfaction of individuals occupying managerial, supervisory, and worker positions within the hospital food service system?

These are questions that cannot be satisfactorily answered without research. In the absence of such data, specific to hospital food service, a survey of some of the types of modern technology presently being adopted for use in hospital food service systems, with an attempt to relate the effects of changing technology on manpower, as documented in industry, to hospital food service may provide a tangible basis for improving the relevancy of existing manpower planning programs.

DISCUSSION OF TERMINOLOGY

Technology

In order to better understand the technology which may influence manpower planning, some effort should be made to define the terms which are relevant to this discussion. Buckingham (7) identifies three concepts of technology which have evolved through a developmental process beginning with the industrial revolution. These are mechanization, mass production, and automation.

Mechanization

Mechanization, the earliest of these, created the factory system and separated management from labor in the production process. Mechanization is the use of machines to perform work. It is based on the principles of standardization of equipment and specialization of tasks. Mechanization, in itself, becomes a developmental process, leading to greater specificity in equipment and specialization of tasks.

> New machinery requires new skills of labor and new knowledge and abilities of management, which, if properly developed, lead to further technological improvement. Machinery also tends to become more highly specialized, causing labor and management to specialize further.[2]

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[2] Walter Buckingham, Automation: Its Impact on Business and People (New York: Harper and Row, 1961), p. 8.

Mass production

The second phase of technological development is mass production, the concept of continuous flow or process. Mass production is a technology based not on mechanical devices but on the principles of production organization. Buckingham states that, "the unique feature of mass production technology is that it permits an enormous increase in productivity, or output per manhour, not through the use of any new machines or the development of any new power sources as did mechanization, but mainly through a new system of organizing the production process."[3]

Automation

The third phase in the evolving process of technological advancement is automation, a term often used loosely to refer to a group of developments which consist of mechanical and electronic devices, mathematical techniques, and information systems. Automation can be specifically defined as, "any continuous and integrated operation of a production system that uses electronic or other equipment to regulate and coordinate the quantity and quality of production."[4] Essentially, automation aims for a production flow that avoids human intervention as far as possible.

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[3] Ibid., p. 9.

[4] Ibid., p. 6.

Automation encompasses the principles of mechanization and continuous process as described above as well as the principles of automatic control and rationalization. Automatic control is the concept of feedback, whereby the input of machines is regulated by predetermined conditions of output. Rationalization is the principle that unites the engineering and managerial aspects of automation. It is the

> . . . application of reason to the solution of problems or the search for knowledge. It leads to the development of objective criteria, the judicious selection of the most efficient procedure, the logical evaluation of performance, the conservation of resources and energy, the elimination of waste; in short, the optimum combination of means for the most efficient attainment of clearly understood ends.[5]

The basic difference in automation, or modern electronic computing equipment, and earlier conventional machinery is that electronic devices perform decision making and control functions as well as production functions, whereas the older machinery did only physical labor. In its broadest usage, automation contributes to both the manufacturing and administrative processes of a firm.

Automation has been more effectively adapted in continuous processing industries (16). Theoretically, the only limitation to automation is that continuous process must be present and continuous process is profitable only for large masses of standardized products (7).

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[5] Ibid., p. 13.

The complexity of the product and the number of highly specialized functions characteristic of hospital food service systems may limit their adaptation to automation; however greater mechanization and reorganization of the production process is possible. Many of the clerical and managerial functions involved in processing food service information have potential for automation.

Job Categories

Manager

The dietitian or food service manager functions as an administrator in hospital food service and has responsibilities similar to those defined by The American Dietetic Association for administrative dietitians. These include:

> Applies the principles of nutrition and management to menu planning, food preparation, and service. Develops appropriate standards for selecting and purchasing food, equipment, and supplies. Is responsible for: selecting, training and supervising non-professional personnel who handle, prepare and serve food; for inspecting purchases received; for sanitation practices in the storage, preparation and service of food. Prepares reports of financial management, safety practices, and training. Maintains cost control, by evaluating physical layout, employee utilization, equipment and procedures. Coordinates dietary services with other departments.[6]

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[6]The American Dietetic Association, "Dietitians and Nutritionists Defined," Journal of The American Dietetic Association, XXXVII (August, 1960), p. 147.

Supervisor

A supervisor is the individual directly above the worker in the organization hierarchy, and has the authority to assign, reward, and discipline other employees. He may serve as assistant to the dietitian or food service manager in planning, controlling, and coordinating the production aspects of the food service operation. He may also perform such clerical and managerial tasks as extending recipe yields, preparing cook's worksheets, determining census estimates, and preparing production schedules. He will have direct responsibility for the training and motivation of employees.

Worker

A worker is any individual not in a supervisory or managerial position, including cooks, bakers, tray service workers, and sanitary attendants.

CHANGING TECHNOLOGY IN HOSPITAL FOOD SERVICE

In the past two decades technological innovations have been introduced at such a rate and in such magnitude that the American society has been termed a technological society. The fact that what is new today can be obsolete tomorrow has affected virtually every area of our society. Economists and national planners have come to view many aspects of our developing technology as challenges. One of the most demanding challenges is in the area of employment, wherein both the necessary skill and the quantitative requirements continually fluctuate.

The influence that technology has had on skill requirements, job structures, and role relationships in industry has been documented. There is a need to examine the extent to which these effects are being or will be duplicated in hospital food service operations where modern industrial methods and concepts and technological innovations are being implemented. Adoption of new methods and concepts will undoubtedly affect the total job structure of hospital food service and thus affect the total manpower planning program.

Knowledge of personnel requirements and utilization are indispensable to effective manpower management. It is

not only necessary to know how many persons are required to man a specific operation; it is necessary to understand the total job structure of the operation, the character and structure of each job, and the personal qualifications and training essential for effective job performance. As technological changes are incorporated into hospital food service systems the character and structure of specific jobs also require review and modification. Manpower requirements may decrease in one area and increase in another. The training needs of individuals presently working within the operation may be affected and the selection criteria and orientation programs for future food service personnel may need to be revised.

Individuals in food service management have learned that efficiency and productivity are far less a matter of hard work on the part of the individual employee than of proper engineering of the job--of taking advantage of advanced technology. Quantity food service systems can no longer be operated as a larger version of the family kitchen. To efficiently control food quality and operation costs, industrial production and management methods must be used (17).

The industrial concept of materials management is finding its place in hospital food service in the form of the central ingredient room. This system provides for all ingredients to be weighed, measured, and assembled according

to the recipe before delivery to the food production area. The ingredients are delivered in a state ready to be assembled by the cook. To accomplish this feat all production operations must be coordinated; vegetable preparation, meat processing, dry stores, et cetera, must be synchronized so that all items are delivered on schedule. The recipe serves much the same purpose as a production document in a factory, dictating the materials required, in the state specified, which are to be delivered to a designated area at a predetermined time. If the production area is broken down into work areas such as meat area, bake shop, mixing area, and frying area, with the ingredients being delivered directly to the appropriate area, the kitchen takes on the characteristics of a factory more than of a conventional kitchen.

Such a production system leads to more detailed specialization of tasks and to more effective utilization of skilled personnel. A highly skilled cook spends his time cooking, not gathering materials and supplies, weighing and measuring ingredients, or calculating how to multiply or divide ingredient amounts to prepare the desired number of portions (15, 20).

The centralized food processing center, servicing satellite dining areas, is another industrial concept being introduced into hospital food service. Although the central commissary concept is more widely used in commercial chain

restaurants, it is also finding its place in large medical centers. Such a system is presently being planned for the Health Services Center for the State University of New York at Stoney Brook (57). All food will be prepared and assembled for service in one cental location. Food will then be delivered, either chilled or frozen, to points of service, ready for use with no additional preparation other than replacing heat in food to be served hot. The dormitories will receive their food already set up on trays similar to an airline service. For patient feeding, trays will be assembled and delivered to food distribution centers on the nursing floors. There the food is to be heated in microwave ovens just before the patient is ready to eat. Likewise, small dining rooms will be located in patient areas for staff and ambulatory patients where pre-chilled and frozen foods will also be heated in microwave ovens immediately prior to service.

Convenience, or ready to serve foods are being incorporated into hospital food service in degrees ranging from the purchase of ready prepared bakery items to total convenience systems. In the total convenience system there is minimal on-premise production; pre-prepared foods are purchased from a commercial vendor to be heated and assembled as required for service. The character of this type of food service is vastly different from that of even a highly systematized conventional one, as the kitchen becomes

simply a place where food is stored until it is reconstituted and assembled for service (10, 34, 43, 49).

One of the closest approximations to automation in hospital food service is the integrated system known as the "dial-a-meal" system being tested in a hospital by Automated Food Supply AB of Sweden, wherein convenience foods are linked with an automatic system of service. Frozen, ready to serve meals are purchased in single portion sizes. The packages are stored in compartments mounted on magazines designed to respond to the dial-a-meal selector. Each nurse's station has a dial selector with which the nurse orders the type and number of meals required. When a meal is ordered, the various menu items are sent through a pneumatic tube to the appropriate area to be placed on a tray. Foods requiring heating pass through a microwave oven before being placed on the tray (58). Although this system is only in the testing stages and may not have widespread practical application within the immediate future, it deserves to be mentioned because it is an indication of a possible direction in hospital food service systems.

Changes in equipment in hospital food service have in general been the improvement of equipment efficiency rather than a dramatic shift to highly automated equipment (16). These equipment improvements serve to make the job of the worker easier and more orderly, rather than alter skill requirements in any significant manner.

Dramatic new tools of management are being adapted from industry for use in hospital food service systems. Modern information technology can enter the world of hospital food service management by the use of computers to process masses of data previously handled by clerks and by the application of sophisticated techniques of quantitative analysis to management problems. This can relieve the dietitian of many of the routine tasks involved in processing the vast amount of information necessary to the operation of a food service system. At the same time, it provides more sophisticated methods of evaluating the operation, to effect more accurate controls, than was practically possible without the use of such technology (37).

Sager and Ostenso (55) reported the use of a computer to adjust recipes to a specified yield and to facilitate accurate ordering of food. They indicated that the possibilities of computer assisted food service management are without limit and could include inventory control, food costing, and production scheduling for optimal utilization of personnel skills.

Other authors have cited the use of the computer in calculating dietary data such as nutritional analyses of planned menus and analyses of patient food intake as requested by the physician (37, 62).

Knichrehm (27, 28) has reported the use of computer assisted simulation to evaluate the possibilities of

different layout arrangements for a cafeteria service line and to determine dining room seating capacity.

Dietitians are also learning to apply industrial engineering techniques to evaluate labor time, determine productivity relationships, and establish more accurately the tasks to be accomplished in food service operations (25, 39).

Although all of these recent developments in hospital food service will undoubtedly affect the jobs of both professional and non-professional personnel, some will probably affect one or the other to a greater extent than others. For this reason, it seems logical to attempt to categorize the effects of technological changes as those affecting management and those affecting non-professional personnel.

EFFECTS OF TECHNOLOGY ON MANAGEMENT

Changing technologies have an impact not only upon the workers in plants and factories but also upon the managerial hierarchy and upon managers. Traditional organizations and processes were developed in a very different technology. There is indication that new technologies will encourage, even compel, the design of new management structures and techniques (12).

Management In Industry

The impact of computer technology will vary from firm to firm; however, in general it will affect the existing structure of the organization, the content and number of jobs at the managerial level and the present structure of authority in the management hierarchy (65).

The use of the computer will tend to reverse the present trend toward decentralization of authority in corporations since information can be more readily centralized (13). Organizations show a corresponding consolidation of activities, with integration of such areas as manufacturing and marketing. The reorganization of traditional groupings of business activities is creating new managerial positions and substantially altering old ones (65). The computer has

had the effect of introducing individuals into the firm with skills unknown a few years ago. People with such titles as "systems analyst" and "operations researcher" are now included in the management hierarchy of many business enterprises.

Management is not so greatly affected by recent production technologies as by more modern administrative technologies, such as information processing, systems analysis, and operations research. Anshen states that "a new production technology in the form of automated processing of materials will not lead to radically new forms of management organization."[7] The reason for this is that the way materials are produced does not determine the basic decisive functions of management. Decision making is the critical characteristic of the management job. Because the raw material for decision making is information, the revolution in information technology is leading to changes in managerial jobs. Whistler and Shultz state that,

> the evidence to date indicates that the craft of management will be changed sharply in some areas, especially those activities related to decision making. Traditional ideas of how to make an

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[7]Melvin Anshen, "Managerial Decisions," in Automation and Technological Change, ed. by John T. Dunlop (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1962), p. 67.

> intelligent decision are being challenged by the new technology.[8]

The effect of information technology on the middle manager illustrates the changing nature of decision making. Middle management is defined as, "that group of employees above first level supervision who either make day-to-day operation decisions in the conduct of a business enterprise or who directly contributes judgments, information, and analysis to the process of decision."[9] The middle managers have filled positions long considered special sanctuaries for those capable of forming reasoned judgments and making operational decisions on the basis of them. Where mediocrity existed, it was a simple matter for these individuals to avoid difficult decisions or the possible consequences of bad ones by "passing the buck" (2). New management technologies have made the job of the middle manager more visable, easier to define and describe.

In a survey (2) conducted for the American Foundation on Automation and Employment, it was reported that automation in the form of information technology has already

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[8]Thomas L. Whistler and George P. Shultz "Automation and The Management Process," in The Annals of The American Academy of Political and Social Science: Automation, ed. by Charles C. Killingsworth (Philadelphia: The American Academy of Political and Social Science, 1962), p. 83.

[9]American Foundation on Automation and Employment, Automation and the Middle Manager (New York: American Foundation on Automation and Employment, Inc., 1966), p. 5.

greatly decreased the need for middle managers in the 22 corporations participating in the survey. For example, Metropolitan Life Insurance Company's volume of business has increased 75 per cent since computerization began in 1954, but the number of middle management jobs has not changed significantly.

In many areas of operation the computer can make decisions on a more timely basis with greater accuracy and consistency than humans. Such routine decisions as whether or not to purchase a certain material, the best form in which to purchase it, and determination of production schedules are being effectively turned over to the computer (2).

With increased availability of information, the parameters of decision making can be more scientifically defined and problem solving can be approached on a more planned, engineered basis as opposed to operation by intuition. Such methods of operation require that managers have a different kind of philosophy and training than was demanded in the past (3).

One survey reported that, "middle management is on the threshold of a change greater than has ever been experienced in the history of modern business."[10] There will be dramatic changes in the content of the middle manager's job

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[10] Ibid., p. 17.

under the impact of computerization, even if the machines accomplish only the information processing rather than the decision making and problem solving functions of the job.

Technological advances which induce changes in the business environment create problems for the middle manager relative to his own job identity and the understanding of the relationship of his role to others in the organization. Some managers have expressed concern about personal adaptability to an automated system and uncertainty as to their roles in it. Fear of losing status as supervisor of a large number of workers is an obvious cause of manager anxiety (2).

The introduction of new disciplines into the management process requires that managers must learn to work effectively with this new breed of staff specialists. One author cited this as one of the "growing pains" of computer technology, because managers may find themselves in sharp conflict with these specialists who frequently express impatience with the traditional ways of management and a lack of familiarity with the nuances of every day business operations (2). This calls for greater development and increased exercise of human relations skills. The position of the manager in this environment must be less like that of a "boss" and more like that of a professional who coordinates the activities of other skilled professionals (65).

Many of the routine day-to-day tasks of the middle manager are being programmed into the computer, thus altering

the content of his job. If he can adjust to these changes he will probably find his job more creative, more important, and more interesting. The manager will spend more time in planning or in evaluating and acting upon information made available to him. This will impose greater intellectual requirements on the manager. Decision making will be of a more qualitative nature as decisions will be based on reliable data which must be rigorously analyzed (2, 3).

Relief from the drudgery of routine tasks will not only give greater freedom and flexibility but will require that the manager fill the gap by seeking broader horizons for his job. He will need an increased knowledge of the computer functions in the management process. To accomplish this the individual will need to be better educated and more skilled in information technology. He will not need to be a computer specialist, but must be able to utilize this tool effectively to accomplish his goals (2).

Wikstrom (66) states that managers can no longer be concerned with just "keeping the store." Management today is much more a process of continuous planned innovation, the creation of changing conditions, the adaption of the organization to these changes and the motivation of employees at all levels to meet new goals. This requires a different type of manager, whether he be at the top or the middle of the management hierarchy.

As the skills and job requirements of management change, so must the training in terms of intensiveness and content. Whistler and Shultz (65) predict an increase in the formal education of managers with an emphasis on fundamental theoretical knowledge. The training and education of managers must enable them to understand and translate the developments of many disciplines to the management process. In addition to exposure to the traditional disciplines of the business school, managers need an increased understanding of higher mathematics, computer technology, statistical analysis, systems design, operations research, and recent developments in the behavioral sciences (2, 66).

American colleges and universities must update and broaden their curricula to meet these changing managerial needs of industry. The business schools have been criticized by industry for failing to provide sufficient understanding in these areas and training in their application to the practical problems of operating an enterprise (2).

The constant change in the technical, social, and economic environment of American industry requires not only that prospective managers receive intensive training initially, but that constant continuing education be pursued to remain abreast of the changes (20). Employers and individual managers have a joint responsibility for remedying potential skill deficiencies through company training programs and personal self improvement programs. Taking part

in company training programs is not adequate, however. To maintain competence, managers must also return to the college classroom for periodic refresher courses. Companies must provide opportunity for this and managers must use initiative in taking advantage of the opportunity (2).

Professional Personnel in Hospital Food Service

In attempting to correlate dietitians in managerial positions with comparable levels of management in industry, a dilemma exists. Is the dietitian in the position of head of a food service department at the top or middle management level? He is clearly in a middle management position in the hospital organization hierarchy; yet he is top management in his own department. He is the authority in food service and has the responsibilities of planning, organizing, controlling, and making policy decisions relative to the operation of the food service department. He, like top management in industry, is faced with the problem of coping with a constantly changing environment in which the food service department operates. As top management in industry cannot be concerned only with adjusting to changes but must innovate and create changes, so must the dietitian who is functioning in this capacity. As top management in industry must innovate in order to survive against the pressure of a highly competitive economy, dietitians in hospital food

service must innovate against the continuous and unremitting pressure of constantly increasing costs.

As medical care has grown into a major force in the American economy, hospital food service has expanded into an industry, large and complex in itself. Such size and complexity demands a reorientation in planning for effective utilization of professional manpower. Because the supply of dietitians is generally inadequate to meet the need, they must increase their effectiveness and productivity by learning to use the new information technology available. If the use of the computer in industry has decreased the need for middle managers, then it can be used to alleviate the shortage of dietitians and allow these professional personnel more time for teaching, training, patient contact, research, and development.

The dietitian is not unlike other managers in the need to recognize the contribution of other specialties to the operation of the food service system. Greenaway states that, "the technology of food service is changing rapidly, with a result that food service managers must be broadly acquainted with and quickly understand how to apply new developments from many fields of scientific and applied research."[11] The dietitian, like the manager in industry,

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[11]Donald Greenaway, "Food Service Management--Its Problems and Promises," Journal of The American Dietetic Association, XLI (December, 1962), p. 548.

must be able to work with the specialists in these new disciplines. This, coupled with the fact that today's food service workers are better educated, have different expectations of how they should be treated, and require different methods of motivation and training, demands increased development and utilization of human relations skills on the part of the dietitian (11).

The increased use of information technology and the trend toward centralization of production in hospital food service requires managerial expertise similar to that of any other large production industry. The technologic, social, and economic developments are making qualified and capable food administrators more essential than ever before (11).

The dietitian is also caught up in a search for identity in an environment characterized by constant and accelerating change. He is seeking his identity as an individual and as a dynamic contributor to health care (40). Somewhere in the super abundance of new information, techniques, food products, and management methods the dietitian must identify the knowledge and measures that will enable him to accurately evaluate the present status of his department and direct its future development. If he can accomplish this he will be better able to determine his role in the changing organization.

In general, information in the literature suggests that the effect of accelerating technological change is the

same on managerial skill requirements whether it be in hospital food service or any other industry. There is a corresponding demand for expertise, flexibility, and adaptability.

Therefore, it is indicated that in addition to training in technical dietetics and basic management concepts, dietitians in managerial positions also need an increased understanding of mathematics, statistical analysis, computer technology, systems design, operations research, and recent developments in the behavioral sciences. To maintain competence, the initial training is not sufficient; the evolving philosophy of management requires a new concept of education.

> Four years of undergraduate study and one year of internship can no longer provide the special, technical and managerial skills necessary for those who continue in food administration. Today the new concept would distribute over a lifetime the amount and kind of formal education needed and this education should include a proper combination of general and professional knowledge and managerial skills. For the experienced dietitian in food administration, continuing education, graduate study, and research will be more necessary than ever before.[12]

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[12]Donaldson, "The Future in Food Administration," Journal of The American Dietetic Association, XLVI (May, 1965), p. 359.

EFFECTS OF TECHNOLOGY ON NON-MANAGERIAL PERSONNEL

In general, the literature concerning the effect of technology on the worker considers primarily the effect of automation on skill requirements and job structure and the psychological aspects of adjusting to automation. It was pointed out earlier that the nature of the product and production methods of hospital food service do not lend themselves to complete automation. For this reason any attempt to draw a close analogy between the food service worker and the worker in an automated plant in industry would be fruitless. However, because the use of industrial production technology in hospital food service is expanding, some effort at identifying the effects of technological change on the worker in industry seems relevant as a point of reference.

The Worker In Industry

Social scientists have conducted research to evaluate the psychological and organizational impacts of recent technologies on the worker in office areas, plants, and factories. From his own work and that of other scientists

Mann (38) established a list of generalizations relative to the manner in which technological change affects the job content and skill requirements of workers, the social and supervisor-worker relationships, and job structure. He and others have reported the implications of these impacts on the educational and training requirements of the worker in areas undergoing rapid technological change.

Job content and skill requirements

Basic changes in technology mean major changes in the division of labor and will alter job content.

With more highly automated equipment, the job content is significantly changed, requiring much closer and more constant attention. The jobs are generally less physically demanding but mentally more complex.

Greater system integration, with fewer employees, generally means that a worker has greater responsibility and jobs are classified as higher skilled.

As tasks become highly specialized, whereby the job consists of a limited number of highly regulated maneuvers, both skill requirements and job interest tend to be decreased.

A higher order of technical competence is required on the part of the supervisor in technologically advanced plants and the integration of operations places a premium on supervisory planning as schedules are generally tighter and more demanding.

Social relationships

Technological changes mean a change in both the functional and social relations of the individual with fellow workers.

As tasks are more highly specialized and work areas are scattered over a wider area, the workers feel isolated and have less chance to talk face to face.

Supervisor-worker relationship

Changes in technology increase the amount and intensity of supervision and alter supervisor-worker relationships.

Workers in more automated plants report much closer supervision as a result of both a decrease in the number of men per foreman and an increase in the amount of time spent by the foremen in direct supervision.

The reduction of social interaction and the increase in direct supervision are sources of dissatisfaction for workers and indications are that relationships with the foreman are not as good as they had been in the less automated plants.

Both workers and foremen feel dissatisfied with their lack of control over their job and feel separated from the work process.

The mechanical controls on production limit the ability of the foreman to effectively utilize his acquired human relations skills or the knowledge he has accumulated about conventional machine processes in meeting increased production rates. This may tend to contribute to tension in worker-supervisor relationships.

Job structures

Changes in structure of jobs means changes in opportunities for promotion and worker job security.

Smaller work forces, fewer job classes, fewer levels of supervision, and increasingly complex technical work environments significantly alter channels of promotion previously open to the worker.

Education and training

> Although there are not extensive data relevant to the specific skills and talents which automation demands, present indications are that emphasis must be primarily on education and training which will make the individual worker as maneuverable, flexible, mobile, and responsive to change as possible (68).
>
> > A good educational background is becoming more essential, even for those in the least skilled jobs, in order to enable the individual to make frequent shifts as technological and other factors increase the tempo of change (6).
> >
> > Major technological change means extended periods of disruption in the basic patterns of working and the amount of prior training and understanding a worker has can significantly affect his ability to adjust to the change and affects the speed with which he regains a satisfactorily high level of productivity (38).
> >
> > The number and complexity of products has a direct influence on training required. Training needs of a company will not be as great for a simple product that is mass produced as for a company having several complex products which are made in small lots to customer specifications. The more complex and numerous the products, the greater the skills and flexibility required of employees (9).

All of these generalizations will not have equal relevance in application to hospital food service systems. However, they may provide some useful information for those planning changes in production methods and managerial processes which result in the use of industrial technologies.

The Hospital Food Service Worker

Sufficient information is not available in the literature to determine with any degree of accuracy the manner in which changing technologies in hospital food service systems do affect the skill requirements, role relationships, and job structure of the worker. The degree to which these factors will be altered by technological change is obviously a function of the extent and nature of the change. There is indication that labor saving devices, improved products and materials, and the organization of the kitchen operation along industrial lines do decrease the numerical requirements for skilled personnel such as those in the cook, baker, and meat cutter categories (15, 37, 49). Changes as a result of technological advancements, other than the quantitative aspects, are purely a matter of conjecture on the part of this author. These are based on the effects of comparable changes in industry which have been documented to some extent.

The incorporation of an ingredient room may alter the content of the cook's job somewhat. If we contrast what may be a typical situation under a conventional materials handling system, whereby the cook is given a recipe for 200 portions and told to prepare 730 servings, to a situation wherein he is provided the recipe already extended to 730 portions as well as the ingredients in a state ready to be

combined, we can see that the job becomes somewhat more specialized. He spends more time in actual production of menu items and less time gathering materials and determining how much to prepare (14, 49). One could surmise that the skill required to prepare a high quality product remains the same, but the judgment necessary in the scheduling of work is lessened because these factors are controlled for him. Whether the skill requirements of the cook are decreased as indicated with greater specialization of tasks, or increased due to greater system integration cannot be determined without direct observation.

One author stated that the production system based on the use of central materials handling had allowed her operation to absorb an 11 per cent increase in the number of patients served and at the same time convert six skilled positions to lower grade positions, requiring a lesser degree of skill and training (15). In a hospital food service system wherein personnel frequently progress from the lesser skilled positions up to that of cook this would significantly decrease the opportunities for promotion for workers. This is a source of anxiety for the worker and may be expressed in two ways, one resulting in excessive competition among workers, the other resulting in frustration and lack of motivation since fewer channels of promotion are open to the worker (2). Both of these may

create problems in the worker-supervisor relationship and demand greater human relations skill on the part of the supervisor.

The extent to which employees can be isolated in a hospital food service system by establishing work areas, assigning specific tasks, and distributing materials to them does not compare with that of an automated production plant but it can be enough to alter social relationships. Manchester (36) stated that with such an arrangement of the kitchen the employees had little opportunity to talk with fellow workers. Other human relations in the organization may be affected by the increased amount of direct supervision that the supervisor is able to give as the content of his job is changed.

The number and kind of skills required in a facility utilizing only convenience foods is probably significantly different from those required in a kitchen where food is both processed and served. One of the promises of convenience food systems is the decrease or elimination of requirements for skilled cooks (10, 34). Because foods are only reconstituted and assembled for service there will be less difference in the amount of training and skill required for job performance among worker positions. The greater similarity of jobs throughout the organization will undoubtedly have the effect of leveling the job structure.

Layout, equipment, and labor costs are generally given as primary considerations in the choice of whether or not to use convenience foods (10, 34). However, one critic indicates that personnel considerations should be made in the planning process. He feels that different training and motivation methods must be used because personnel who only reconstitute and serve food do not have the same vested interest in food quality as the chef or cook who prepares a product for service (32).

The technical skills and knowledge required of the supervisor will probably be less when there is little actual control over the production process. This author's connotation of a cook supervisor is an individual who can not only recognize quality in food but who also knows the particularities of the process necessary to accomplish high quality. Although the requirement for technical competence in food production may be decreased, the changes in career patterns and possible changes in the relationship of worker to product will probably place increased demands on supervisory expertise and require greater development and utilization of human relations skills on the part of the supervisor.

The use of computer assisted management processes not only affects the job content of the dietitian but may also affect that of the supervisor who serves as an assistant in calculating recipe yields and keeping other records. In addition to learning to fill the time gap created by

relief from clerical tasks, he must gain the skills of using the new information made available by the changing technology.

Because new information technology provides more immediate feedback and closer operational control, the opportunity and necessity for the supervisor to control the work process is decreased. He may feel that this reduces his status in the organization and it may affect his relationships with superiors and subordinates alike. Additionally, he will have more time for supervisory tasks and, as workers were indicated to resent increased direct supervision, this may affect worker-supervisor relationships.

These changes in position requirements, career patterns, and organizational relationships may not be extensive; yet dietitians or food service managers should be aware of their possible occurrence when planning major changes in the operation. Resistance to change on the part of personnel is one of the major barriers which must be overcome when incorporating new methods or technological changes in an organization. The primary problem is understanding that the nature of the resistance is generally not directed toward technical change but toward social change and change in human relationships (31). Technological change is generally dysfunctional as well as functional to the individual and to the organization (6). If dietitians are aware of

these possible side effects, they can plan to overcome the disadvantages and more effectively capitalize on the advantages of developing technology.

NOTES ON MANPOWER PLANNING

An organization's manpower is its most crucial resource. Therefore, planning for manpower must be an integral part of the organization process. As was stated earlier, manpower planning is more than forecasting needs in numbers; it must include planning for performance and skill requirements, organization structure, and programs for the acquisition, development, utilization, and maintenance of the work force (8).

The qualitative aspects of manpower planning are frequently given insufficient consideration and changing demands of managerial, supervisory, and worker positions are often overlooked. The recent acceleration of technological change and the increasing complexity of human relationships in organizations require that manpower planning be approached on a broader basis, to include qualitative as well as quantitative aspects (33).

As new technologies and innovations are introduced into an organization there is a need to develop detailed plans for new processes and products which can be translated into the overall manpower planning program. Two very important aspects for consideration in such programs are selection criteria and manpower development.

Factors that may effect changes in manpower requirements, both numerically and qualitatively, are the influence of research and development, use of data processing equipment, changes in materials and supplies, and product and process changes (8). These changes and influences are presently being felt in hospital food service systems; they will affect the total manpower planning program and consequently have implications for any guidelines used in developing criteria for the selection and training of personnel.

The criteria for selection of personnel must be determined by the actual needs of the specific organization. Recruitment of personnel is a continuing function and requires careful planning. Individuals having the responsibility of selection of personnel should be aware of changes in the internal organization which affect the type of operation and hence the type of manpower required.

Careful evaluation of the educational requirements actually necessary for job performance is essential. Demanding more education than is required for the job may create a situation wherein the worker has greater expectations in job interest and variety than is provided. The lack of opportunity to grow and develop in a job has been cited as a possible contributor to a high rate of turnover of hospital workers (49).

Although education requirements must be critically evaluated, it has been indicated that increased educational

background is becoming more essential even for those in the least skilled jobs because a constantly changing work environment may require the individual to make frequent adjustments in his work patterns (6).

Every organization must also decide whether to hire unskilled workers and train them for specific jobs or to attempt to hire skilled individuals. Yet, the changing methods of production and distribution of food in hospital food service systems indicate that emphasis should be placed on the development of potential qualities in workers rather than on hiring persons with acquired skills (11).

The studies conducted in industry pertaining to the introduction of new work procedures indicate the importance of the general state of readiness that an organization and its members should be brought to before technological change is introduced (38). Major innovations which create discontinuities in work patterns and require the transfer and alteration of job skills can only be accomplished through revision of normal training patterns (48). Extensive training before a change is made is necessary to insure successful transition to new production methods.

A work environment characterized by constant change requires that training be incessant in nature. A survey of blue collar workers indicated that continued on-the-job training was the most beneficial form of training in adjusting to technological change (48). However, a training

program consisting only of on-the-job training may not be adequate. Food service administrators must be aware of the principles of education and be able to determine which training methods will best fill the needs of their particular operation. Employee performance can generally be increased and maintained at a higher level if workers have an understanding of the principles behind the techniques of their jobs (9). Therefore, a training program which encompasses classroom orientation as well as on-the-job training will undoubtedly be more effective in food service operations.

The absence of an integrated long range training program with a continuing investment in time and money has been indicated as the greatest disadvantage of hospital manpower programming (40). Hospital food service systems are complex organizations performing highly specialized functions. Specialized knowledge is required to control the quality of a highly perishable product and to meet the particular needs of individual patients. The already existent complexity of the organizational functions coupled with accelerating technological change demand that personnel training be given preeminence in the planning of organizational activities.

SUMMARY AND CONCLUSIONS

Changes and improvements in supplies, equipment, facilities, and methods of production and control are drastically altering the technical, economic, and social environment of hospital food service. The use of information technology in management, centralized production and materials handling, and convenience food systems create operations very different from those characteristic of hospital food service ten to fifteen years ago.

Of all the aspects of long range planning, there are none of greater importance than planning for manpower and organization structure. The recent technological changes in hospital food service systems will undoubtedly affect the structure of the organization and alter the needs of the total manpower planning program. As methods of production and managerial processes change, the number and type of skills required will be altered. This will influence the type and intensity of education and training necessary for effective job performance at every level of the organization.

Without research specific to hospital food service, it is difficult to determine the effects of changing technologies on skill requirements, job structure, and role

relationships within the organization. Information in the literature, relative to the effects of technology on these factors as documented in other industries, can serve as a basis for comparison, but only to a limited extent. From such comparisons one can only derive inferences and develop hypotheses concerning the effects of technological change on manpower requirements of hospital food service systems; one cannot establish with certainty that the effects reported by other industries are equally operative in modern hospital food service systems or that such information can be used as an absolute base for improving the relevancy of existing hospital food service manpower planning programs.

However, literature pertinent to hospital food service management strongly suggests that technological change does affect job structures, skill requirements, and role relationships. More definitive study and research is needed to further explore both the nature and the extent of manpower adjustment for technological change in hospital food service systems.

BIBLIOGRAPHY

1. American Dietetic Association. "Dietitians and Nutritionists Defined." Journal of The American Dietetic Association, XXXVII (August, 1960), 147.

2. American Foundation on Automation and Employment. Automation and the Middle Manager. New York: American Foundation on Automation and Employment, Inc., 1966.

3. Anshen, Melvin. "Managerial Decisions." Automation and Technological Change. Edited by John T. Dunlop. Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1962.

4. Avery, Arthur C. "Work Design and Food Service Systems." Journal of The American Dietetic Association, LI (August, 1967), 148-53.

5. Bennette, Addison C. "Focus on Management Methods--Keeping the Good People We Have." Hospital Topics, XLVII (February, 1969), 31-35.

6. Blum, Albert A. "Job Skills for Automated Industry." Management of Personnel Quarterly, IV (Winter, 1966).

7. Buckingham, Walter. Automation: Its Impact on Business and People. New York: Harper and Row, 1961.

8. Coleman, Bruce Pumphrey. An Exploratory Study of Information for Manpower Planning. Unpublished Ph.D. dissertation, Indiana University, 1966.

9. Daily, Andrew A. "Selection and Organizing the Training Staff." Training and Development Handbook. Edited by Robert L. Craig and Lester R. Billel. New York: McGraw Hill, 1967.

10. Divine, Harvey C. "Impact of Convenience Foods on Food Handling Facilities." Hospitals, JAHA, XLIII (February 1, 1969), 63-66.

11. Donaldson, Beatrice. "The Future in Food Administration." Journal of The American Dietetic Association, XLVI (May, 1965), 357-60.

12. Dunlop, John T., ed. Automation and Technological Change. Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1962.

13. Farmer, Richard N. Management In The Future. Belmont, California: Wadsworth Publishing Co., Inc., 1967.

14. Fine, Sidney A. "The Use of the Dictionary of Occupational Titles as a Source of Estimates of Educational and Training Requirements." Journal of Human Resources, III (Summer, 1968), 363-75.

15. Food Service Division, Walter Reed Army Hospital. Data Automation Requirements: Army Hospital Food Service System. Washington, D.C.: Walter Reed Army Medical Center, 1968.

16. Ganong, Warren L. "Automation in Food Processing and Serving." Journal of The American Dietetic Association, XXXVIII (February, 1961), 119-21.

17. Greenaway, Donald. "Food Service Management--Its Problems and Promises." Journal of The American Dietetic Association, XLI (December, 1962), 547-49.

18. Hanan, Mack. "Corporate Growth Through Venture Management." Harvard Business Review, XLVII (January-February, 1969), 47-53.

19. Hansen, Karl E. "Work Sampling Can Cut Dietary Costs." Modern Hospital, C (May, 1963), 86-88.

20. Heinemeyer, Jane M., and Ostenso, Grace L. "Food Production Materials Handling." Journal of The American Dietetic Association, LII (June, 1968), 490-497.

21. Hodgson, James D. "Automation--A Study in Promises, Problems and Polemics." Management of Personnel Quarterly, II (Autumn, 1963), 2-9.

22. Hunscher, Helen A. "Continuing Education: An Antidote to Obsolescence." Journal of The American Dietetic Association, XLIII (August, 1963), 115-19.

23. Illson, Murray. "Blue Cross Asks a 49.5% Rate Rise for Most in Plan." New York Times, May 23, 1969.

24. Institutions Magazine. "Convenience and Beyond: A Digest of Scientific and Technological Data." LXIV (April, 1969), 89-112.

25. Kent, Jean Woolley and Ostenso, Grace L. "Productivity Relationships of Hospital Dietary Departments." Journal of The American Dietetic Association, XLVII (August, 1965), 104-109.

26. Killingsworth, Charles C., ed. The Annals of The American Academy of Political and Social Science: Automation. Philadelphia: The American Academy of Political and Social Science, 1962.

27. Knickrehm, Marie E., Hoffman, Thomas R., and Donaldson, Beatrice. "Digital Computer Simulations of a Cafeteria Service Line." Journal of The American Dietetic Association, XLIII (September, 1963), 203-208.

28. Knickrehm, Marie E. "Digital Computer Simulation in Determining Dining Room Seating Capacity." Journal of The American Dietetic Association, XLVIII (March, 1966), 199-203.

29. Kruger, Daniel. "Automation and Manpower." Journal of The American Dietetic Association, XLIII (September, 1963), 197-203.

30. Landgraf, Walter E. "Needed: New Perspective on Health Services." Harvard Business Review, XLV (September-October, 1967), 75-83.

31. Lawrence, Paul R. "How To Deal With Resistance to Change." Harvard Business Review, XLVII (January-February, 1969), 4-7.

32. Litman, C. I. "Convenience Foods--Their Effect on Your Image and Your Profit." The Cornell Hotel and Restaurant Administration Quarterly, IX (May, 1968), 14-15.

33. MacCullough, Allison V. "Long Range Organization and Manpower Planning." Michigan Business Review, XVI (March, 1964), 28-32.

34. Maddox, Darrell. "Kaiser Kitchens Eliminate Most Cooking." Modern Hospital, CVI (June, 1966), 116-19.

35. MaGraw, Richard M. Ferment in Medicine. Philadelphia: W. P. Saunders Co., 1966.

36. Manchester, Katharine E. Quantity and Quality Production in Patient Feeding. Presentation before the Society for the Advancement of Food Research, 1968.

37. Manchester, Katharine E., and Sager, Jane F. "The Army Food Service Data Processing System." Article prepared and accepted for publication in Journal of The American Dietetic Association.

38. Mann, Floyd C. "Psychological and Organizational Impacts." Automation and Technological Change. Edited by John T. Dunlop. Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1962.

39. Marteney, Annabelle, and Ohlson, Margaret A. "Work Sampling of a Dietary Staff." Journal of The American Dietetic Association, XLV (September, 1964), 212-17.

40. McCarthy, Eleanor F. "Food Service and Dietetics." Hospitals JAHA. XLIII (April, 1969), 101-104.

41. McNulty, Matthew. "Health Manpower." Hospitals, JAHA, XL (April, 1966), 83-88.

42. Miller, Gertrude E. "To Be Or Not." Journal of The American Dietetic Association, XLVII (July, 1965), 15-19.

43. "Modern Hospital of the Month: Redwood City's Hospital Is Youngest Member of Growing Kaiser Family." Modern Hospital, CXI (December, 1968), 83-86.

44. National Advisory Commission on Health Manpower. Report of The National Advisory Commission on Health Manpower. 2 vols. Washington, D.C.: United States Government Printing Office, 1967.

45. National Industrial Conference Board. The Challenge of Technology. New York: National Industrial Conference Board, 1966.

46. National Industrial Conference Board. The Challenge of Innovation. New York: National Industrial Conference Board, 1967.

47. Ostenso, Grace, and Donaldson, Beatrice. "Effective Use of Hospital Dietary Labor Resources." Hospitals, JAHA, XL (July 16, 1966).

48. Piore, Michael J. "On The Job Training and Adjustment to Technological Change." Journal of Human Resources, III (Fall, 1968), 435-49.

49. Quam, Mary E. "Convenience Foods and the Existing Food Service System." Hospitals, JAHA, XLIII (June 16, 1968), 136-37.

50. Report on Medical Care Costs, Consumer Price Office, United States Department of Labor, cited in "Washington Wire." Modern Hospital, CXI (December, 1968), 30-31.

51. Report of the Technical Committee on Medical Care of the Interdepartmental Committed to Coordinate Health and Welfare Activities, 1938, as cited in The Report of the National Advisory Commission on Health Manpower. Vol. II. Washington, D.C.: United States Government Printing Office, 1967.

52. Robinson, Wilma F. "How Will the Hospital Dietitian Function in the Future?" Journal of The American Dietetic Association, XLIX (August, 1966), 110-15.

53. Rothenbuhler, Ervin F., and Bartscht, Karl G. "Determining Dietary Staff in Hospitals--Methodology." Journal of The American Dietetic Association, XLVII (July, 1965), 25-28.

54. Rutstein, David D. The Coming Revolution in Medicine. Cambridge, Massachusetts: The MIT Press, Massachusetts Institute of Technology, 1967.

55. Sager, Jane F., and Ostenso, Grace L. "Computerized Recipe Adjustment and Food Ordering." Journal of The American Dietetic Association, LII (June, 1968), 498-501.

56. Somers, Herman Miles, and Somers, Anne Ramsay. Medicare and the Hospitals: Issues and Prospects. Washington, D.C: The Brookings Institution, 1967.

57. Specialized Systems, Vol. II, Food Service Systems. State University of New York at Stoney Brook Health Science Center, State University Construction Fund, 1969.

58. Spink, George. "Materials Handling Systems." Hospitals, JAHA, XLIII (February 1, 1969), 53-58.

59. Stabb, Josephine H. "Learning: A Lifetime Adventure," Journal of The American Dietetic Association, XLV (July, 1964), 15-18.

60. Stamm, Emily K. "Food Service and Dietetics: Annual Administrative Reviews." Hospitals, JAHA, XL (April, 1966), 77-79.

61. Stogdill, Ralph M. "The Behavioral Sciences and Technologies--Impact on Management." Journal of The American Dietetic Association, XLIX (August, 1966), 99-102.

62. Tullis, I. Frank, Lawson, Virginia, and Williams, Rubye. "The Digital Computer in Calculating Dietary Data." Journal of The American Dietetic Association, XLIV (May, 1965), 384-86.

63. United States Department of Health, Education and Welfare. Report of The President on Medical Care Prices. Washington, D.C.: United States Government Printing Office, February, 1967.

64. Weisbrod, Burton A. "Investing in Human Capital." Journal of Human Resources, I (Summer, 1966), 5-21.

65. Whistler, Thomas L., and Shultz, George P. "Automation and the Management Process." The Annals of The American Academy of Political and Social Science: Automation. Edited by Charles C. Killingsworth. Philadelphia: The American Academy of Political and Social Science, 1962.

66. Wikstrom, Walter S. Developing Managerial Competence--Changing Concepts, Emerging Practices. New York: The National Industrial Conference Board, 1964.

67. Wilt, John A. "The Compensation Game." Modern Hospital, CXI (August, 1968), 66-68.

68. Wolfbein, Seymore L. "Automation and Skill." The Annals of The American Academy of Political and Social Science: Automation. Edited by Charles C. Killingsworth. Philadelphia: The American Academy of Political and Social Science, 1962.

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