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AN EVALUATION OF PROGRAMMED INSTRUCTION IN A MANAGEMENT DEVELOPMENT PROGRAM

By

Leroy G. Cougle

A Dissertation Submitted to the Faculty
of the Graduate School of Loyola University
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

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1972

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L. G. Cougle

Waukegan, Illinois

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CHAPTER I

INTRODUCTION

Statement of the Problem

Management education and training have become areas of increasing concern to those interested in the growth of the business and industrial community. Management training traditionally has focused its attention on the development of those functional skills necessary to operate and perform within the framework of the management hierarchy. Toward this end, management education has concentrated on the knowledge and skills necessary to direct the resources available for the successful accomplishment of the organizational objectives.

Management has attempted to educate the manager through three essential components: Selection, intellectual conditioning, and supervised training.

"Selection is the process through which we determine whether or not a man has innate leadership ability and, on the basis of that determination, then make a secondary and probably more important determination of the degree to which he possesses that ability. Intellectual conditioning is the process of educating the individual in the principles, laws, truths and abstract theories that make up the body of knowledge upon which the management profession is based. Supervised training is the process of

guiding the individual as he applies and uses this knowledge in practical events of daily occurrence."[1]

Intellectual conditioning and supervised training present problems to the manager concerned with the development of his subordinate managers. The manager needs not only a grasp of the more abstract theories that bear on his profession but also some education and training in the functional skills of management. These functional skills are traditionally thought of as planning, organizing, controlling, and directing.[2]

Supervised training of the manager likewise plays an important role in the management development effort because of the need for the manager to translate his theory into acceptable patterns of performance within the organizational structure. One aspect of the total management development structure is that the more identical the classroom experiences and application to the actual management requirement, the more quickly the manager can learn to apply the concepts and techniques, and the less supervised training he may need.[3] This in turn would lead to greater proficiency on the part of the manager.

Another problem area of managerial training and development associated with both intellectual conditioning and super-

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[1]Robert E. Finley, (ed.) The Personnel Man and His Job (New York: American Management Association, 1962), p. 214.

[2]Robert G. Hicks, The Management of Organizations (New York: McGraw-Hill Book Co., 1967), p. 158.

[3]Joel M. Kibbe, Clifford J. Craft, and Burt Nanus, Management Games: A New Technique for Executive Development (New York: Reinhold Publishing Co., 1961), p. 39.

vised training is the element of decision making. Decision making by the manager and the control function go together. In order to carry out the decision-making process, the manager must understand and be able to effectively use the control function.[1] He must also be able to use the control data as a base for determination of decisive alternatives and to evaluate the merit of these alternatives in terms of performance and results. Through the process of elimination, he can then make the ultimate decision on the best course of action within the framework of his responsibility.

An additional aspect of management education and training is the formal instruction received by the manager in higher education or a business curriculum at the secondary level. Within these areas, the necessity for application of the principles and practices is of equal importance. The transfer of learning from the classroom to the work environment can be assisted if the learner experiences practical problems similar to those he will encounter in the business environment.

The lecture method has long been used as a means for presenting knowledge material during the intellectual conditioning phase of management training.[2] In this context the lecture method has been an accepted technique for teaching the managerial functions, including the function of control. While ample publi-

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[1]Ernest Dale, Management: Theory and Practice (New York: McGraw-Hill Book Co., 1965), p. 550.

[2]Robert L. Craig and Lester R. Bittel, (ed) Training and Development Handbook (New York: McGraw-Hill Book Co., 1967)p.141

cations and case studies exist to document the use of programmed instruction as an effective educational method,[1] limited research has been completed to identify the usefulness of programmed instruction as a management training technique.

Purpose of the study

The purpose of this study is to evaluate the effectiveness of programmed instruction as a method of teaching a management skill. The study concentrates on the managerial control function and within the scope of control specifically deals with the element of scheduling as it applies to the availability of human resources to accomplish the organizational objectives.

The hypothesis of this study is that programmed instruction is as effective as the lecture method of instruction for teaching the management control function, scheduling.

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[1]Gabriel D. Ofiesh, Programmed Instruction: A Guide For Management (New York: American Management Association, 1965), p. 165-401.

CHAPTER II

BACKGROUND DATA RELATING TO THE STUDY

Management defined

A broad definition of management has been given by Claude.

> Management is the determiner of our economic progress, the employer of our educated, the amasser of our resources, the strength of our national defense, and the molder of our society. It is the core of all our public as well as personal activities. And it is all these things because man has found no substitute for it in the effective achievement of his goals.[1]

Management has had its role in society since the beginning of man's evolution. In the earliest periods when family groups, then tribes, formed for mutual assistance in hunting and protection from enemies, man even then recognized the need for authority and the necessity for a system of management which would allow for the even flow of common affairs of the group.

With the beginnings of management, man was able to plan for and organize and direct his efforts toward the communal effort necessary for his own development. The education of the individual was directed toward the continuation of the values of the group while attaining its common goal also was stressed in this educational development.

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[1]George S. Claude, Jr., The History of Management Thought (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1968), p. 178

Management has evolved and grown until today the definition of management by Sisk is as follows: "Management is the coordination of all resources through the process of planning, organizing, directing, and controlling in order to attain the stated objectives."[1] Koontz and O'Donnell have defined management as "The accomplishment of desired objectives by establishing an environment favorable to performance by people operating in organized groups."[2] Koontz and O'Donnell further explain that management is a process of planning, organizing, staffing, directing and controlling.

In these and other definitions there exists the understanding that management is the accomplishment of certain objectives through the efforts of the individual and the group activities. Management becomes the process of defining the activities of the individual and the group. Once the specifications are defined as to who is responsible for what, and the process is functioning, it is up to the manager to maintain this activity through the proper positioning of the persons involved. At the same time the manager must insure the level of individual satisfaction and motivation necessary for the accomplishment of the objective.

Perhaps the most dynamic and up-to-date definition of

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[1]Henry L. Sisk, Principles of Management: A Systems Approach to the Management Process (Chicago: Southwestern Publishing Co., 1969), p. 10.

[2]Harold Koontz and Cyril O'Donnell, Principles of Management:An Analysis of Managerial Functions (New York: McGraw-Hill Book Co., 1964), p. 1.

management has been given by Lawrence Appley, formerly of the American Management Association. Appley defined management as ". . . guiding physical and human resources into dynamic organization units which should attain their objectives to the satisfaction of those served, and with a high degree of morale and sense of attainment on the part of those rendering the service."[1] The organization must be a pliable dynamic entity capable of achieving its objectives to the satisfaction of those served. Taking "those served" as meaning any recipient of the results of the objective achieved by the organization, one can readily visualize the place of management in any group activity. Management also can be visualized as the core function of all public and personal activities.

A continuing challenge to the science of management exists in that management not only must meet the needs of the recipient of the objectives achieved by the organization, but management must also maintain the morale and sense of attainment on the part of those rendering the service. Including the morale and well-being on the part of the provider brings about a responsibility to management which requires that the skills attained by the manager be of the highest quality. He should be allowed to practice his managerial skills within an on-going organizational structure which reflects his basic managerial philosophy.

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[1]Lawrence Appley, "The Nature of Management," Training Film produced by the American Management Association, New York, 1967.

The purpose of management

Men have always collaborated for some common objective. Such collaboration implies arrangements for a division of labor. This in turn postulates the existence of a leader. The leader is the individual whose task is both to make the arrangements and to see that the remainder of the group carries out the objectives. The leader has the responsibility to plan, organize, direct, and control.[1]

Where the group is a very simple one, there may be no formal appointment of a leader. Everyone knows what his job is and how it fits in with the jobs of the other members of the group. The individual accepts as natural the part he is expected to contribute to the success of the group effort. The authority rests with the group, and is not vested in any individual. The common goal of the group is its cohesive force.

As the groups have grown and the organization has become more formalized, the need for a formal leader became greater. The major role of the leader is to plan and organize the work effort in such a way that the needs of the individual and the group and the organizational objectives are met at the same time. The leader takes on the role of interpersonal influence, exercized in situations and directed toward the attainment of a

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[1]Joel M. Kibbe, Clifford J. Craft, and Burt Nanus Management Games: A New Technique for Executive Development, (New York: Reinhold Publishing Co., 1961), p. 36.

specific goal or goals.[1] This has evolved to the point that today the organization is concerned with the relationships between individuals and the work they perform.

As the authority of the group has been vested in the leader or manager within the formal organizational structure, the manager has obligations towards his superiors, his workers, and the general overall community. There are some authorities who maintain that the authority of the manager is grounded in the consent of those whom he manages.[2]

Management is not an isolated activity but is a participating and interacting process which requires certain skills and which is governed by the same moral code and value systems which govern the other activities of the group. The pursuit of an objective for its own sake should not be the dominating factor; such thinking can only lead to conflict with other groups. In the business environment the responsibility of the manager is to give service to the group over which he has authority, within the limits imposed by obligations to other groups whom he must also serve. It is the responsibility of the manager to direct and control the activities of the individual worker so that his personal task makes a real contribution to the total group effort. Adequate recognition should be given for services rendered. The manager also has the responsibility to provide for the status

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[1] Robert Tannenbaum, Irving R. Weschler, and Fred Massarik, Leadership and Organization: A Behavioral Science Approach (New York: McGraw-Hill Book Co., 1961), p. 24.

[2] Ibid., pp. 413-14.

and dignity of the individual as a member of the group by directing and controlling the work efforts of the individual in such a way as to provide for some measure of responsibility and initiative.

The manager also must accept the purpose of the worker's acquiring a sense of reciprocal responsibility. The group as a work unit cannot do without the individual, and the individual cannot do without some work group to achieve his goals and objectives. The manager has the responsibility to define the objectives of the group, to recognize the objectives of the individual, to make internal assignments, and to control efforts which will reflect the needs of the individual.

A broader purpose of management is to provide goods or services to the total community of which the group is a part. These goods or services must meet the overall needs and objectives of the community and at the same time provide for a sense of attainment of the work group providing these same goods or services.

Finally, the manager must effectively utilize his own skills to ensure the maximum utilization of the productive potential of the group. He must utilize his skills in adequately allocating the resources available to him which can best maintain the proper balance between the groups within the community.

Management development defined

Management development can be defined as any attempt to improve current or future managerial performance by imparting

knowledge, conditioning attitudes, and increasing skills.[1] According to Yoder, it is widely recognized that managers can and do become obsolete. Many do not adjust to change, and may fail to acquire new skills or upgrade their old ones. Others lose their drive through lack of application of these skills. Further education is the most popular prescription for overcoming the lack of skill.[2]

Management development has at least two co-equal objectives: To help all members of management improve their performance and to prepare at least some for advancement.[3] In general the development activities propose to improve the quality of manager performance by making him a more effective manager. To adequately impart the skills to the manager, the management development specialist must understand the functional responsibilities of the manager and how they are utilized within the framework of the group effort.

Within this broad array of managerial responsibilities and purposes, the individual manager must acquire selected skills in order to perform adequately the role assigned to him. The imparting of these skills is the responsibility of the superior individual or group. As in other educational activities, the

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[1]Robert J. House, Management Development: Design, Evaluation, and Implementation (Bureau of Industrial Relations, University of Michigan), p. 13.

[2]Dale Yoder, Personnel Management and Industrial Relations (Englewood Cliffs, N. J.: Prentice-Hall Inc., 1970, 6th ed.), p. 388.

[3]Ibid., p. 390.

teaching of the managerial skills is often delegated to selected members of the total managerial group. Those persons responsible for the formal teaching of the managerial skills operate within the framework of management development.

Objectives of management development

The management development process must be defined in terms of measurable change in either the state of the manager or in the performance of the manager or both.[1] On the part of the individual manager the determination of desired terminal behavior is a prerequisite for deciding what methods will be employed to achieve the desired behavior. Thus the changes in the state of the manager or in the performance of the manager are defined and specified in a statement of terminal behavior.

The objective of management development may be a desired level of the manager's knowledge, a desired attitude of the manager toward the job practices taught in the development program, or a desired skill level of the manager. The objectives of a management development effort can be defined as a desired terminal state at a given future time in either or all of the following: Knowledge, attitude, skill, or job performance.

Knowledge objectives prescribe responses that the manager is expected to make in reply to questions about the material taught in the management development program.

Objectives concerned with attitudes prescribe the convic-

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[1]Robert F. Mager, Preparing Instructional Objectives (Palo Alto, Calif.: Fearon Publishers, 1962), pp. 25-26.

tion or predisposition that the manager is expected to take relating to the prescribed learning experiences during the development efforts.

Objectives concerned with achievement of skill define the overt responses the manager is expected to exhibit under developmental conditions. These skill objectives may be either intellectual or manual.

Job performance objectives describe the desired response to actual job situations and problems.

Within the definition of these objectives, the management development specialist will determine the most appropriate mix of learning experiences.

Skills the manager is to learn

Planning has been defined as "the analysis of relevant information from the present and the past and an assessment of probable future developments so that a course of action (plan) may be determined that enables the organization to meet its stated objectives."[1]

Planning is a management skill which can be learned in a management development program. According to the definition given by Sisk, planning is the analysis of previous experiences to assist in deciding in advance what is to be done to meet the organizational objectives of the operating unit. Planning is such an integral part of the management function that Koontz and

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[1]Sisk, Principles of Management, p. 82.

O'Donnell have observed that unless a manager has some planning function, it is doubtful that he is truly a manager.[1]

Planning as a function of management may take the form of planning for management development,[2] planning for the use of some recent technological methods,[3] or planning for the use and implementation of some recent research findings through management science concepts, such as operations research.[4] In all of these, certain key elements stand out as major factors which the manager must learn if he is to be an effective manager. These elements of planning may be summarized as follows: (1) clarifying the problem and defining the objective relating to the area under consideration, (2) gathering the factual data, (3) developing possible solutions or alternative courses of action, (4) analyzing the facts and the alternatives, (5) deciding upon a single course of action, and (6) recommending and arranging the plan for execution. Research in problems of motivation and productivity indicate that plans are implemented more enthusiastically and effectively if those who must carry them out have been involved in their development.[5] Thus, to the extent possible, persons who

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[1]Koontz and O'Donnell, Principles of Management, p. 73

[2]Edwin S. Roscoe, Organization for Production: An Introduction to Industrial Management (Homewood, Ill.: Richard D. Irwin, 1955), p. 375.

[3]Ernest Dale, Management: Theory and Practice (New York: McGraw-Hill Book Co., 1965), pp. 370-75.

[4]Harvey M. Wagner, Principles of Operations Research (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1969), p. 45.

[5]Rensis Likert, The Human Organization: Its Management and Values (New York: McGraw-Hill Book Co., 1967), p. 57.

will be expected to implement a plan should be included in the planning process. These persons may make contributions by providing information not otherwise available to those responsible for the final planning decisions.

It obviously is neither necessary nor desirable for all members of an organization to participate in all of the planning that goes on within the organization. In planning, the question of who should participate, how much, and when depends on the plans being made, the degree to which the persons have a contribution to make to the planning, and the skill which the individual may posses in the overall planning requirement. A further consideration may be the development process of the manager. What contribution will participation in the planning make toward the developmental process.

A second and equally important skill to be learned by the manager is that of organization. His ability to plan will fall by the wayside if his managerial skill in organization is lacking. Scott has defined formal organization as a system of coordinated activities of a group of people working cooperatively toward a common goal under authority and leadership.[1] Caplow takes a broader approach by defining organization as a social system that has an unequivocal collective identity, an exact roster of members, a program of activity, and procedures for replacing

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[1]William G. Scott, Organization Theory: A Behavioral Analysis for Management (Homewood, Ill.: Richard D. Irwin, Inc., 1967), p. 103.

members.[1]

From a management development point of view, the organizational skill may be considered as requiring the manager to do the following: (1) group the activities of the participants in a logical manner, (2) assign duties to the members of the group, (3) delegate authority to the group or selected members, and (4) establish relationships among the contributing members of the group and among the sub-groups. The developing manager must also retain his awareness of the objectives of the organizational unit. Both the planning and organization must contribute toward the successful accomplishment of the objectives.

Some authorities discuss the management function of control as consisting of the following: (1) establishing standards, (2) checking, reporting, and appraising performance, and (3) taking action to correct deviations.[1,2] In this regard, the taking of action to correct deviations brings the manager back again to the cycle of planning and organizing. Thus the control element integrates the complete management development cycle.

Each management function requires knowledge, attitude, skill, and job performance. Each level should be stated in terminal behavior, and the management development process must concentrate its efforts on the accomplishment of these terminal

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[1]Theodore Caplow, Principles of Organization (Chicago: Harcourt, Brace, World, Inc., 1964) p. 1.

[2]Koontz and O'Donnell, Principles of Management, p. 538.

[3]Sisk, Principles of Management, p. 564.

objectives.

Development efforts and methods

The clear identification of those managerial functions which are to be developed and the statement of the terminal behavior expected of the manager at the completion of the learning cycle will indicate the appropriate methodology to be employed in bringing about the desired behavioral change. There are various methods for inducing this behavioral change at the proper time and at the appropriate level of managerial knowledge, skill, attitude, and job behavior.

As in most learning situations, the lecture method is a technique useful in the management development program. The lecture serves as a useful vehicle to impart information and develop attitudes. The information or knowledge may be new or background material for the manager. Two shortcomings of the lecture method in a management development program are the lack of learner participation and the possibility of superficial material for surface effect.[1]

A conference or discussion session is a meeting of management personnel to pool their ideas and experiences in order to arrive at some conclusions through discussion. Before a manager can be expected to gain a learning experience from the conference or discussion method, he must have an understanding of the fundamentals which are to be considered. While this

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[1]Yoder, Personnel Management, p. 379.

method can be an effective learning tool, it does require some prior knowledge and some prior skills on the part of the manager.

By presenting him with actual case examples, the case study can be an effective means of giving the manager an insight into the working relationships, considerations, and problems of the everyday management of the organization. The case study is a real situation that has occurred within the organization and will hopefully be one in which a successful solution was reached. Even in those examples where the solution proved something less than successful, the case study may be used as an effective management development method to teach knowledge, skills, and attitudes. Case studies are also effective in the early stages of the coaching process in the management development cycle.[1]

Coaching involves direct personal instruction and guidance, usually with extensive demonstration and continuous critical evaluation and correction from the manager's superior.[2] Coaching as a management development technique is directly coupled with the concept of delegation. As the coaching progresses, the manager learns additional skills, attitudes, and knowledge; and these are generally reflected in improved job performance standards. As the performance standards of the manager improve, his superior delegates more formal authority

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[1]Earl G. Planty and J. Thomas Freeston, Developing Management Ability (New York: The Ronald Press Co., 1954), p. 112.

[2]Ibid.

and responsibility to him; and through this growth the coaching cycle expands.

Role-playing is often used in management development to accomplish attitudinal objectives. The method is based on actual managerial experiences and are reenacted by members of the group who make their own decisions and react to the situations as they perceive their managerial role.

Just as role-playing is designed primarily for the attitudinal objectives in the management development program, the business game is designed to evaluate the application of knowledge and skills in simulated job performance situations. The manager is able to learn by doing without suffering the actual penalty of failure on the job. These simulations may be actual experiences within the organizational structure and may permit the manager a first hand experience in the application of his knowledge and skills.

Yoder defines the behavioral objectives of laboratory or sensitivity training as follows: (1) helping participants improve their understanding of human behavior and their ability to predict reactions, (2) engaging them in an analysis of the process by which they typically evaluate and judge others, (3) demonstrating and analyzing the processes by which people relate to each other, (4) increasing the participants' personal awareness of the impressions they create, (5) heightening their sensitivity to the opinions and feelings of others, and (6) increasing their per-

sonal satisfactions from relationships with others.[1] Sensitivity training can be an effective management development technique in imparting knowledge of self and personal relationships and job-performance objectives.

Film and television instruction is usually used with one or more of the other methods of managerial instruction. The television receiver is most often used with a lecture presentation or as a display vehicle for demonstrations.[2]

On-the-job instruction is a method which allows the manager to learn selected skills and to practice the skill under the watchful eye of a superior until he is accomplished enough in the skill to allow him to use it in the everyday managerial situation.

Job rotation allows the manager to rotate among job assignments which are relevant to his managerial development.

Programmed instruction is an ordered sequence of stimuli to which a learner responds in some specified way. His responses are reinforced by immediate knowledge of results. His movement through the program is in small steps, ensuring that he makes few errors. He practices current responses, and moves by a process of successively closer approximations toward what he is supposed to learn from the program.[3] Programmed instruction has proved valu-

[1] Ibid., p. 381

[2] Thomas F. Costello and George N. Gordon, Teach With Television: A Guide to Instructional TV (New York: Hastings House Publishers, 1961), p. 14.

[3] Sr. M. Stephenette, Programmed Instruction (Unpublished lecture notes, spring semester 1970, Loyola University).

able in programs where the knowledge or skill to be learned should always be presented in the same manner or where the participants in the program are widely scattered.

The uses of some of these methods have been investigated by Carroll, Paine, and Ivancevich. Their study attempted to identify the various methods used by training directors in the business industrial situation and how the training director perceived the effectiveness of these methods. The findings are presented in Table 1.[1]

Each method has an ability to contribute significantly to the attainment of a particular set of behavioral objectives as outlined in the management development program. The objective may be considered as an intent communicated by a statement describing a proposed change in a learner - a statement of what the learner is to be like when he has successfully completed a learning experience.[2]

The method of clearly defining the behavioral objectives allows a broad array of learning techniques to be used. The scope of these learning techniques is limited only by the resources available to the management development program. The selection of the method may influence the outcome of the behavior-

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[1]Stephen J. Carroll, Jr., Frank T. Paine, and John J. Ivancevich, The Relative Effectiveness of Alternative Training Methods for Various Training Objectives (Presented at Annual Meeting, Midwest Division, Academy of Management, Michigan State University, April 11, 1971).

[2]Robert F. Mager, Preparing Instructional Objectives (Belmont, California: Fearon Publishers, 1962), 0. 3.

TABLE 1

RATINGS OF TRAINING DIRECTORS ON EFFECTIVENESS OF ALTERNATIVE TRAINING METHODS FOR VARIOUS TRAINING OBJECTIVES

Training Method	Knowledge Acquisition		Changing Attitudes		Problem Solving Skills		Interpersonal Skills		Participant Acceptance		Knowledge Retention	
	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank	Mean	Mean Rank
Case Study	3.56[b]	2	3.43[d]	4**	3.69[b]	1**	3.02[d]	4	3.80[d]	2*	3.48[e]	2
Conference Method	3.33[d]	3**	3.54[d]	3*	3.26[e]	4	3.21[d]	3	4.16[a]	1	3.32[f]	5
Lecture (with questions)	2.53	9*	2.20	8	2.00	9	1.90	8	2.74	8	2.49	8
Business Games	3.00	6	2.73[f]	5	3.58[b]	2	2.50[e]	5	3.78[d]	3	3.26[f]	6
Movies-Films	3.16[g]	4	2.50[f]	6	2.24[f]	7	2.19[g]	6	3.44[g]	5	2.67[h]	7*
Programmed Instruction	4.03[a]	1	2.22[h]	7	2.56[f]	6	2.11[g]	7**	3.28[g]	7	3.74[a]	1
Role Playing	2.93	7	3.56[d]	2	3.27[e]	3	3.68[b]	2	3.56[e]	4	3.37[f]	4**
Sensitivity Training	2.77	8	3.96[a]	1	2.98[e]	5*	3.95[b]	1*	3.33[g]	6	3.44[f]	3
Television Lecture	3.10[g]	5	1.99	9	2.01	8	1.81	9	2.74	9**	2.47	9

[a]More effective than methods ranked 2 to 9 for this objective at .01 level of significance
[b]More effective than methods ranked 3 to 9 for this objective at .01 level of significance
[c]More effective than methods ranked 4 to 9 for this objective at .01 level of significance
[d]More effective than methods ranked 5 to 9 for this objective at .01 level of significance
[e]More effective than methods ranked 6 to 9 for this objective at .01 level of significance
[f]More effective than methods ranked 7 to 9 for this objective at .01 level of significance
[g]More effective than methods ranked 8 to 9 for this objective at .01 level of significance
[h]More effective than methods ranked 9 for this objective at .01 level of significance
* Least agreement
**Most agreement

SOURCE: Carroll, Paine, and Ivancevich, The Relative Effectiveness of Alternative Training Methods for Various Training Objectives.

al objectives, and as such, the training director or person in charge of the management development program must consider that the most important criteria must be the relative effectiveness of the training methods being considered for attaining a particular behavioral objective.

The study focused on the training directors as the group most qualified to serve as experts in the relative effectiveness of the various methods for particular training objectives. The survey was conducted among the largest 200 companies in the country. The list was chosen from the Fortune 500 list of major companies. Approximately fifty-nine percent or 117 companies responded. Table 1 indicates that programmed instruction is considered by the training directors as the best method for knowledge acquisition and knowledge retention.

A study conducted by Utgaard and Dawis attempted to determine the relative frequency usage of training methods. The report of practices in 112 companies is presented in Table 2.[1] In this study, programmed instruction was ranked ten out of eighteen in training methods used in industrial training. The incidence of usage of programmed instruction is slightly below the "seldom" used level in the survey. The study also points out that certain learner-centered methods such as conference, discussion, job rotation, coaching, special study, and case study are above the "seldom" used level. Learner-centered methods

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[1]Stuart B. Utgaard and Rene V. Dawis, "The Most Frequently Used Training Techniques," Training and Development Journal (February 1970), pp. 40-43.

TABLE 2
RANK ORDER OF FREQUENCY OF USE OF 18 TRAINING TECHNIQUES, BY TYPE OF FIRM.

Training Technique	Type of Firm: Manufacturing[a] Rank Order	Manufacturing[a] Mean Value[c]	Non-manufacturing[b] Rank Order	Non-manufacturing[b] Mean Value[c]
1. Job instruction training	1	3.9	1	4.0
2. Conference or discussion	2	3.5	2	3.4
3. Apprentice training	3	3.1	6.5	2.5
4. Job rotation	4	2.8	3	2.8
5. Coaching	5	2.6	6.5	2.5
6. Lecture	6	2.4	5	2.6
7. Special study	7	2.3	4	2.7
8. Case study	8	2.1	10	2.2
9. Films	9	2.0	8.5	2.4
10. Programmed Instruction	10	1.9	8.5	2.4
11. Internships and assistantships	11	1.8	11	2.0
12. Simulation	12	1.7	12	1.9
13. Programmed group exercises	13.5	1.6	16.5	1.3
14. Role playing	13.5	1.6	13	1.6
15. Laboratory training	15	1.5	16.5	1.3
16. Television	16	1.4	14.5	1.4
17. Vestibule training	17	1.2	14.5	1.4
18. Junior board	18	1.1	18	1.1

[a]Consists of 63 firms.
[b]Consists of 14 transportation, 13 finance, 10 retail, and 12 "other" firms.
[c]Computed from the following values: 5 = Always; 4 = Usually; 3 = Average; 2 = Seldom; 1 = Never.

above the "seldom" level outnumber the incidence of leader centered methods such as job instruction training, apprenticeship training, lectures, and films. Each method has some probability of influencing the behavioral outcome of the learner, and the manner of manipulation of the method may influence the behavioral outcome of more than one of the learning objectives.

That the methodology is not mutually exclusive in determining the terminal behavior of the learner is indicated in the study by Carroll, Paine, and Ivancevich.[1] In their study, summarized in Table 1, each method has some influence on the learner outcome. The key lay in selecting the method which would give the maximum return in terms of learner behavioral change as indicated by the level of objectives.

Other factors that must also be taken into account in the management development effort are the ability of the manager in the learning situation, the amount of development effort put forth by the manager, and the elements of the organizational environment of the manager which may influence his ability to learn and the application of his knowledge.

The selection of the learning method must be based in part on the environment in the manager's organization. No two organizations require identical management practices, and hence no two organizations can effectively employ identical management

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[1]Carroll, Paine and Ivancevich, "The Relative Effectiveness of Alternative Training Methods for Various Training Objectives."

development methods. Management development methods which are practices without due regard to the environmental factors may not result in improved management behavior at all.[1] Development efforts without environmental considerations may actually cause problems by inducing frustration on the part of the manager. In those situations where the manager's expectations are that the knowledge learned will be useful and rewarding to him, the environment must allow him to be rewarded. Whenever the environment does not allow him to apply the knowledge or does not reward his learning, a situation for frustration exists. The situation where a manager is responsible for generating profit within the organization would provide an environment in which the knowledge could be applied at the discretion of the manager and where the rewards for the knowledge and its application would be almost immediate. From this, it appears that programmed learning might be an effective learning method to concentrate on the acquisition of knowledge in a management development program.

The programmed instruction method

The effect of programmed instruction depends to a large degree on the active response of the learner. The difference in types of programmed instruction occurs in the format of the program, in the way the learner is expected to respond, and in the manner in which he is informed of the adequacy of his response.

A pioneer in the field of programmed instruction,

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[1]Lyndall Urwick, Management Education in American Business (New York: American Management Association, 1954), p. 90

Dr. S. L. Pressey, experimented with a method to provide automated teaching and testing. He hoped to release the teacher from routine tasks. In the Pressey method, the learner receives information, and then his comprehension is tested through the use of multiple-choice questions.[1]

Dr. B. F. Skinner emphasized the analysis and control of the behavior of the learner. Skinner's method depends upon reinforcement as an element of operant conditioning within the framework of the conditioning learning behavior theory.[2] Skinner's method was based on the preference that the learner would proceed through the program with no errors. Therefore, the learning material is presented in small steps or frames with each step (frame) containing cues or prompts which are removed as the learner gains expertise with the material. The response to each frame is constructed by the learner, and it is this response which determines the degree of activity on the part of the manager learner. The learner compares his constructed response with the correct answer provided in the program. This matching allows him to discover immediately whether or not he is correct in his response. If he is correct, the correct response is reinforced; if he is incorrect, he is shown the correct response immediately so that the incorrect response is not reinforced. Skinner's method is usually referred to as the linear method of programmed

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[1]A. A. Lumsdaine and Robert Glaser, Teaching Machines and Programmed Learning: A Source Book (Washington, D.C.: National Education Association of the United States, 1962), p. 35.

[2]Ibid., p. 100

instruction.[1]

Both Pressey and Skinner required that the learner respond correctly to each step of the program before proceeding. This is not the case of the branching method of programmed instruction as devised by Norman Crowder. The branching method, rather than seeking errorless performance, allows the learner to make a choice of responses, and based on his choice, determines what learning material he will be exposed to next. The choices are a series of multiple-choice questions relating to a section of learning information which the learner has just been exposed to or that is based on an accumulation of learning experiences. If the learner answers the test question correctly, he is automatically given the next unit of information. This step is followed by the multiple-choice question. If the learner fails to respond to the question correctly, the nature of the error is explained, and he may be returned to that learning unit, or he may be given an explanation of why he was incorrect and sent to the next unit. At any point in which he answers incorrectly he may be branched back beyond the original learning unit for remedial exercises. He may also be branched into additional learning experiences which may cover the same material in greater depth. Additional frames may provide the slower learner with supplemental units of learning. The supplemental units allow the slow learner to arrive at the point of terminal behavior

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[1]James Gillespie, John R. Olsen and David W. Wark, Proceedings of the Programmed Instruction Institute (San Antonio, Texas: National Society for Programmed Instruction, 1962), p. 17.

with the same approximate behavior as the faster learner. The multiple-choice items permit recognition of a correct response and also develop the paths of learning in the event the correct response was not given.[1]

The third generally accepted method of programmed instruction is the mathetics approach proposed by Thomas Gilbert. This method is a system for determining the optimum arrangement of instruction given certain terminal behavior criteria. A detailed statement of the learning objective is written in a stimulus response term arrangement referred to as a prescription of behavior. A reversed or backward chaining approach may be used in which the learner completes the last element of the terminal behavior first, and then adds the step or element just before the terminal element and continues to work his way back, mastering each step as he progresses.[2]

Each of these methods involves the utilization of three basic techniques (1) application of the laws of learning, (2) writing effective teaching points which are the smallest increments of knowledge the learner is to learn, and (3) the sequencing of the teaching point.[3]

The application of the laws of learning include the following: (1) immediate knowledge of results; (2) reinforcement

[1]Lumsdaine and Glaser, pp. 286-98.

[2]Thomas F. Gilbert, The Journal of Mathetics, I, No. 1 (January 1962), pp. 53-71.

[3]Federal Electric Corporation, Programmed Instruction Techniques:Linear and Intrinsic (Training course conducted at Randolph AFB, Texas: September 1962).

serves to strengthen the learning through application of appropriate rewards to the learner; (3) the learner moves at his own rate depending upon his ability to progress through the learning sequences; (4) the learning item or sequence is not abandoned until it has been answered correctly; and (5) there is a tendency for the most frequent response to be the one most likely to be recalled.

The basic step size is determined by the amount of information or knowledge the learner can absorb at a single increment of the learning material. Skinner emphasized the small-step technique. Crowder advocated larger steps. More recently, the Center for Programmed Learning for Business, of the University of Michigan, has championed steps which are extremely large so long as they can be correctly responded to by the intended program population.[1] The step size geared to the needs of the individual learner would seem to be the optimum requirement. This is possible with certain applications of programmed instruction with the computer.

The sequence of the learning points can greatly affect the rate and degree of the change in the behavior of the learner. According to Skinner, the acquisition of complex behavior requires that the learner pass through a carefully designed and often lengthy sequence of steps. Each step must be so small that it can always be taken, yet in taking it, the learner moves some-

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[1]Dale M. Brethower, et al., Programmed Learning: A Practicum (Ann Arbor, Michigan: Ann Arbor Publishers, 1965), pp. 979-77.

what closer to fully competent behavior.[1] The rationale that each step must be small enough to ensure success, but at the same time large enough to move the learner toward the terminal behavior, is commonly accepted for each method of programming. The branching format generally tends to employ a larger step size than the linear format.

Using programmed instruction

Industry generally has accepted the use of programmed instruction as a learning methodology. For companies of all sizes, programmed instruction offers advantages. Because the learner is able to proceed at his own pace, there is no direct requirement for a homogeneous group. Programmed instruction has been used by scientists and doctors as well as semi-illiterate high school dropouts. Programmed instruction to the business manager is practical, immediate and operational in terms of the behavioral results and investment returns.

Some advantages of programmed instruction to the business industrial community are the following: (1) the program consists of skills, capacities, and knowledge which top management wants employees to have so that specific organizational goals can be better achieved; (2) it consists of measurable changes in behavior; (3) it is not abstract; (4) it can reduce overall training time; (5) it can provide for decentralized training; (6) programmed instruction provides an effective rationale for a profit

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[1]B. F. Skinner,"Teaching Machines," Science (October 1958), pp. 969-77.

and loss analysis of the training program; and (7) programmed instruction can be used as a client or customer service to increase public relations and as promotional sales techniques.[1]

An evolution and development of programmed instruction can develop as a result of continuing research into the application, analysis of results, and continuing education of the user into its capabilities and uses.

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[1]John R. Murphy and Irving A. Goldberg, "Strategies for Using Programmed Instruction," Harvard Business Review (May-June 1964), pp. 115-132.

CHAPTER III

SURVEY OF RELATED LITERATURE

Programmed instruction in education

Educators who are acquainted with programmed instruction seldom question its philosophy and principles.[1] Programmed instruction was originally adapted for use within the educational environment, and only later, within the business community for the education of the workforce.[2] Professional educational journals and other educational publications have recognized the promise of programmed instruction.

Programmed instructional materials have been pre-tested to quality-control performance on model-type learners, and the educational literature must give emphasis to the behavioral analysis, standards and quality control of the program.[3] Quality standards are common among the business and industrial activities, but have been slow in taking hold in the education of the business manager.

That programmed instruction will work in the educational

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[1]Phil C. Lange, (ed) Programmed Instruction (Chicago: University of Chicago Press, 1967), p. 285.

[2]Ofiesh, Programmed Instruction. pp. 60-62.

[3]Lange, p. 295.

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environment was reported early by Lumsdaine and Glaser.[1] The development of programmed instruction has been very much in tune with the dynamics of educational change.[2] Just as there are many ways of teaching within the educational environment, there are just as many ways of teaching within the industrial community.

Use of programmed instruction in industry

One of the noted studies in programmed instruction states,

> Much of the research in programmed instruction has been done in centralized training situations utilizing "captive" trainees. Educational institutions, military training centers and in the case of industrial studies, company schools have constituted the typical training environments in which programmed instruction has been studied.[3]

Because numerous training activities take place at decentralized locations rather than in centralized controlled environments typical of many training centers, an effort should be made to develop a programmed training package which shows its application to a training environment where training supervision is minimal.

Typical examples of experiments conducted to evaluate the effectiveness of training programs within a fairly struc-

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[1]Lumsdaine and Glaser, pp. 578-690.

[2]Lange, p. 319.

[3]Paul Welsh, John A. Antointetti, and Paul W. Thayer, "An Industry Wide Study of Programmed Instruction," Journal of Applied Psychology, Vol. 49, No. 1 (1965), pp. 61-73.

tured learning environment are those by Hughes and McNamara.[1] Whitlock[2] and Goldberg.[3] Research on the use of programmed instruction in a decentralized environment has been reported by Meacham[4] and Moye.[5]

Perhaps the concern with a structured or unstructured environment is of relatively limited importance. Programmed instruction training systems are designed for use with minimal assistance from a formal instructor, and ideally the assistance of the instructor is not needed at all.[6] The efficient programmed instruction package is designed so the active involvement of the learner is required, and the step size is such that he progresses within the guided exercises toward the

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[1]J. L. Hughes and W. J. McNamara, "A Comparative Study of Programmed and Conventional Instruction in Industry," Journal of Applied Psychology, Vol. 45, No. 4 (1961), pp. 225-31.

[2]Gerald H. Whitlock, "Programmed Learning: Some Non-Confirming Results," Training and Development Journal (June 1967), pp. 11-13.

[3]Myles H. Goldberg, Robert I. Dawson, and Richard S. Barrett, "Comparison of Programmed and Conventional Instruction Methods," Journal of Applied Psychology, Vol. 48, No. 2 (1964), pp. 110-14.

[4]Jac D. Meacham, "Aerospace Industrial Programming (Past, Present and Future)," Trends in Programmed Instruction (Washington, D.C.: National Education Association and The National Society for Programmed Instruction, 1964), pp. 105-06.

[5]Jean S. Moye, "Training Programmers for USAA," Trends in Programmed Instruction (Washington, D.C: National Education Association and The National Society for Programmed Instruction, 1964), pp. 114-16.

[6]Gabriel D. Ofiesh, Programmed Instruction: A Guide For Management (New York: American Management Association, 1965), p. 54.

accomplishment of the terminal objective.

The typical training situation within industry places the burden of responsibility for the learning process on the instructor. Programmed instruction places the burden of responsibility for developing an effective learning package with the instructor. Once the program is completely developed, the responsibility for learning rests with the learner. The active involvement of the learner with the program should in part provide the motivation to learn. Because of the cost involved in the industrial training situation, the manager must be assured that the knowledge and/or skills which the learner is to learn is in fact learned and that the learner accepts his responsibility. Adequate validation of the programmed instruction package can assure the learning. In some situations the cost of the development of the program can be realized with the instruction of as few as thirty personnel.[1]

Even in those circumstances where the amortization of the cost of the program is so favorable, there are other situations where the costs of the program may be outweighed by other factors. As an example, one could consider the program which deals with relatively static subject matter and which will be used for an extended period of time. The savings gained by employees performing the task faster and with fewer errors when they are first on the job can ultimately make up the original cost. A second situation could be considered which involves a business organization

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[1]"Cutting the Training Tab," Chemical Week, March 1962, pp. 111-13.

where the demand for error-free performance is a prime consideration. The necessity for error-free performance generally applies to companies whose business is related to public safety. The cost of the error could be high, and any program which will eliminate or reduce the possibility of errors may be considered as a cost savings device.[1]

Learning can be assured through the advantages of the technology offered by programmed instruction. The effectiveness of each element of the program is tested before it is accepted in its final form. The more traditional methods of instruction permit the instructor to rely on a lesson plan and his sensitivity to the group to carry through his instruction. This method may provide for learning through a trial and error basis. By contrast the programmed instruction package is tested before it is used in a learning situation. Each step is validated on a typical learner population before it is included as a part of the total program. At each step any ineffective or irrelevant content is revised or removed to ensure that the learning steps are the proper size and that learning is taking place at each step.[2]

Through this development process programmed instruction has been found to be relatively more efficient and effective than other methods of instruction in studies conducted by Marguilies

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[1]"Transfer of Training," Programmed Learning Bulletin, Center for Programmed Learning for Business, Vol. II, No. 1, Winter 1965, pp. 1-2.

[2]James E. Espick, Bill Williams, Developing Programmed Instructional Materials: A Handbook for Program Writers (Palo Alto, Calif.: Fearon Publishers, 1967), pp. 112-18.

and Eigen,[1] Finley,[2] Sica,[3] Geer,[4] and Deterline.[5] That programmed instruction is being used in industry has been reported by Cather,[6] Hawley,[7] and Utgaard and Dawis.[8] In a series of studies conducted at IBM and reported by Marguilies and Eigen, in which a programmed textbook was compared to a course involving both lecture and discussion, it was determined that the programmed instruction method increased learning by ten percent and reduced the time to complete the material by twenty-seven percent.[9] Finley reported the results of his research at the Shering Corporation where programmed instruction proved superior

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[1]Stuart Marguilies and Lewis D. Eigen, Applied Programmed Instruction (New York: John Wiley and Sons, 1962), p. 84.

[2]Robert E. Finley, "Experiments in Programmed Learning," Revolution in Training: Programmed Instruction (New York: American Management Association, 1962), pp. 102-05.

[3]Donald J. Sica, "Personnel Pointers: Programmed Learning," Personnel Administration, April 1964, pp. 45-46.

[4]L. N. Geer, "A Study of Comparative Methods of Teaching Basic Electricity," Training Directors Journal, 1962, pp. 17-24.

[5]William A. Deterline, An Introduction to Programmed Instruction (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1962), p. 83.

[6]Harry E. Cather, "Programmed Instruction in the Aerospace Industry," Training and Development Journal, October 1967, pp. 29-32.

[7]William E. Hawley, "Programmed Instruction," Training and Development Handbook (New York: McGraw-Hill Book Company, 1967), pp. 225-50.

[8]Utgaard and Dawis, "The Most Frequently Used Training Techniques," pp. 40-43.

[9]Marguilies and Eigen, p. 84.

to the lecture method.[1] Sica indicated that life insurance fundamentals were better learned by programmed text materials than by lecture of the same material.[2] According to Geer a study of technical training at Southern Bell Telephone Company indicated that the employee taught by the programmed instruction method was able to score significantly higher on the post-test than the employees receiving the normal lecture material in the course of instruction.[3] Deterline reported that learners undergoing a military training program were able to score higher on the post-test than learners receiving the traditional lecture presentation.[4]

In the use of programmed instruction in industry, Cather reports that of forty-two major firms in the aerospace industry, approximately 66.7 percent now utilize and plan to expand their programmed instruction capability.[5] Hawley uses the experience of Kodak as representative of the larger corporations which are making extensive use of programmed instruction as a major training method.[6] The study by Utgaard and Dawis concentrated on the use of programmed instruction within the manufacturing industries located within the Minneapolis-St. Paul metropolitan industrial

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[1]Finley, pp. 102-05.

[2]Sica, pp. 45-46.

[3]Geer, pp. 17-24.

[4]Deterline, p. 83.

[5]Cather, pp. 29-32.

[6]Hawley, pp. 225-50.

complex. The survey mix included large, medium, and small companies.[1] Their study indicated that programmed instruction as a training method ranked about the median in relation to other training methods. A survey conducted by the Center for Programmed Learning at the University of Michigan indicated that of the persons participating in the workshop at the center to train personnel in the development of programmed instruction materials, approximately sixty percent completed the projects. Of that number approximately eighty-three percent of the programs which were developed had been implemented within the company training program. Some of the measurable results reported by the center were increased productivity and reduced turnover.[2]

In considering the satisfaction of management with programmed learning, the survey results of the Center indicate the following: In eighty-one percent of those cases where management was satisfied, performance did in fact improve, but a number of other changes also occurred at a high rate. Eighty percent of the satisfaction cases showed effects other than improved performance. Thus management satisfaction seems to be partly controlled by the number of different changes that are recorded. The implication would logically seem to be that in some situations management may be looking for improved performance, while in other situations the goal may be reduced training time or cost

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[1]Utgaard and Dawis, pp. 40-43.

[2]"Center Report: Alumni Survey," Design and Development, Vol. 2, No. 1, p. 1.

or some other outcome."[1]

Satisfaction on the part of the learner is another element that should be considered in the industrial use of programmed instruction materials. The satisfaction of the learner with the method of learning may contribute to the over-all effectiveness of the learning outcome. In a study conducted by Hughes and McNamara, it was found that from a group of seventy learners eighty-seven percent liked the programmed instruction better than the conventional method of instructing, and eighty percent stated they would prefer using programmed instruction in future courses. Only six percent liked programmed instruction less than the conventional instruction, and thirteen percent would have some objection to using programmed instruction in future courses.[2]

In a study conducted within the insurance industry, Goldberg, Dawson, and Barrett report that the advantages of programmed learning were most evident at the completion of the course in helping the slower learners to obtain a direct familiarity with the course material.[3] Beginning level clerical employees who had graduated from high school recently and were generally under twenty years old were used in this study. The study left some question as to whether programmed instruction would benefit the faster learner in the development of problem-

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[1] Ibid., p. 3.

[2] Hughes and McNamara, pp. 225-231.

[3] Ofiesh, Programmed Instruction, pp. 165-401.

solving skills.

While most of these previously mentioned studies relate to the industrial situation, experiments have also been performed with lower level employees at the managerial level, clerical, administrative employees, and technical personnel. Perhaps the most comprehensive listing of programmed instruction case studies is that compiled by Ofiesh.[1] In his listing he includes the American Bankers Association, who conducted a study which included bookkeepers, business machine operators, clerks, management trainees, secretaries, tellers, messengers and pages. Burroughs Corporation used their program for sales and field service representatives. The First National City Bank of New York developed programmed instruction materials to teach skills such as the use of the flexowriter operation. General Electric (Re-entry Systems Department) offered a series of programmed courses intended to assist in the employee education development program.

American Telephone and Telegraph used programmed instruction to train sales personnel. The National Institute of Health used programmed instruction in training its employees, including M.D.'s and Ph.D's. Most of the courses are aimed at the technical or lower professional employee. The Liberty Mutual Insurance Company concentrated on the training of its sales force. The Life Insurance Agency Management Association concentrated its

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[1] Ibid., pp. 165-401.

programming effort on life insurance trainees. Technical training was the main thrust at The Martin Company (Denver Division) and the Michigan Bell Telephone Company.

These are typical of the case histories reported. Only a few organizations such as General Electric, American Telephone and Telegraph, and the National Institute of Health used programmed instruction in management or management-related training. General Electric Re-entry System used programmed instruction not only for its lower echelon personnel, but also for their 2,900 professional employees. The response to programmed instruction was favorable and assisted the company in its efforts to encourage employee self-development.[1] The American Telephone and Telegraph Company found that programmed instruction was able to teach sales personnel product knowledge and problem solving techniques. The end-of-test score results were 78% correct.[2] The National Institute of Health found that results of the programs were generally favorable.[3] In none of these management programs is data provided which compares programmed instruction with other management development techniques.

Some program considerations

In dealing with most groups in the business/industrial training environment, age differences may present a factor to be

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[1] Ibid. pp. 185-87.

[2] Ibid. pp. 235-41.

[3] Ibid. pp. 312-15.

considered. A study by Fisk[1] sought to determine the relationship between sample characteristics (sex, education level, age, etc.) and performance in programmed instruction. In measuring pre-test and post-test scores, the older the group the lower the average learning performance. In the measure of attitude toward programmed instruction, the oldest group had the most favorable attitude. The twenty to thirty-nine year old group learned the most and liked the programmed instruction method the least.[2] A study by Neale reported the use of trainee bus conductors to learn to read fare charts. Measuring the post-test results after comparing a one-hour programmed instruction package with the lecture method for the younger group (under thirty), programmed instruction proved superior to the classroom instruction. For the older adults, classroom instruction was better, but not significantly so.[3]

Melaragno points out that branching programmed instruction is one way to account for individual differences. Branching permits the learner to branch out at frequent times during training to the instruction supposed to be most appropriate to his individual needs. The branching program can accommodate the individuality in amount of instruction and kind of instruction as

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[1]Alfred I. Fisk, "Some Treatment and Population Variables in Programmed Instruction," Journal of Educational Psychology, Vol. 55, No. 3 (1964), pp. 152-58.

[2]Ibid.

[3]J. G. Neale, "Adult Training: The Use of Programmed Instruction," Journal of Occupational Psychology, Vol. 42, No. 1 (1968), pp. 23-31.

well as rate of progress of the learner.[1]

There are two basic strategies in the branching methodology. The first is to direct the learner to an alternate route of remedial material. The second is to provide the learner with a review or second exposure to material he does not yet understand. With these two approaches the branching allows the programmed instruction developer to adjust the instruction to each individual learner's instructional needs and to adjust the instruction with respect to the learner's past experiences. According to Gilman, a branching program has the following characteristics: (1) information is provided to the learner, (2) the learner answers a question designed to ascertain the degree to which the learner understands the concept, (3) if the learner does not understand a concept, he is provided with remedial information, (4) if a learner does not master a particular area of instruction, he may be returned to review that material, and (5) a criterion test to decide what kind of information to present to the student.[2]

That the same sequencing of learning experiences for all is not important was borne out in a report by Neidermeyer.[3] The model most commonly employed to describe the hierarchy of learn-

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[1]Ralph J. Malaragno, "Two Methods of Adapting Self-Instructional Materials to Individual Differences," Journal of Educational Psychology, Vol. 58, No. 6 (1967), pp. 327-31.

[2]David A. Gilman, "Remedial and Review Branching in Computer Assisted Instruction," National Society for Programmed Instruction Journal, Vol. III, No. 1, pp. 4-8.

[3]Fred C. Niedermeyer, "The Relevance of Frame Sequence in Programmed Instruction: An Addition to the Dialogue," AV Communication Review, Vol. 16, No. 3 (1968), pp. 301-317.

ing is Gagne's concept of a knowledge structure where the principles to be learned depend upon previously acquired principles and concepts. In turn these principles and concepts depend upon previously learned stimulus-response associations. The sequence of the branching program depends generally upon the performance of the diagnostic or criterion item. While the sequence of the branching program is important, it may be acceptable to allow a learner to by-pass selected sections of the learning material. As Mager has said, "Where it is necessary to teach one thing before another, do so. But be careful. There isn't nearly as much reason for this kind of sequencing as instructors like to believe."[1]

According to Hamilton, the factors which are of concern to the programmer are (1) a logically ordered sequence in the learning material. (2) a determination of whether the learner will be required to make a specific response, (3) a consideration of whether the learner's response shall be overt and (4) for provision of confirmation of immediate knowledge of results.[2] She points out that the sequencing of the learning materials is separate and apart from the sequencing of the frames. As long as the over-all sequencing of the learning materials remains the

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[1]Robert F. Mager and Kenneth M. Beach, Jr. Developing Vocational Instruction (Palo Alto, Calif.: Fearon Publishers, 1967) p. 60.

[2]Nancy Russell Hamilton, "Effects of Logical Versus Random Sequencing of Items in an Autoinstructional Program Under Two Conditions of Covert Responses," Journal of Educational Psychology, Vol. 55, No. 5 (1964), pp. 258-66.

same, the sequencing of the frames, as in a branching program, is not of major consequence. She defines an overt response as one which can be measured. Her findings from the study were that the readings of the programmed material with the "responses" filled in as part of the context was superior to having a blank to be filled in or the selection to be made in a multiple-choice situation.

In comparing the advisability of a constructed response item (filling in the blank) to the multiple-choice item as an element of overt response mode in the program, Williams determined that the constructed response mode was superior to the multiple-choice mode.[1] However, in both types of responses, the programmer should guard against the practice of "overprompting" during the course of the program. In a study into the acceptability of overprompting, Anderson, Faust, and Roderick found that the overprompt does not improve achievement.[2]

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[1]Joanna P. Williams, "Combining Response Modes in Programmed Instruction," Journal of Educational Psychology, Vol. 57, No. 4 (1966), pp. 215-19.

[2]Richard C. Anderson, Gerald W. Faust, Marianne C. Roderick, "Overprompting in Programmed Instruction," Journal of Educational Psychology, Vol. 59, No. 2 (1968), pp. 88-93.

CHAPTER IV

THE EXPERIMENTAL DESIGN

The design

Management development continues to be a problem for the organizational effectiveness of the business and industrial community, and an equal problem for the schools and departments of business at the higher education level, as well as the business and vocational education programs of the secondary levels. In a study of four hundred management development programs, House reached the conclusion that almost all of the programs failed to achieve their objective.[1] Hannon conducted a study of one hundred forty-six companies who were asked to evaluate their own development programs. The response was that the programs were inadequate in achieving the objectives.[2] Most existing management development programs use conventional approaches to the teaching-learning situations.[3]

In reporting the use of programmed instruction Ofiesh in-

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[1]Robert J. House, "A Commitment Approach to Management Development," California Management Review, Spring 1965, p. 15.

[2]J. W. Hannon, "How Companies Look at Training," Training and Development Journal, Jan. 1968, pp. 32-34.

[3]J. P. Campbell, M. D. Dunnette, E. E. Lawler, and K. E. Weick, Managerial Behavior, Performance, and Effectiveness (New York: McGraw-Hill Book Company, 1970), pp. 287-326.

dicates that there has been some attempt to evaluate the effectiveness of programmed instruction as a management development technique. For the most part, these studies have concentrated on general characteristics of management, rather than on the functional classes of management.[1]

Campbell has found that most management development programs use conventional approaches to the teaching-learning situation.[2] A study is needed which will compare the programmed instruction method with the conventional methods of instruction related to specific functions of management.

This study evaluates the effectiveness of programmed instruction to teach the general management function of control within a management development program. Management control can be considered as the control of the financial, human, and material resources available to the organization.[3] This study concentrates on the scheduling of human resources as a sub classification of the control function. Specifically, the study evaluates the effectiveness of programmed instruction to teach scheduling, as a managerial control function, compared with the conventional lecture method to teach scheduling.

> The hypothesis of this study is that programmed instruction is as effective as the lecture method to teach the management control function, scheduling.

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[1]Ofiesh, Programmed Instruction. pp. 58-66.

[2]Campbell, et al, Managerial Behavior, Performance, and Effectiveness.p. 325.

[3]Dale, Management: Theory and Practice. pp. 511-12 .

The design of the study is to identify a group of persons who would normally receive the instruction relating to scheduling. These individuals were divided into two matched groups based on the variables, age, length of service, education, reading speed, reading comprehension, quantitative language, combined quantitative and language, and pre-test. One group received programmed learning, and the other group received lecture instruction. The same instrument was used to test both groups, immediately after completion of instruction. The after-instruction results of the groups were compared using a chi square analysis.

Selecting the program

The decision to select scheduling as the topic to be programmed was based in part on the general course objectives. These objectives were considered as helpful in selecting learning experiences for the scheduling program.[1] Beyond the general requirements of the objective, the topic allowed for objectives to be further stated in terms of measurable goals, rather than in the form of topics or generalizations or other content elements which would only indicate the area of content to be dealt with.[2] Stating objectives in terms of measurable goals is the effective means of selecting appropriate evaluation instruments

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[1]Tyler, Ralph W. Basic Principles of Curriculum and Instruction, (Chicago: The University of Chicago Press, 1969) p. 44.

[2]Ibid. p. 45.

measuring the attainment of these goals.[1]

For the purposes of this study, the decision to program the learning material usually presented in a classroom-lecture situation was conditioned on three additional criteria: (1) the body of knowledge or information could be organized into a series of sequential concepts for self-instructional purposes, (2) the subject content lent itself to a continuous and immediate evaluation of the learner's progress, and (3) the material to be learned could be presented in a format that could control the student's progress.

In addition to being applicable for programming, the classroom-lecture material was further suited for a branched format of programmed instruction. The material met the requirements for branched programming by meeting the following additional criteria of: (1) ability to be presented in organized sequential steps with each step followed by appropriate discriminating test items of the multiple-choice variety, (2) limiting the number of responses the student could select, (3) providing for continuous evaluation of the learner's progress, and (4) providing control by increasing the student's ability to find the correct response.

A further rationale of branched programming is that learning takes place during the learner's exposure to each portion of the new material. The multiple-choice question is asked to determine the adequacy of the learner's achievement. Allowing

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[1] J. P. Campbell, et al, Managerial Behavior, Performance, and Effectiveness, pp. 304-05.

the student to choose the next material he will see by his act of selecting an answer to a multiple-choice question makes it possible to detect and correct any errors that occur. The lecture material under consideration met all the requirements for a branched program.

The persons assigned as resource personnel held the positions of Director of Operations, Operations Manager, National Training Director, Manager, National Training Center, and Instructor. Each man had been promoted from within the ranks of the company to his present position. For the resource group, the minimum time as an employee of the company was seven years. Each resource person had spent at least two years in a position which required application of the knowledge and skill to be taught by the programmed-learning package for this study. The Manager, National Training Center, had direct supervisory responsibility for the teaching of the managerial control function. The three instructors assigned as resource persons were responsible for teaching the skill in the classroom, and providing appropriate application experiences. The instructors had been teaching at the training center for a minimum of seven months. Each instructor had attended a forty-hour Train-the-Trainer program conducted by an outside agency. The Train-the-Trainer program concentrated on classroom techniques of teaching at the cognitive level.

The resource persons were to provide data in the compilation of the task analysis, subsequently to provide additional data as requested, and to act as a review committee for technical

accuracy and applicability of the material which was programmed.

At the beginning of the study, a single instructor was assigned the teaching responsibility of the topic to be programmed. He remained in this assignment throughout the study, and acted as the classroom instructor during the final experimental phase.

Initial programming data gathered

The basic data was collected from the company operations manual, from the lecture notes and presentation of the training center staff personnel, and from conferences and interviews with personnel of the training and operations department.

As the data was collected, it was compiled, sorted, analyzed, and fed back to the resource person for verification of technical accuracy and proper sequence of the operations. The factual data gathered during this phase of the development was fed back to the applicable person who had presented or brought forth the original data and to one of the resource persons in the event the data originated outside the resource committee. Since each of the resource persons was considered to be a subject-matter expert within the area under consideration, additional verification with other personnel within the organization was not considered necessary.

Task analysis

The task analysis represented the basic document upon which the total programmed instruction effort was developed. The

task analysis served as the source document for the programmer. The programmer should know what the learner is to do, how he is to do it, why he does it, and the skills the learner must possess in order to perform satisfactorily in a job situation. If the programmer is not knowledgable of these points, one should not expect the programming effort to be successful. In the development of the task analysis, the programmer relied exclusively on the basic data gathered in the initial data-gathering phase. This data included both the written factual information and information and factual data provided from the knowledge of the subject by the resource personnel.

In determining what the manager was to do, the programmer first established a complete scope of the job, all of the physical and mental activities, and the individual steps which constituted the specific job activities. Be it physical or mental, most jobs consist of more than one task, and even one task often involves different physical and mental activities. It is the responsibility of the programmer to discover, analyze, and report the specific task to the resource person. He should describe the task in the most direct terms so as to develop a clear, concise, coherent, and complete description of the job.

How the manager is to perform the activity concerns the methods used by the manager in accomplishing his task. The how and where may be a two-part consideration to be made by the programmer. Physically, the performance of the task may involve the use of instruments, devices, or equipment. Then he follows the

routine or procedure within the movement of the activity itself. Additionally, the methods may lie chiefly in know-how and the relationships that must be applied to the task. This may involve the use of calculations, formulas, the application of judgments or decisions, or the selection and transmittal of thought. The manager may use a single method in the accomplishment of a task, or he may have at his command several alternate methods to accomplish the task, any of which may be used with equal success.

Of the four parts of the task analysis, perhaps the most important is why a task is performed. Why the manager performs the job is actually the purpose of the job itself and is indicative of the relationships among the variant tasks that comprise the total managerial activity. The WHY outlines the scope of the task and justifies the WHAT and HOW of the performance of the task by the manager. The overall purpose is a minimum of the sum total of the purposes of all the combined tasks. These comprise the total managerial responsibilities of the manager within the training situation. It is within the development of the WHY as it relates to the task analysis that the programmer must use the utmost care in determining from the resource person the reason each task is performed. The programmer must do this for two reasons: (1) to clarify the overall purpose of the job, and (2) to show the task relationships as the job progresses to the completion of the managerial task cycle.

The final stage in developing the task analysis is a de-

finition of the skills involved. Defining the skills consists of listing and explaining the basic factors which must be considered in the accomplishment of the task. These elements bring out the manual skills, knowledge, abilities, relationships, and other characteristics required of the manager by his job performance. The skill portion of the task analysis may also be considered as a guide list to aid the programmer in obtaining and recording all the information necessary to discriminate between levels of managerial jobs, establishing the degree of difficulty of any job or task, identifying threshold learning behavior and assisting in establishing the behavioral changes the programmer seeks to bring about in the management trainee.

Once the task analysis is developed by the programmer, it provides a basic document which details the integral parts of the managerial activity. The task analysis represents a series of concise statements of what is to be learned, how the learning is to take place, the definition of why the activity is important to the learning sequence, and a statement of the skills required to enter the learning set or that would be developed during the learning. The task analysis was reviewed and approved by the resource committee. The task analysis is included as Appendix I.

Objectives

The task analysis is the source document for the specification of the behavioral objectives. The specification of objectives of a program must be made in terms of behavioral end pro-

ducts: What the learner must be able to do, the operations he must be able to perform, the concepts and techniques he will be able to apply, and the relationships he will be able to identify and use when he has completed the program.

The actual written specifications of the objective of an instructional sequence is an intent to communicate by a statement describing a proposed change in the learner. Such a statement should convey to the reader the specific aims of the learning sequence. An objective is meaningful only to the extent that it succeeds in indicating the goals of instruction exactly as they were conceived by the instructor or course designer. The objective should be stated in terms which are clear enough that another instructor or program writer could teach it and obtain the same end results.

The specification of instructional objectives should rule out all possible alternatives to the goal. The objective should be stated in unequivocabal terms that are not open to misunderstanding. Such verbs as "to know," "to grasp the significance of," or "to enjoy" must be replaced by such definitive statements as "to write," "to solve," "to identify," or "to construct" if the objectives are to be clearly and explicitly defined.

A statement of instructional goals should also indicate the conditions which will be imposed upon the learner during his try-out performance, what will be provided, what he will be denied, and under what environmental or organizational conditions the behavior should occur.

The programmer should specify the behavior that is to be accepted as evidence that the learner has achieved the objective. The statement of objectives should answer the question, "What will the learner be doing when demonstrating that he has achieved the objective?" If the objective is to be stated clearly and without ambiguity, this question must be answered. In general, the more objectives that are included, the more clearly is the intent of the programmer indicated to the reader.

The programmer outlines the conditions under which the desired behavior can be expected to occur. What information, charts, data, other source documents, and resources the learner will have at his disposal when he carries out the expected behavior.

The final element in the specification of the objective is the determination of an acceptable level of performance. It is important to state how well the learner must perform to achieve the acceptable behavior. Acceptable levels of performance can be indicated by specifying a time limit in which the behavior must be performed or a minimum number of correct responses or the percentage or proportion of performance accuracy that will be acceptable. It is normally to be expected that some learners will surpass the minimum standard.

The behavioral objectives developed by the programmer for this study were criterion statements of the behavior. These objectives also were intended to serve as statements of terminal elements of the various learning steps throughout the programmed

text. The objectives were reviewed and approved by the Resource Committee. The objectives are included as Appendix II.

program development.

The actual development of the program text involved the initial writing of teaching frames, correction frames, criterion frames, information frames, and panel frames.

A series of frames combine to form a learning set. Each set must pass through a developmental testing process. In developmental testing a set can be used separately or in conjunction with other sets. If a set in developmental testing is used with other sets the terminal behavior for the testing set becomes the principal element. Each set was tested on a selected sample of subjects who were identified as conforming to the manager-user population. The identification of the sample subjects was made by the staff instructor personnel at the training center.

The persons of primary importance in the instructional programming activity are the subjects on whom the program is tested while it is in the initial stage of development. A key factor in the program development is the data obtained on learner performance as he interacts with the program. A program works only if students display the behavior called for in succeeding steps and can perform the specified terminal behavior at the end of each learning set.

During the developmental testing stage the learner teaches the programmer what should be the next meaningful frame in the program. The learner's response to each frame and his

final test performance within the set are the measures which guide the program developer in revising the program. The judgment and comments of the learners regarding the frames and step size to which they are exposed will frequently be useful in the total development of the program.

The testing process in the development of the program was conducted with approximately two hundred student personnel assigned to the training center. After each developmental testing tryout, the frames were analyzed, and the success with which the terminal behavior was attained was evaluated. The developmental testing was performed on a one-to-one basis during the initial stages of development and in small groups during the later stages of development.

An advantage to the one-to-one developmental testing is the degree and type of communication which can be exchanged between the programmer and the learner. However, as the program matures, it is sometimes more appropriate to have larger numbers of comments at the expense of individual feedback. As the program neared completion the developmental testing was expanded to include groups. Since the program was not fully developed, the possibility existed that a learner would not learn from the program or learn an incorrect concept. To prevent non-learning or mis-learning, the programmer and the instructional staff participated in the group developmental testing. At pre-selected points in the program each learner had contact with one of the staff persons. Through a series of questions and applications,

the staff person would determine whether the learner was ready to proceed or required remedial work. If remedial work was required, the staff person would instruct the learner until he had reached the level of proficiency required to move to the next set. The staff instructor recorded all difficulties encountered by the learners. These comments were later analyzed and used in the developmental testing process. In addition to the forced interaction of instructor and learner, the learner was free to ask any questions as he proceeded through the program. These questions were recorded and used in the developmental testing. As the program developed, the questions were not necessary, and the forced instructor learner interaction was phased out. As a result of this developmental testing system, as the program neared completion it had been virtually field tested.

Pre/post-test

Programmed instruction concepts emphasize the importance of assessing and making explicit the initial behavior of the learner so that it can be used as the basis from which to guide the student performance toward terminal behavior. This initial behavior is normally assessed by some type of testing situation. These tests should not be employed to weed out individuals who are unlikely to attain the specific terminal behavior under the particular training conditions. The purpose of these tests should be to predict performance in an established course of training and to identify early in the training cycle those learners who may require additional assistance.

Considering the training system as a whole, it should be possible to determine the best combination of instructional objectives, input behavior requirements, and instructional procedures in order to achieve overall organizational goals with maximum efficiency.

A pre/post-test was required which would measure the skill of the manager under simulated operational conditions. To develop the test the programmer relied on the behavioral objectives of the program and the resource committee. The resource committee identified those behavioral objectives which were of key importance to evaluate the ability of a manager to operate in the field under the condition of limited or no supervision. An initial copy of the test was developed and reviewed by the committee. After some changes the test was forwarded to selected members of the operations department for their comments. A final review by the resource committee approved the test as indicative of the performance requirements a manager is expected to achieve in the field.

Within the context of the analysis by the management personnel and their observation that the test was measuring actual managerial requirements of a field manager, the test was accepted as having face validity. For the purposes of this study, face validity is considered adequate. An analysis of the course of study, instructional materials, and behavioral objectives was sufficient to establish content validity.

The administration of the pre-test was conducted by the

Manager,National Training Center. The manager of the training center had no instructional contact with the learners during the experimental phase of this study. The test was administered to the entire group at the training center. The date selected was one which was early in the eight-day course of instruction. The time was nearing the completion of an instructional day. The atmospheric conditions, lighting, spacing, desk and writing room availability was in the normal classroom arrangement of the training center. The characteristics of the training room were within the limits of acceptability for testing conditions, and the conditions were identical for all participants in the test-taking situation.

Control of variables

The variables were established as the pre-test score, age of the learner, length of service with the organization stated in months, highest level of educational attainment, reading speed, reading comprehension, quantitative ability, and language ability.

In addition to the pre-test, the other instruments used were the SRA Reading Record and the SRA Verbal Form B. The SRA Reading Record is intended to measure four basic skills in reading to provide a profile in (1) rate of reading, (2) reading comprehension, (3) everyday reading skills, and (4) reading vocabulary. The reading record also includes a check score to make certain that all participants understood how to take the tests and that they marked the answer sheets correctly. For the

purposes of this study, the reading record was considered important since the experimental group would be instructed exclusively in the written word using the programmed instruction material. Selections from telephone directories, maps, graphs, and an index are included as a part of the everyday reading skills section of the test. Another section of the SRA Reading Record tests the learner in his ability with technical vocabulary sentence meaning, and general vocabulary. For the purposes of this study, only the sections on reading speed and reading comprehension were considered as important. However, the total test was administered to the group.

The SRA Verbal Form B is intended for use within the industrial situation to assist in the definition of the individual's general intelligence, his ability to learn to solve problems, and to foresee and plan creatively and quickly. For the purposes of this study, it was decided to use the linguistic score, quantitative score, and total score. The linguistic score represents the facility in the use of language and was closely related to the individual's performance in work requiring language comprehension. The quantitative score represents the individual's efficiency in perceiving and adjusting to mathematical problems. The total score provides an indication of the general intelligence level of the individual.

The administration of both tests was conducted by a staff member of the training center. The conditions for the post-tests were identical to the conditions for the pre-test with

the exception that the day was later in the week of the instructional period. The test administration manual for both tests was followed to the letter.

The variables used to divide the group on a matched-pair basis were identified as age, length of service, education, reading speed, reading comprehension, quantitative, language, total (of quantitative and language), and pre-test. Once the pairs were matched, a statistical test was run on the variables for both groups to test the matching by means of a "t" test. The mean, standard deviation, and "t" test results are shown in Chapter V.

Administration of differential training program

The matched groups were designated as control and experimental groups. The control group would receive the usual lecture presentation, and the experimental group would participate with the programmed instruction package. Other than the administration of the tests to establish the matching for the variables, the learners had no indication that a study would be conducted comparing programmed instruction with the lecture method. The instruction was conducted at the regular time when the curriculum schedule indicated it normally happened. The normal lecture classroom time allotted to the topic was two hours. Since the post-test was also to be administered, an additional hour was added to the topic for that day for a total of two hours lecture time and a one hour post-test. An additional fifteen minutes was

added to allow for the separation of the groups and an explanation of what was to follow. The total elapsed time was three hours fifteen minutes.

At the completion of the instructional period just preceding the time allotted for the study, the class was normally given a ten-minute break. This procedure was followed on the day of the study. When all of the learners were seated at the completion of the break, the manager of the training center made a short presentation stating the purpose of the study and the part the individuals were to play. The purpose of the previous tests and the general matching procedure was explained. The center manager answered any questions from the group.

The names of the persons in the experimental group were then read with no reference to the term experimental group or to the fact that this group would go through the programmed instruction materials. When all of the names for the experimental group were read, the group was asked to adjourn to the adjoining classroom. Both rooms were identical in structure, and the physical arrangements in each were identical. The atmospheric and other conditions were identical. Once in the room the administrator of the programmed learning for the experimental group explained that at each seating place was a packet of materials. The materials were self-explanatory, and each learner was to read the materials and follow the instructions. The administrator explained that he could answer no questions, and there would be no talking among the participants. Only the materials provided and a pen or pen-

cil provided by the learner could be on the table. When each learner had completed the material contained in the packet, he was to raise his hand. It was explained that the group in the other classroom would take a post-test at the end of their lecture. The group was instructed to open their packet and start. No mention was made of time allotted to complete the programmed instruction materials or the post-test.

The role of the administrator was that of a proctor. The programmed-learning materials were structured to facilitate minimum training supervision. The minimum training supervision allowed the application and use of the programmed learning materials in the field without the benefit of the normal instructor or classroom situation. This was desirable from a management development point of view since the manager is often expected to perform his managerial functions before he has had the opportunity to participate in the managerial training program. Thus, if the program was completely self-instructional, it would be an added benefit.

The lecture group was administered by the staff instructor who normally was responsible for that lecture. At the time of the study, the lecturer had been assigned as a staff instructor at the training center for approximately two years. He had progressed in his instructional responsibilities, and at the time of the study, was assigned the additional responsibility of Senior Instructor. The Senior Instructor was assigned because of his ability to teach all of the classes within the curriculum and

because of his superior ability as an instructor and classroom manager. The lecturer had been assigned the study topic as a part of his normal instructional duties for approximately seven months prior to the time of the experimental study. During this period he had instructed approximately twelve training classes in the subject. While he had participated in the development of the pre and post tests, these tests were so similar in content that it was the opinion of the center manager and the national training manager that the lecturer would not "teach the test".

The conditions of the lecture were identical to that which would have normally taken place with the exception that the group had been split in half. The conditions for both groups were identical in respect to room, outside noise, and other classroom conditions. The classrooms were sufficiently isolated from each other so that no noise could be heard from the other room during a normal classroom presentation.

The lecture period remained at the normal two hours. At the completion of the lecture, the instructor passed out the post test and directed the class to follow the instructions with the test. He advised them that the other group also was taking an identical post test. The instructor told the lecture group that during the post test there would no be talking among participants nor could he answer any additional questions from individuals. He then distributed the post test and remained in the classroom to supervise the test.

Both groups were advised that no one could leave the

room during the period of instruction or during the post-test. Both groups were also advised that as each individual completed the test, he could leave the room but could not remain in the vicinity of the classroom. A recreation room is provided at the training center, and the participants were advised to adjourn to the recreation room until the completion of the instructional period.

All of the learners in both groups were able to complete the post-test within the allotted time. While time was not considered one of the critical factors with the programmed instruction materials, the completion did take place within the allotted time with no difficulty to any learner. No comparison was made of the average times to complete the post-test between the two groups.

In the design of this experimental study a programmed learning package was developed. The program development relied upon the management personnel of the company as the subject matter experts. The program was intended to teach Field Managers the element of control. As a functional responsibility the element of control within the service industry ranks with, or above, the elements of planning, organizing and directing.

To test the effectiveness of the program, a normal classroom group was used. One-half of the group received the normal lecture, and the remainder of the group received the programmed instruction. Both groups were matched on the variables of pre-test score, age of the learner, length of service with the organ-

ization, education, reading speed, reading comprehension, quantitative ability and language ability. The lecture and programmed instruction were administered under similar normal conditions.

CHAPTER V

RESULTS OF THE STUDY

There were forty-two persons assigned to the class which was to be used for the experimental study. Of the forty-two, one member was sixty-three years old and could not be matched. Another member invalidated his SRA Reading Record by marking the answer sheet incorrectly, and two members invalidated the SRA Verbal test in a similar manner. The remaining thirty-eight students were used for the experimental study. Nineteen were assigned to the experimental group and nineteen to the control group. The number of observations (N) is reported as nineteen for each group in the lecture and programmed learning method groups.

Of the members of the original class who were not included in the experimental study, two joined the lecture group and the other two remained with the programmed learning group. At the end of the post-test, the results of those not to be included were removed from their respective group. At no time did any of the learners become aware that they were not to be included in the final analysis of the data.

During the post-instruction critique the lecture instructor was questioned about the amount of participation and

questions coming from the two learners who were dropped from the study but remained a part of his group. The purpose of the critique was to determine if these persons had taken undue instructional time for questions or individual attention. The lecture instructor reported that neither of the learners had asked any questions or had taken any individual instruction time. All of the members of the programmed learning group had completed the program in the allotted time.

Upon completing the programmed learning material each member of the experimental programmed learning group received and completed a post test. At the completion of the lecture portion of the class period for the control lecture group the post test was distributed and completed by each member. The mean and standard deviations for the results of the post test are presented in Table thirteen on page 84.

Tables three through eleven present the mean and standard deviation for the variables, age, length of service, education, reading speed, reading comprehension, SRA Verbal, quantitative, SRA Verbal Language, SRA Verbal total, and pre-test scores for the control lecture group and the experimental programmed learning groups.

The mean and standard deviation for the age variable are presented in Table three. While age was not considered crucial to the experiment, it was considered desirable to match the groups so that the mean age of both groups was approximately similar.

Table 3

Comparison of the Means of Lecture and Programmed Learning For the Variable Age

LECTURE	PROGRAMMED LEARNING
NO. OF OBS. = 19	NO. OF OBS. = 19
MEAN = 29.9	MEAN = 28.8
S.D. = 6.9	S.D. = 8.8

Length of service was considered an important variable since experience in the store could provide some learning experiences for the individual concerned. The matching of the groups on length of service, according to the mean length of service, provided two similar groups. The mean and standard deviation for the length of service variable are given in Table four. It is interesting to note that the mean of the experimental (programmed learning) group exceeded that of the control group only by .7.

Table 4

Comparison of the Means of Lecture and Programmed Learning For the Variable Length of Service (Months)

LECTURE	PROGRAMMED LEARNING
NO. OF OBS. = 19	NO. OF OBS. = 19
MEAN = 16.4	MEAN = 17.1
S.D. = 15.7	S.D. = 16.7

Education as a variable is extremely important in this investigation. Both groups proved to be similar in terms of years of education as indicated by a common mean of 13.4 and a slight difference in the standard deviation. Table five presents the results of the education variable.

Table 5

Comparison of the Means of Lecture and Programmed Learning For the Variable Education

LECTURE	PROGRAMMED LEARNING
NO. OF OBS. = 19	NO. OF OBS. = 19
MEAN = 13.4	MEAN = 13.4
S.D. = 1.6	S.D. = 2.1

Table six gives the mean and standard deviation for the reading speed variable. Since the experimental group was expected to learn through reading, reading speed was considered an important variable. Therefore, it was necessary that both groups be as closely similar as possible in their reading speed.

Table 6

Comparison of the Means of Lecture and Programmed Learning For the Variable Reading Speed

LECTURE	PROGRAMMED LEARNING
NO. OF OBS. = 19	NO. OF OBS. = 19
MEAN = 277.3	MEAN = 300.0
S.D. = 126.2	S.D. = 114.3

Table seven presents the reading comprehension of 93.2 for the lecture group and 90.6 for the programmed learning group and standard deviation of 24.6 and 39.7 respectively. Since the experimental group used its reading ability to learn, it was important that both groups be matched according to their reading comprehension ability. Both groups were closely similar in their reading comprehension.

Table 7

Comparison of the Means of Lecture and Programmed Learning For the Variable Reading Comprehension

LECTURE	PROGRAMMED LEARNING
NO. OF OBS. = 19	NO. OF OBS. = 19
MEAN = 93.2	MEAN = 90.6
S.D. = 24.6	S.D. = 39.7

Each group was required to make computations during the learning experience. Both groups should have approximately

similar levels in terms of their quantitative abilities. The groups are matched according to their quantitative scores. Table eight presents the mean and standard deviation for the SRA-verbal quantitative variable.

Table 8

Comparison of the Means of Lecture and Programmed Learning For the Variable SRA-Verbal Quantitative

LECTURE	PROGRAMMED LEARNING
NO. OF OBS. = 19	NO. OF OBS. = 19
MEAN = 22.1	MEAN = 23.8
S.D. = 5.8	S.D. = 7.8

Since having a working knowledge of the language is important to the study as a factor of the learner's understanding the material, both groups should be approximately similar in relation to their language abilities. The identical mean of 30.1 and the variation of 1.9 in the standard deviation indicates that the groups are matched for the language variable. Table nine presents the mean and standard deviation for the SRA-verbal language variable.

Table 9

Comparison of the Means of Lecture and Programmed Learning For the Variable SRA-Verbal Language

LECTURE	PROGRAMMED LEARNING
NO. OF OBS. = 19	NO. OF OBS. = 19
MEAN = 30.1	MEAN = 30.1
S.D. = 9.5	S.D. = 11.4

The SRA-verbal total combining the quantitative and language scores into a general over-all score is an additional check on the matching of the control and experimental groups. The means of 52.2 for the lecture group, and 54.0 for the programmed learning group represents a small difference of means. Both groups are similar in relation to their total scores. Table ten presents the mean and standard deviation for the SRA-verbal total.

Table 10

Comparison of the Means of Lecture and Programmed Learning For the Variable SRA-Verbal Total

LECTURE	PROGRAMMED LEARNING
NO. OF OBS. = 19	NO. OF OBS. = 19
MEAN = 52.2	MEAN = 54.0
S.D. = 14.5	S.D. = 18.9

Since it was possible that the learners could have had prior knowledge of the principles and techniques to be presented, it was considered important to have the groups approximately similar as to their knowledge of scheduling. As a measure of this prior knowledge, a pre-test indicated the means of both groups was separated by exactly one. The separation of the standard deviation was only .4. Both groups are matched in regard to the pre-test. Table eleven presents the mean and standard deviation for the pre-test variable.

Table 11

Comparison of the Means of Lecture and Programmed Learning For the Variable Pre-test

LECTURE	PROGRAMMED LEARNING
NO. OF OBS. = 19	NO. OF OBS. = 19
MEAN = 54.7	MEAN = 55.7
S.D. = 40.4	S.D. = 40.8

From the results in the above tables, it is obvious that both groups were satisfactorily matched for the variables, age, length of service, education, reading speed, reading comprehension, quantitative, language, total, and pre-test. To verify the matching, a test was needed which would allow for the measure of difference between the means of the two groups. A T test provides for a measure of difference from small samples. For each variable, both the lecture and programmed learning groups had a number of observations (N) of nineteen. For none of the

variables does the difference between means meet the .05 level of confidence. It can be assumed that there is no significant difference between the experimental and control groups on any of the variables used in this study. The results of the test of the significant difference between means is reported in Table twelve.

Table 12

Significant Differences Between Means

Degrees of Freedom = 36

VARIABLES	T TEST
Age	.387
Length of service	.094
Education	.083
Reading speed	.578
Reading comprehension	.241
Quantitative	.753
Language	.001
Total	.316
Pre-test	.076

Table thirteen presents the mean and standard deviation for the post-test. Both groups were matched in terms of the variables of the study. The results of the post-test should reflect learning which resulted from the method of presentation to the experimental and the control groups.

Table 13

Comparison of the Means of Lecture and Programmed Learning For the Variable Post-test

LECTURE	PROGRAMMED LEARNING
NO. OF OBS. = 19	NO. OF OBS. = 19
MEAN = 80.6	MEAN = 93.6
S.D. = 19.9	S.D. = 11.6

To measure the difference between the post-test results of the experimental and control groups, the means of the post-test were subjected to a statistical analysis using the chi square. The result of 3.887, with one degree of freedom, is significant at the .05 level of confidence. A post-test score of one hundred was considered the desired goal for the learning experience. Therefore, the post-test scores were analyzed in terms of one hundred, with all scores less than one hundred falling into the second frequency for purposes of the chi square analysis. Table fourteen illustrates the post-test score tabulations.

Table 14

Post-test Scores Analysis

Post-test Scores	Control	Experiments	Total
0-99	11	5	16
100	8	14	22
Total	19	19	38

The comparison between the two groups of learners with nineteen assigned to each group, and with each group matched in terms of the observable variables, and based on the results of the post-test indicates that the programmed learning group had a higher level of achievement. The level of achievement is significant at the .05 level of confidence.

CHAPTER VI

CONCLUSIONS

The hypothesis of this study is that programmed instruction is as effective as the lecture method to teach the management control function, scheduling. The hypothesis is rejected. This study has shown that programmed instruction is more effective than the lecture method in teaching the managerial control function, scheduling.

This study was undertaken in order to evaluate the effectiveness of programmed instruction as a management development technique. The importance of management with its classes of functional skills and competencies which must be learned by each individual as he assumes his leadership role is generally accepted within the educational and business communities.

This study has concentrated on the functional classification of control. The classification of functions which the manager must learn includes planning, organizing, controlling, and directing.[1] Control, as it is used within this study, is the allocation, scheduling, and utilization of the human resources available to the organizational unit. Managerial control includes the process of establishing standards, checking and ap-

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[1] Dale, Management: Theory and Practice, pp. 5-6.

praising performance, and taking action to correct deviations. When used within this context, control becomes the single element which integrates the complete management development cycle.[1]

A further consideration in identifying control as the main managerial function for the purpose of this study, is the universal requirement for organizational control. In many situations, control is considered as an activity to designate the process of utilizing the available resources.[2] Manpower planning encompasses the broad and long range of control of the human resources. Service organizations are perhaps the first to recognize the need for effective control of the human resource. While the service industry may have a greater need for more effective "people" control, the control of the human resource is not limited to the service organizations. The principles and concepts of control as practiced within the service industry are applicable to other industries and organizational activities.

One additional consideration for selecting control within the requirements of this study is its general requirement at all levels of the managerial hierarchy.[3] In this sense, control should be considered as an integral part of a business management curriculum. If control can provide the integrating element to bind the total management development cycle together, it too

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[1]Koontz and O'Donnell, Principles of Management, p. 538.

[2]Sisk, Principles of Management, pp. 562-63.

[3]Koontz and O'Donnell, p. 541.

can provide the elements of continuity, sequence, and integration for the overall business curriculum.

Scheduling is a sub-classification of the control function.[1]

Scheduling within the service industry operates on a more limited time base than traditional scheduling in other industries. As a part of the total management development process, the manager must learn to schedule whether it is on a long or short time base.

The techniques of scheduling within the food service industry are transferable. The results of this study have application wherever scheduling the manpower resource becomes an important aspect of the manager's job. While scheduling as it is practiced within the food service industry may have applications to other industrial situations, further study is required to prove the usefulness within other managerial activities.

Programmed instruction was chosen for the study because it has proved its usefulness in many areas of education. There is still a great deal of misunderstanding concerning how it should be implemented. Part of this dilemma stems from the fact that programmed learning usually affects the internal arrangements of the instructional procedure. The group or class is the basic unit for most training and instruction, and for administrative convenience the tolerance for individual differences from the group mean is generally limited. Programmed

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[1] Ibid. p. 543.

learning, on the other hand, is individually administered. The self-pacing feature of programmed learning capitalizes upon individual differences. The administrative limits on individual variation that previously held the group or class together as a managable unit are destroyed by the program. The full range of individual differences exposes the true heterogeneous nature of the group and makes the traditional formulas for group administration difficult.

In an attempt to minimize the administrative problems that arise, the trend has been to employ programmed learning to complement the other and more traditional forms of group instruction. This has been done in a variety of ways. Sometimes a programmed unit is used to replace a given area of the customary form of instruction. This may be a basic fundamental of the course or specific topics within the course that have proven to be difficult topics when covered by other methods. In this application, the entire group is usually given the program at one time. The theory behind this approach is that when using short units of programmed instruction, the group does not have an opportunity to "spread out" very much. In other instances, short programs have been used to cover prerequisite material or to provide remedial material for the learner who is unable to keep up with the group or class. In these cases, the program is actually used to minimize already existing individual differences within the group. A third approach to integrating programmed instruction into an existing group-oriented administration is

through its use as enrichment material. Here, short units related to the regular curriculum, are provided to selected learners to enhance their understanding of their regular work. Enrichment materials sometimes take the form of advanced subject matter and at other times provide problem-solving opportunities in the context of the regular curriculum.

These instances are typical of situations where the use of programmed learning has been superimposed upon an instructional procedure that is already in existence. Programmed learning can make a contribution where conventional training and instructional programs do not exist because of inherent situational problems.

One such problem is geographic distribution of the learners. In situations where a number of individuals who require training in a specific function or skill are widely distributed geographically, there is no other method of training that can approach programmed learning in effectiveness and economy. This also applies to situations where the individuals may be centrally located but, because of their work responsibilities, they cannot be assembled into a training group. A similar situation exists in organizations where individuals requiring specific training are brought into the organization in very small numbers. Another area where programmed learning fulfills an unmet need is in situations where other forms of instruction are not available. Small organizations and units that could not support a live instructor are able to provide themselves with the highest level of

training competence through the use of programmed materials. This serves to increase the organizational unit's flexibility in the training that it can provide.

It is within these situational considerations that this study concentrated. The use of programmed instruction of the nature and intent characterized by the managerial principles covered may also be extended for use in the more traditional vocational and business education curriculums of the secondary schools and departments, or schools of higher education. To prove the ability of the programmed instruction technique, it was compared with a normal lecture presentation of the same learning material.

The results of this study in using programmed instruction as a management training technique in an industrial training situation have indicated the improvement in learning achievement which is possible as compared with the achievement resulting from the lecture method in a management training program.

This indicates a higher result of better trained managers to perform the functions normally required of them. It would appear that there is no reason why programmed instruction cannot be extended to include other areas of training in the responsibilities of the managerial functions. The programmed instruction method of management training holds the promise of greater efficiency within the business situation.

Since the programmed learning materials in this study were prepared for implementation with a minimum of supervision,

two additional benefits would seem to accrue. One, that the possibility exists for the management training center to train a greater number of personnel with no additional cost other than the cost of the programmed instruction materials. This increased group size can expect to have equal or a greater level of achievement than the lecture method for a similar group. Secondly, by allowing the manager to be trained in the managerial function at his home location rather than at the central training center, the programmed instruction holds the possibility of greater decentralization of training. In some situations the manager will also be expected to start performing his managerial role before he has had the opportunity to attend a training session at the training center. In these situations the programmed instruction materials may help to overcome some of the shortcomings of the learning environment.

This study has attempted to help alleviate the scarcity of research data available in the area of the education of the professional manager. Future studies using this technique may further indicate the applicability of programmed instruction as a learning tool for the manager.

The education and development of the professional manager to function within the public or private sectors and to carry out his duties wherever they may be is a continuing demand of our society. The general principles of management apply to the manager whether he is operating within the large factory or the large school district, the first-line supervisor in business or

the area supervisor or coordinator in the school system. Programmed instruction can teach the managerial functions, and further research may define the extent to which programmed instruction is effective in teaching the manager.

APPENDIX I

TASK ANALYSIS

WHAT	HOW	WHY	SKILL
1. Identify need for scheduling.		Avoid mistakes in staffing. Means of achieving QSC. Cost Control.	Supervisory Managerial understanding of profit motive.
2. Statement of what scheduling is.		Right person. Right place. Right time.	Train worker OJT. Identify performance level of worker.
3. Past volume as a predictor of future expectations.	Analysis of hourly sales volume. Number of employees working during that hour. Totals, comparison of totals with last week and cumulative. Weather that day. Other factors which may have affected sales. Separate sheet for each day of the week.	Projections are only valid as the data for past sales volume.	Read cash register. Post from daily cash sheet add & subtract compute cumulative totals. Observation of occurrences which may affect sales.

WHAT	HOW	WHY	SKILLS
4. Hourly sales volume.	From the cash register. Total sales for that hour. Where possible, break the hour into smaller parts. Gross minus sales tax.	To identify the peaks and valleys in sales during the open time.	Read cash register, post to daily cash sheet, and volume summary sheet.
5. Factors affecting sales projection.		To identify those influencers of daily sales activity.	
6. Volume pattern.	Sales volume/observing the pattern.		Knowledge of volume pattern.
7. Post daily totals.	Addition of the hourly sales figures into a total for the day.	Reflect daily volume.	Addition.
8. Comparison of daily total with sales volume for this day last week.	Subtract larger from smaller. Indicate whether an increase or loss from last week (+ or -)	To assist in identifying longer range sales trend by the month, quarter, year.	Addition. Subtraction.
9. Weather for that day.	General indicator of the state of the weather. Average daily temperature. Short term occurrence which was different from general	Identify weather factors which may be influencing sales volume.	Supervisory. Alertness to climatic conditions.

WHAT		HOW	WHY	SKILLS
		description.		
10.	Other factors which may have affected sales volume.	School holiday, strike at nearby plant, competition opening day, etc. Any influence which may have occurred in the immediate or general area..	To identify special peaks or valleys in volume which may be outside of norm.	Supervisory. Alertness to happenings in the local community.
11.	Sources of information which will affect volume.	Newspapers, employee feedback, civic organizations.		
12.	Volume sales projection.	Forecast based on past performance as recorded on volume summary sheet. Look at coming events as the same types of factor that affect volume. Rely on help to provide specific kinds of information.	Fairly accurate analysis for projection of weekly sales.	Interpretation data.
13.	Identifying monthly trend.	Total and compare monthly totals for the year. Compare with trend for previous years.	Identify those peaks when work force must be available and trained. Identify when to tie	Data analysis and interpretation.

WHAT		HOW	WHY	SKILLS
		Plot on a graph to visualize the comparison of month-to-month and year-to-year.	advertising, or extra effort to remove or decrease valley.	
14.	Identify weekly trend.	For the month, plot the volume for each week. Compare with same week of previous years.	Identify peaks and valleys in weeks. Identify where extra effort may be needed.	Data analysis and interpretation.
15.	Identify hourly trend.	For the day, plot the volume for each hour for selected or random sample of days.	Identify those areas where customers have become conditioned to coming to or staying away from the store.	Data analysis and interpretation.
16.	Number of employees working during the hour.	Recap of the total number working during any part of the hour.	Provide a rough estimate of the number which may be necessary now.	Supervisory.
17.	Compute labor hours for projected volume per chart.	Select sales volumes which occur more frequently for the hour. Identify employee work hours for that volume from the volume summary sheet.	To approximate the number of employees needed for any given production figure.	Data analysis and interpretation.

WHAT	HOW	WHY	SKILLS
18. Compare hourly sales volume and employee hours with same volume or employee hours with other periods.	Select the model employee hours and plot sales volume to average out, or identify those volume hours with employee hours outside the norm to identify deviations from the pattern.	A needed tool to forecast employee hourly requirements for projected volume.	Data analysis and interpretation.
19. Finalize data for employee hours needed for specific volume sales.	Averaging those hour volumes selected, with abnormal deviations removed.	Give an indication of the employees needed to support projected sales.	Analysis and interpretation of data. Addition, subtraction, division.
20. Weekly sales projection.	Use data from volume summary sheet for same period last year as first rough approximation.	Will give approximate sales volume.	Managerial.
21. Compare with last week's volume.	Identify whether the sales trend has been up or down. Identify reasons for movement in the trend.	An indication of a trend that may be developing.	Managerial. Interpret data.
22. Compare trend with trend of this month last year.	Identify variations in the trend of this year from past performance.	Indication of things which may be happening which you may have overlooked.	Managerial. Interpret data.

WHAT		HOW	WHY	SKILLS
23.	Analyze differences in trend.	Compare factors and conditions which may have affected previous volume, with factors of this period.	Identify areas of weakness or strength.	Managerial. Interpret data.
24.	Firm-up sales projection.	Using data from previous steps, arrive at a firm figure for the weekly projection. Base figure also on growth objective for the year.	Firm projection of what sales should be, all things remaining equal.	Managerial. Interpret data.
25.	Determine weekly labor hours.	From the data computed previously, extract the required labor hours to meet the sales projection. Refer to chart and make necessary adjustment "extra maintenance man-crew training, etc."	Identify the number of labor hours needed.	Managerial.
26.	Fixed labor hours.	Identify those employees who will be working no matter what the sales volume. Use chart on back of sheet.	These are part of the fixed labor costs, just as other fixed costs of doing business.	Managerial.

WHAT	HOW	WHY	SKILLS
27. Analyze fixed labor hours.	Determine adequacy of the time spent with the return on volume sales.	May help you identify areas where costs can be reduced, or where additional help is needed.	Cost analysis.
28. Compute total fixed labor hours.	Total all employees on salary, or hourly who are a part of the fixed labor cost.	Weekly fixed labor hours.	Managerial. Addition.
29. Compute total variable labor hours.	Subtract the total fixed labor hours from the total weekly labor hours.	Identify variable labor hours needed to meet the projection.	Subtraction.
30. Daily sales volume projection.	Based on projections from previous periods determine the daily sales projection to meet the weekly figure. Compute first by %, then relate to sales volume.	Identify what sales volume should be for each day.	Compute percentage.
31. Enter daily projection on the McDonald's Work Schedule. a. Compute daily percent.	For each day of the week, enter the projected total daily sales.	Keeps figure at hand when computing and recording hourly figures.	Transferring.

WHAT	HOW	WHY	SKILLS
b. Compute daily variable hours.			
c. Add on chart fixed variables for total daily labor hours.			
32. Hourly sales volume projection.	Based on data from previous periods, project the anticipated sales for each hour. Total will equal figure entered on total daily sales.	Allow for more firm employee-need projection.	Percentages. Addition.
33. Enter hourly projected sales for each hour of business.	Within the daily listing, enter the projected hourly sales.	Figures at hand.	Transposing.
34. Compute hourly variable labor hour needs.	Based on sales projections. Determine total labor hour needs, subtract fixed labor hours.	Identify the number of variable labor hours to meet this projection.	Computational.
35. Average customer billing.	Compute from data the approximate average customer billing for each hour.	Assist in identifying variable labor hour personnel needs.	Managerial.

WHAT		HOW	WHY	SKILLS
36.	Variable labor hour positions.	Identifying those positions necessary to be filled will depend upon the product mix for each store. Knowledge of store and mix is vital. Refer to data on record to determine the approximate product mix.	Will help to identify which persons to bring in. Identify the skills needed by the total crew to run a shift.	Managerial.
37.	Enter names, stations, and hours worked for all fixed labor hourly personnel.	List on top line for each day, the names of all management personnel who are required to be on hand regardless of sales volume. Do the same for hourly personnel.	Identifies the management persons on hand during store hours. Identifies openers, closers, maintenance and others needed.	Managerial.
38.	Identify types of scheduling.	Full shift. Short shift. Split shift. Overlapping. Station rotation.	Common language among all personnel.	Supervisory.
39.	Worker training needs identification.	Appraisal of each employee's level of performance on specific positions.	Identify employees who can perform required jobs.	Recognition of acceptable performance level.

WHAT		HOW	WHY	SKILLS
40.	Listing of employees.	By time availability. By position performance.	To identify when and what jobs each can work.	Supervisory.
41.	Positioning of employees.	Identification of the positions to be filled and the employees who are trained and qualified to fill them.	Know what basic jobs necessary for basic operation.	Knowledge of equipment. Knowledge of people.
42.	Positioning consideration beyond equipment and employee performance.	Appearance. Moral character. Attitude.	The image presented to the customer.	Understanding of human relations.
43.	Rotating positions within the shift.	Identifying those who are in need of further training. Provide for individual needs.	Break monotony. Means of OJT.	Supervisory.
44.	Positioning to increase productivity.	Elimination of bottlenecks. Provide for increased QSC.	Provide for better profits.	Supervisory ability to identify need for deviation. Ability to position to increase productivity.
45.	Approximate span of control.	Identification of number of employees each supervisor can effectively supervise.	More effective supervision, greater control.	Supervisory. Empathy with customer needs through knowledge of equipment capabilities. Understanding of each employee.

WHAT	HOW	WHY	SKILLS
46. Identify personnel available and with needed skills to work the needed shift.	Review employee available chart. Review training needs chart. Identify those persons who are available and with needed skills. Allow for some training on the job.	Be certain right people at right time in right place.	Managerial.
47. Enter names, station, and hours worked for each variable labor hour person.	Station should be the primary station he will start on. Shift rotation will be up to the shift supervisor. Hours will be the total worked that day. If it's a split shift, be careful of local laws. Black (left side) for day, and Red (right side) for night employees.		Managerial.
48. Line out hours worked.	Single line from beginning to end of work period.	Allows management and shift supervisors to visualize who and what skills available, identify	Managerial.

WHAT	HOW	WHY	SKILLS
		needed overlaps, arrange for training.	
49. Compute total labor costs. a. Compute labor percentage.	Average hourly crew rate x crew hours + management salaries.	Determine how closely labor hours will have to be controlled.	Computational. Managerial.
50. Posting the schedule.	Post in a conspicuous place where all can see. Post at least four days in advance of day to start, ideally one week in advance.	So all employees will be aware of their responsibility.	Supervisory.
51. Follow-up.	Check daily cash sales against projections. If above or below, keep an eye on where people should be added or taken away.	Keep on target. Identify large errors and identify necessary corrections.	Managerial.
52. Identify days and hours where you intend to build volume.	Verify that sufficient personnel are on hand during these periods.	Building sales volume may take some investment in extra manpower.	Managerial.

APPENDIX II

OBJECTIVES

1. Define the term scheduling and write the three elements of scheduling.

2. List three of the four elements contained in the volume summary sheet which contribute to a prediction of sales volume.

3. State a minimum of five factors which may affect the sales volume of a store.

4. Using the labor percent chart, and given a scheduling worksheet, and the weekly sales volume projection, enter the approximate labor hours used.

5. Given the number of managers and assistant managers, and their maximum weekly total work hours; on the scheduling problem answer sheet, compute and write the hours worked for management hours, Monday through Sunday and the total.

6. Given the daily range of work hours for the maintenance man; on the scheduling problem answer sheet, compute and write the maintenance hours worked Monday through Sunday and the total.

7. Given the daily range of work hours for the openers; on the scheduling problem answer sheet, compute and write the openers' hours worked Monday through Sunday and the total.

8. Given the daily range of work hours for the closers; on the scheduling problem answer sheet, compute and write the closers' hours worked Monday through Sunday and the total.

9. Given the projected sales volume for the week, and the total fixed labor hours, compute the total variable labor hours.

10. Given the daily sales volume and the weekly variable labor hours, compute the variable labor and write the variable labor as a percentage, for Monday through Sunday.

11. Given the daily sales volume and the variable labor as a percentage for each day, compute and write on the scheduling homework sheet the variable hours scheduled for Monday through Sunday.

12. Given the McDonald's work schedule, the daily and hourly sales volume projection and a list of employees with the hours they can work, complete the McDonald's work schedule for fixed and hourly labor personnel for Monday.

13. Given the labor formulas sheet, the total weekly labor hours for all hourly and salaried employees, and the number of management personnel, compute and record on the schedule problem homework sheet the total labor hours for the week.

14. Given the labor formulas sheet, the weekly net sales and total weekly labor hours, compute and record on the scheduling problem homework sheet the weekly sales per man hour.

15. Given the labor formulas sheet, the average hourly crew rate for the week, the total weekly crew hours and total weekly management salaries, compute and record on the scheduling problem answer sheet the labor dollars for the week.

16. Given the labor formulas sheet, the total weekly wages and the weekly net sales, compute the weekly labor percent.

APPENDIX III

SELECTED PORTIONS OF PROGRAM

PREFACE

This lesson concerns SCHEDULING. There are many elements within the store management process which contribute to the total success of the profit picture; but perhaps none is more important than SCHEDULING.

Whenever you consider SCHEDULING, you are really considering the labor costs, and the ability to give the customer the quality, service and cleanliness he has come to expect from the McDonald's operation.

The labor costs reduce to the basic element of TIME. TIME is money. Controlled time through proper scheduling is controlled labor costs, and lost time through improper scheduling is uncontrolled labor costs. And controlled or uncontrolled labor costs are reflected in profits.

The one single best way to properly control labor costs is through proper scheduling. Also consider worker efficiency, but even there, the store can only be as efficient as the schedule allows.

SCHEDULING is time, and time is money, and money is profits. Learn your scheduling lesson well. It is a major factor in the success of your store.

Please turn to the next page.

INTRODUCTION TO THE LEARNER

This is a programmed book. While the pages are numbered consecutively, you do not read them in numerical sequence. Instead, you follow the directions at the bottom of each page. The directions will tell you which page to turn to.

While reading this programmed book, you will be asked questions about what you have read. These questions are intended to help you learn, as well as determine what your next step will be. Here is how the programmed book works. After reading the selection on a page, you will find a multiple-choice question. Choose the answer you think is most nearly correct. Beside that selection, you will find instructions. The instructions will tell you which page to turn to. You should turn to the page number shown beside your answer. Where there is no multiple-choice answer, you will just be given instructions.

If you select the correct answer, you will read some more information and be given another question. If you should choose an incorrect answer, you will be given some additional information and more instructions about which page to turn to.

Follow the instructions carefully, and you'll find how enjoyable a learning experience this type of book can be.

Now please turn to page 1, and begin.

1

Who needs Scheduling?

We all do! Scheduling is related to the question of proper staffing of the store. Questions such as, who is to work, when are they to work, and where will they work must be answered. Mistakes in staffing can be costly, not only in terms of the salaries you have to pay, but also in the potential loss of sales volume.

We schedule to run a top-notch store for profit, and to provide the means for our own growth. Scheduling can give us the elements of quality, service and cleanliness that each store needs to meet projected sales volume.

We schedule as a means of cost control. A loose or a tight schedule can not only hurt your sales volume, but it can also cut into the profits by affecting your labor costs. Labor costs are your highest cost item.

Scheduling gives us the means to achieve QSC, and control costs, but what really is scheduling?

Scheduling is:

A. Right people in the right place. Turn to page 3

B. Right number of people at the right time. Turn to page 5

C. Neither A nor B is correct. Turn to page 4

D. Both A and B are correct. Turn to page 9

2

You are not following the instructions for using this book.

You are to read the question on the page, select one of the responses, and turn to the page next to your choice.

None of the responses told you to turn to page 2.

If you are to be successful in learning "SCHEDULING", you must pay attention to detail, and you must follow the instructions contained in the book.

On each page you will be given some reading. At the end of the page you will be told to turn to a particular page. If the reading is followed by a question, your answer will determine what page you turn to. In either situation, you must follow the instructions exactly. When you return to page 1, look again at the bottom of the page; select one of the answers as the one you think is correct, and then turn to the page indicated. Now, return to page 1, and good luck.

Your answer: Right people in the right place. Almost right, but it needs just a little more.

We are interested in establishing and maintaining the elements of QUALITY, SERVICE AND CLEANLINESS. We can only accomplish this by having the people on hand who are trained and qualified to do the job; by having them in the positions for which they are trained.

We must also maintain some element of control over the costs of providing the quality, service and cleanliness. To control the costs of our operation, we must control the costs of labor, our most costly single item. There are a number of ways to control labor costs, and one of them certainly must be the control of the number of people working at any one time.

We have to consider the factor of the availability of the personnel. Having them there at the right time is probably just as important as having the right number. Scheduling extra people in after the rush period has passed is really not helping meet our QSC goals. Scheduling extra personnel during the rush period would allow us to provide quality merchandise, give courteous speedy service, and maintain exceptional cleanliness. But to control costs and maintain the QSC we must also know at what time to let the extra people go.

Return to page 1, and select another answer.

Your answer: Neither A nor B is correct. No, that is not right.

In addition to having the right people in the right place at the right time, scheduling also means having them there in the right numbers.

If you are to be successful in learning with this method, you must pay attention to what is said on each page and answer each question honestly.

Now please return to page 1 and select another answer.

Your answer: Right number of people at the right time. Almost right, but not quite.

Yes, we definitely have to have the right number of people, and at the right time; but we need just a little more than that if we are to meet the requirements of QUALITY, SERVICE AND CLEANLINESS and at the same time control the costs of operation.

You have a firm grasp of the concept of maintaining costs control by regulating the input of people into the operation. But, perhaps you should look just beyond the numbers of people and consider their quality. Consider their ability to operate at the various positions as a part of the element of their quality. Consider the training each of them has received as a part of their quality. Consider their physical appearance and moral characteristics as an element of their quality.

With these considerations, you should recognize that in addition to the right numbers and time, you have to have a person who can do the top quality job you require. And, you have to have enough of these top quality persons so you can provide relief and rotation, and still maintain your QSC.

Return to page 1, and select another answer.

Your answer: Net

That is correct. The net sales accurately reflect the dollars returned to the unit. The net also allows anyone looking at the performance of the store to make comparisons with other stores where the sales tax may be different. One final point for net, is that the % chart which gives us an indication of the number of labor hours we should use for a given sales volume is in net. More about the % chart later.

The net sales are recorded on the Volume Summary Sheet. This Volume Summary gives you an hour-by-hour account of the daily sales activity. Note on Panel #1, that the net sales are entered for each hour for 1/2, 1/9 and 1/16.

Below are the stores net sales, by the hour for 1/23.

12	80
1	100
2	50
3	30
4	30
5	40
6	100
7	90
8	40
9	30
10	20
11	30

Enter these figures on Panel #1, in the column 1/23.

After you have entered the figures, turn to page 11.

7

Your answer: Decrease.

No, that is not correct.

The sales tax would have increased, but not your net sales. Net sales reflect the total amount of the sale, LESS any sales tax. So if the sales tax goes up or down, the net sales will remain the same.

Under a 4% sales tax, with your gross sales at 600 per day, your net sales would be:

Gross sales	600
Times sales tax	.04
Equals	24.00

So

Gross sales	600
Minus amount received as sales tax	24
Equals net sales	576

If the sales tax increased, your input into the register would increase by a proportionate amount, because you would have to collect more from the customer. But you would also subtract this new amount from the gross to get at the net sales.

To reflect the input dollars returned to the unit, regardless of sales tax, we would use as our sales volume sales:

Gross Turn to page 13

Net Turn to page 6

Your answer: 96

No, you are not correct.

Check your addition to be certain that the total for the day is 640. If it is not 640, then your mistake was a simple arithmatic one.

WEEK OF	1/2	1/9	1/16	1/23
TOTAL	642	750	554	640
-LAST +WEEK	+50	+108	-196	
-CUMMU +WEEK	-20	+30	+25	
CONDI-TIONS	40° Fair	36° Fair Sale Day	42° Rain Down-pour 11-2	

Look at the 750 column, this is the sales total for 1/9. This total for 1/9 of 750, is compared against the total sales volume for last week, which was 642. Since the total for 1/9 was in excess of the total for 1/2, it is a + to indicate that it is above last week's total. And the amount is just a matter of subtracting 642 from 750 for a last week of 108.

Also, for 1/16 the total is 554, comparing this with the total of 1/9 which is 750, we see that the 554 is below the 750 so we indicate this with a - sign. And the difference between 554 and 750 is 196.

Return to page 11 and select another answer.

Your answer: Both A and B is correct. Right!

Where does the data come from to determine how many people are needed in what position, who they should be, and at what time are they needed.

The best place to get it is from the records of past performance. What was the sales volume during this same period last year. This information comes from the cash receipts, and some type of volume summary sheet you should be using.

Take out Panel #1.

This is a VOLUME SUMMARY SHEET. The VOLUME SUMMARY SHEET gives you an overview of what your volume was for each hour of the day.

Note that this Summary Sheet is for Tuesday. On it record the sales volume figures for Tuesday's only. Use a separate sheet for each day of the week. Many managers keep the sheets in a three-ring binder with tab separators for each day. The binder helps make it easy to get to and easy to use. Keep it anywhere, but keep it up-to-date.

The VOLUME SUMMARY SHEET will give you a year-by-year record of the sales volume on a particular day, which is then summarized into a summary for the week and month. It reflects the picture of the dollars that are returned to the store, and this figure is important in an analysis of your volume predictions.

Since the VOLUME SUMMARY SHEET will record the historical data of sales volume, should the entries be gross or net sales?

Net — Turn to page 6
Gross — Turn to page 12

10

Your answer: Increase.

The sales tax would have increased, but not your net sales.

Net sales reflect the total amount of the sale, LESS any sales tax. So if the sales tax goes up or down, the net sales will remain the same.

Under a 4% sales tax, with your gross sales at 600 per day, your net sales would be:

Gross sales	600
Times sales tax	.04
Equals	24.00
So	
Gross sales	600
Minus amount received as sales tax	24
Equals net sales	576

If the sales tax increased, your input into the register would increase by a proportionate amount, because you would have to collect more from the customer. But you would also subtract this new amount from the gross to get at the net sales.

To reflect the input dollars returned to the unit, regardless of sales tax, we should use as our sales volume sales:

Gross — Turn to page 13

Net — Turn to page 6

YOUR VOLUME SUMMARY SHEET, PANEL #1, should look like this: 11

VOLUME SUMMARY SHEET

Tuesday - Net Sales Year:____

WEEK OF	1/2	1/9	1/16	1/23	1/30	2/6	2/13	2/20	2/27	3/5	3/12	3/19
12	82	70	42	80								
1	98	120	51	100								
2	50	68	27	50								
3	31	52	35	30								
4	29	40	28	30								
5	42	40	44	40								
6	100	113	110	100								
7	93	125	95	90								
8	37	41	38	40								
9	30	36	32	30								
10	28	25	27	20								
11	22	20	25	30								
12												
TOTAL	642	750	554									
+LAST -WEEK	+50	+108	-196									
CUMMU +- WK	-20	+30	+25									
CONDI TIONS	40° Fair	36° Fair Sale	42° Rain Downpour									

Next compute the total and make a comparison with the result of the sales volume for last Tuesday.

The figure for + or - last week should be:

96 — Turn to page 8
86 — Turn to page 19
76 — Turn to page 14

Your answer: Gross

No, gross sales is not the correct answer.

Gross sales are the total sales rung up on the cash register, and reflect the total of the money collected from the customer. Included in this total is any tax which your local area may have in effect.

The net sales is the total that is received into the cash register less any amount of tax. It is this amount that will be returned to your unit. The additional amount must be turned in to the appropriate tax collecting agency.

Assume that in 1965 your local and state sales tax was 3.9%. Also, assume that in 1968, your local government added an additional .5% to the sales tax. What would be the effect on the net sales of your unit.

Increase	Turn to page 10
Decrease	Turn to page 7
Remain the same	Turn to page 15

13

Your answer: Gross.

No, gross is not the correct answer.

While gross sales may reflect an easier figure for you to arrive at, it complicates the picture later on.

As an example, suppose the corporate office wanted to make a regional area comparison of the sales volume at different size stores. If local governments within the area charged different sales tax, the comparison would not be valid since one store may reflect more or less dollar volume, but that dollar volume is not the dollars which are to be returned to the store.

Also in analyzing past performance, and changes in the sales tax structure would require making some adjustment to all of the sales volume figures so we could accurately visualize how the unit is doing this year with past performance. One final consideration is that the chart, which gives us an indicator of the dollar volume we should expect is listed in net sales.

Please turn to page 9, and select another answer.

Your answer: Remains the same.

That is correct.

For our purposes in this book Gross shall mean all income without deductions for sales tax or any other purpose. Net shall mean the total sales dollar LESS the sales tax. There are other considerations to arrive at the net sales dollar, but for our purposes we will consider the subtraction of the sales tax only.

Please turn to page 9.

Some of the things which you could have listed are:

Bus loads stopping in for orders.

Special orders, such as Fish burgers prepared for a school lunch every Friday.

Special events such as holidays, circus or carnivals in the area.

School schedules such as days off for teacher institutes, athletic contests, dances, semester breaks and openings.

Special promotions on a local, regional or national basis.

Road construction, or any circumstance which may affect the traffic flow pattern past your store.

Power failures, or equipment breakdowns.

Price changes.

Social or civil demonstrations such as strikes, school disorders, peace or civil marches.

Competition.

Any circumstance which could have affected sales volume should be listed under conditions.

Be certain that this section is filled out daily. It is difficult to come back, even a week later and remember what happened. And if you should want to analyze your pattern at some time in the future, you should have a record of what the conditions were while the day was in progress.

Please turn to page 21.

Your answer 86: Your're correct.

NOTE: Refer to VOLUME SUMMARY SHEET Panel #1.

The "CUMMU. WK." represents the running figure for the week. It tells whether you are ahead (+) or behind (-) the week's projections. It gives you a running account of the actual sales in comparison with the projected sales volume. For this book, we shall assume that the CUMMU. WK. entry is to be +20 for 1/23. Please enter the +20 in the CUMMU. WK. box for 1/23.

The final step is to complete the conditions column. On January 23 the weather was sunny, and the temperature 41° with no other exceptional factors which may have affected sales. Please write this information in the "Conditions" box.

Also in the conditions box, should be listed ANY event which could have had some affect on the sales volume for that day. On Panel #1, you can see that weather is one circumstance that should be noted, since it will have some affect on sales volume for that day. List at least three other circumstances which may affect sales volume. After you have listed them, turn to page 16.

14

Your answer: 76

No, that is not correct.

Check your addition to be certain that the total for the day is 640. If it is not 640, then your mistake was a simple arithmatic one.

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Look at the 750 column. This is the sales total for 1/9. This total for 1/9 of 750 is compared against the total sales volume for last week, which was 642. Since the total for 1/9 was in excess of the total for 1/2 it is a + to indicate that it is above last weeks total. And the amount is just a matter of subtracting 642 from 750 for a last week of 108.

Also for 1/16 the total is 554, comparing this with the total of 1/9 which is 750 we see that the 554 is below the 750 so we indicate this with a - sign. And the difference between 554 and 750 is 196.

Return to page 11 and select another answer.

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APPROVAL SHEET

The dissertation submitted by Leroy G. Cougle has been read and approved by members of the Department of Curriculum and Instruction.

The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

Carter V. Friebergg
Signature of Advisor

Jan 14, 1972
Date