1A

A SYSTEMATIC APPROACH TO ADP TRAINING

by

ELMER LEE LALICKER

B.S., Oklahoma City University, 1973

A MASTER'S REPORT

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Computer Science

KANSAS STATE UNIVERSITY
Manhattan, Kansas
1979

Approved by:

E.A. Unger

Spec Coll.
LD
2668
.R4
1979
L34
c.2

Table of Contents

1.0 Introduction 1
1.1 Problem 1
1.2 Definitions 3
1.3 Motivation to Train 4
1.4 Audience 7
1.5 Organization of the Paper 7

2.0 A Systematic Model for Training 9
2.1 Introduction 9
2.2 Philosophical Environment Prerequisites 9
2.3 Integral Part of Organization 11
2.4 Training as a System 12
2.5 A Basic Training Model 13

3.0 Assessment 15
3.1 Introduction 15
3.2 Training Coordinator 15
3.3 Organization 17
3.4 ADP Employee Training Records 18
3.5 Job Descriptions 21
3.6 Summary 24

4.0 Development 26
4.1 Introduction 26
4.2 Skills and Knowledge 26

THIS BOOK CONTAINS NUMEROUS PAGES WITH DIAGRAMS THAT ARE CROOKED COMPARED TO THE REST OF THE INFORMATION ON THE PAGE.

THIS IS AS RECEIVED FROM CUSTOMER.

4.3 Career Paths 31

4.4 Analysis of Training Tasks 34

4.5 Training Alternatives 35

4.6 Summary 36

5.0 Implementation 38

5.1 Introduction 38

5.2 Selecting Topics for Training 38

5.3 Selecting People for Training 41

5.4 Budgeting 42

5.5 Selecting Training Alternatives 43

5.6 Establishing Successful In-house Training 44

5.7 Informal Training 47

5.8 Summary 49

6.0 Sources of Training 51

6.1 Introduction. 51

6.2 Pre-employment Training 51

6.3 Vendor Training 55

6.4 Associations and Societies .58

6.5 Educational Firms and Institutions 59

6.6 Training Material 61

6.7 Summary 64

7.0 Evaluation 65

7.1 Employee Evaluation .65

7.2 Evaluation of Training 66

7.3 Summary 69

8.0 Conclusions 73

8.1 Contribution 73

8.2 Further Research Needs 74

References 76

Appendix 78

List of Figures

2.1 A Basic Training Model 14
3.1 Training Profile 20
3.2 Sample Job Description 22
3.3 Assessment 25
4.1 Employee Skill Levels 28
4.2 Sample Career Paths 33
4.3 Development 37
5.1 Implementation 50
7.1 Personnel Evaluation 67
7.2 Training Evaluation 70
7.3 A Systematic Training Model 72

Chapter 1

Introduction

1.1 Problem.

"Probably whenever Sitting Bull, Geronimo and the other chiefs pow-wowed the first topic of converstaion was the shortage of Indians. Certainly today no meeting of the high-and-mighty is complete until someone polishes the conventional wisdom 'our big trouble today is getting enough good people.' This is crystal clear nonsense." (20)

In the above quote the thing that is nonsense is the thought that good people in sufficient quantities can be found. There are only so many Automat Data Processing (ADP) people available and it is always easy to catch someone polishing the above "conventional wisdom". Good people are not found, they are grown. If an organization has a desire for more good ADP people, then only through training will more good people be available to the organization. Post-employment training is the key source of skills in a computer service center. (21)

Very few of the early ADP practitioners received any formal training in ADP. They came from diverse educational backgrounds including principally mathematics, accounting, physics, economics and engineering but not excluding any major profession. Today, however, ADP training is evolving toward the pattern normally followed in other professions--- formal courses in the subje in public and private institutions followed by on-the-job training to adapt the general education to the specific needs of the employer. (21)

ADP managers today are bombarded by a great deal of mail advertising for such things as training seminars, classes, and programmed instruction. If it is assumed that the majority of these advertised training products are relatively good, the question facing a manager is how much benefit can be gained and by which employee? Whether the training is needed or of value to the particular organization can only be determined if the ADP managers have previously defined the training needed by their employees.

When the advertisements for the training are reviewed or other alternatives for training are considered, they should be reviewed to determine if something is being offered which appears to satisfy an existing need within the organization. That, however, is not the usual case. For example, how many times has a manager said, "this looks like a real good course", while reviewing some of the advertising received in the mail. "I wonder who we have that we could send to this course." This type of response is impulse shopping for training and not the approach recommended. It must be recognized that this example demonstrates what can happen when the training needs are not systematically developed.

The above example assumes ADP managers take the time to review training alternatives. A more realistic example might be one in which the material is not reviewed because of more pressing demands for the managers' time. Also, if the managers do not have the time to review alternatives and have not established responsibility for such action within the organization, many good training opportunities may be missed.

Based on the research for this paper, it cannot be stated to what extent the above situations are applicable, but it is proposed that the applicability is much higher than the case where the alternatives are reviewed to determine correlation to predefined needs.

In addition to the desire for more good people, an evaluation of personnel costs should provide an incentive to train ADP people. Personnel costs as a part of the ADP budget are increasing. As these costs become an increasingly larger percent of an organization's ADP budget, there will be more pressure to increase ADP employees' proficiency. (15) Proficiency can be improved through training.

Further, as a new professional field, ADP is continually developing. New ideas currently being developed include techniques or tools which if used properly, can significantly improve employee proficiency. (15) A training program provides the vehicle for quickly and efficiently implementing the new idea.

The motivation to train employees should be strong within the ADP indust However, there remains for the managers the difficult questions of who to train, when to train, where to train, how to train, and what ideas or techniques to include. The purpose of this paper then is to present a model for use in answering these questions through development of a systematic training program to accomplish and administer individualized on-the-job-training.

1.2 Definitions.

In the first few pages of this paper the word training has been used repeatedly. What is training? Too often, training is thought of as giving classes, but this is only a small part of training.

Training is a succession of planned experiences intended to bring the skills and knowledge of the ADP employee closer to the future needs of the organization. (21)

This definition for training points out that training supports the futur needs of the organization and is therefore a management tool which if used correctly should result in the organization becoming more cost effective.

The focus of this paper is on-the-job training needed to adapt an employee to the specific needs of an employer. On-the-job training is also referre to as post-employment training and it has two forms--formal and informal. Formal training includes all scheduled and planned training and is usually associated with the classroom or study center environment. Informal training however, is not necessarily planned or controlled, but is better described as automatic training. This training occurs through peer group contact, machine experimentation and reading of the literature. Both formal and informal training are a part of the planned experiences of most ADP employees.

Training includes the development of skills and knowledge. The two types of training which address these two areas are termed skill training and environmental training. Skill training is the series of experiences orie ed toward the technical requirements of the individual job. An example would be the training of a programmer to use structured techniques or the training of a supervisor in techniques for interviewing prospective employees Environmental training, on the other hand, includes conveying knowledge about the organization to an employee. If an employee understands the reason for his job and how his job contributes or fits into the total scheme of things, he will generally be more interested and more productive. (10)

Training is by definition something that is planned and has objectives. It is the succession of planned experiences that requires a systematic approach to training. It is not as important how the training is accomplished as why the training is accomplished. The training must be a part of the need succession of experiences for the employee.

It is the purpose of this paper to provide a model which presents a systematic approach to ADP training consisting of four major interconnected component processes: assessment, development, initiation and evaluation.

1.3 Motivation to Train.

Almost every article published in the last few years which addresses the cost of software development makes a point that personnel costs are increasin as a percent of total costs and hardware costs are decreasing as a percent of cost. (15) Several such articles indicate that about one third of all computer center costs are related to hardware and two thirds are related to personnel. Further, it is predicted that hardware costs will continue to decline and personnel costs will continue to increase. Additionally, in software life cycles, these reports indicate that the major expense is for maintenance and operation of the software which are essentially personnel costs. (15) Many proposals have been made regarding ways to make people more productive and software more efficient and easier to maintain. All of this effort reflects the cost of personnel.

People costs are real and exist today and will exist tomorrow. Many of the areas being studied and resulting in proposals to increase productivity do not exist today and may not exist tomorrow. (2) For example, it has been fourteen years since the theory of structured programming was introduced. In brief, this theory states that any program can be written with only three control structures. Furthermore, programs written with only these structures will have fewer errors when they are created than programs that use unconditional transfer of control (GOTO) statements. (14) As a result structured programs will be easier to test and maintain than unstructured programs. (14)

Because the theory promised improvements in the areas of program testing and maintenance, it had enormous implications for programmer productivity. Since somewhat in excess of fifty percent of a typical programming budget is spent in program testing and maintenance, any theory that could improve productivity in these areas should surely be accepted with open arms. However, structured programming was not accepted because it was too academic. Everybody, however, did agree with the theory. But how did a programmer design, document, code and maintain a program using structured programming or GOTO-less programming? More specifically, how should the thousands of programmers in industry apply this new theory in their daily work? In short, structured programming was a theory waiting for a practical method of implementation. To a degree the wait continues today. According to some surveys, only one fourth of the computer centers today claim to use structured programming techniques. It is not so much that methods of implementation are not available, it is just that the available methods of implementation are incomplete or impractical. (14)

The above example with structured programming is but one of many examples of theories or ideas which will make programmers more productive and provide cost reductions. Theories, however, do not work without good implementation methods; people need to receive training on implementation methods. Through the systematic approach to training these theories must be evaluated and implementation methods found or created if the theories are determined to provide a significant cost benefit.

Basically, people are the largest single ADP expense. Management must take action to develop training that in fact causes employees to be more productive and develop less costly software. A study done in 1965 showed the average COBOL programmer was producing ten to twelve lines of code a day. A study done in 1975 showed no improvement. In contrast studies done on projects using structured programming were far different. One showed 35 to 65 lines of code per day. A second study found 110 to 120 tested lines of code and a third study of a period of over four years showed an increase in productivity of seventy-seven percent. (14) It is apparent that there are new ways to do things that improve productivity. New ideas and theories must continually be evaluated, implementation approaches must be devised, and training programs developed in an effort to increase employee productivity to a point that productivity increases at a more rapid rate than the related personnel costs.

1.4 Audience.

The primary focus of this paper is the computer service center. This organization is a part of a larger organization and ADP is not the primary reason for the existence of this larger organization. The computer service center provides support to other elements of the larger organization. The computer service center has responsibilities which include procurement and operation of hardware; procurement, development and operation of software; and to advise and assist the customers of the service center.

This paper is written in a manner which is intended not to restrict the audience to ADP technicians or to those individuals with management experience or training. It is hoped that this paper will be of value to the ADP practitioners with little or no management experience who are just assuming or preparing to assume management responsibilities, as well as to managers with little or no ADP experience but with responsibilities for the supervision of ADP employees. In this effort a vocabulary which would restrict the usability of the paper have been avoided. Of course, it is primarily targeted toward the ADP manager who in most cases will have expertise and be knowledgeable in both ADP and management.

1.5 Organization of the Paper.

Chapter 2 presents the basic model proposed for a systematic approach to training. This model consists of four phases: assessment, development, initiation and evaluation. Assessment normally would be considered the first phase of the training process. The gathering and refinement of relevant organizational and personnel information occurs in this phase. Development is the phase in which training needs of employees and of the organization are delineated. Additionally, sources of training are identified. The matching of needs with sources within time and budget limitations and the actual training occur in the initiation phase. The last phase, evaluation, occurs after training is complete to assess with multiple benchmarks the effectiveness and benefits of the training. The four phases are designed to be used in a continuous dynamic fashion with feedback occurring between various phases to change the training program in response to organizational, employee and extern change. Chapters 3 through 5 elaborate on the phases of the model: assessment development and initiation respectively. Chapter 6 provides delineation of the sources of training in the ADP field and some evaluation of the quality of these sources. Chapter 7 covers the evaluation phase of the model and chapter 8 summarizes the results and provides guidance for future work.

Chapter 2

A Systematic Model for Training

2.1 Introduction.

This chapter presents the basic model for a systematic approach to training of ADP personnel. Prior to presentation of the model, other considerations are presented regarding prerequisites for the model to be workable in a given organizational environment. Also, training as a system is placed in perspective.

2.2 Philosophical Environment Prerequisites.

"The average human has an inherent dislike for work and will avoid it if he can. Because of this human characteristic of dislike of work, most people must be coerced, controlled, directed, threatened with punishment to get them to put forth adequate effort toward the achievement of organizational objectives. The average human being prefers to be directed, wishes to avoid responsibility, has relatively little ambition, wants security above all." (11 Behind every managerial decision or action are assumptions about human nature and human behavior. A few of these are indicated in the opening of this paragraph. These types of assumptions exist today and would not have persisted if there were not a considerable body of evidence to support them. That body of evidence, however, can be self-fulfilling. That is, people tend to act the way they are treated. If the above assumptions about people influence the managerial decisions and action, then it is likely that the people will react in a manner which confirms the assumptions. Training in an organization with managerial decisions and action based upon the philosophies above about people is not possible using the model and procedures proposed in this paper.

This model was developed with the belief that the limits on human collaboration in the organizational setting are not limits of human nature but of management's ingenuity in discovering how to realize the potential represented by its human resources. This belief is based on the following assumptions about people. "The expenditure of physical and mental effort is as natural as rest or play. External control and the threat of punishment are not the only means for bringing about effort toward organizational objectives. Man will exercise self-direction and self-control in the service of objectives to which he is committed. Commitment to objectives is a function of the rewards associated with their achievement. The average human being learns, under proper conditions, not only to accept but to seek responsibility. The capacity to exercise a relatively high degree of imagination, ingenuity and creativity in the solution of organizational problems is widely, not narrowly, distributed in the population. Under the conditions of modern industrial life, the intellectual potentialities of the average human being are only partially utilized." (11)

An ADP manager may be surprised to find that employees' perception of managerial policies regarding the treatment and assumptions about people are different than what the manager intended. The employees must perceive a positive attitude toward training by managerial personnel for training to be successful. A lot of people in managerial positions are establishing policies that send unintended messages to people. (8) As a result, managers can have a very significant impact on training. For example, many organizations have annual or semi-annual merit reviews which have as a primary intention the determination of whether an employee should receive a salary hike and perhaps to recommend training that might improve employee performance. The effect of such perfunctory reviews, however, is that the employees tend to feel there is no demonstrated interest in their development and improvement. (3) Right or wrong, the feeling will prevail that a need for training is used as justification for a lesser salary increase. Again when such an employee attitude is caused by the perceived managerial attitude, the training program defined in this paper is not going to be successful. (3) For this training program to be successful, it requires an environment which is perceived by the employees to support training and reward for efforts on the part of individuals who take action to improve their job performance through training.

2.3 Integral Part of Organization.

This model is a proposal for a systematic approach to training which should become an integral part of other organizational functions, e.g., hiring promotion and evaluation. Systematic training will have other benefits, e.g. it will provide the nucleus for an overall personnel development program within an organization. A good training program will tailor the training program to each employee, thus effectively raising the level of expertise to the needs of the job for which an individual was hired. Also, an effective training program may make it feasible to hire from within the organization by allowing individuals who are less qualified than desired to become viable candidates for a position. These people are familiar with the organization and must have demonstrated a desire to advance. The systematic training program can ascertain the resources required to train these employees It has been shown that in-house promotion can create a great deal of employee loyalty. (20)

As a part of the employee evaluation process, the employee should have the progress of the last period measured and projected improvements establishe for the following period. (3) These activities fit into the training program in that the improvement during the period is at least partially a function of the training experience and the projected improvements are at least partially training requirements for the employee.

Promotion should be impacted by training. A promotion should be linked to the individual being prepared for the advancement by incrementally broader training experiences. At the same time an individual selected for promotion may be less than fully qualified for the new job but through proper training can grow into the new position. (17) Through use, the systematic training model will become an integral part of the organization and result in personnel training being an active part of the personnel actions of promotion, evaluation and hiring.

2.4 Training as a System.

Training is a necessity---not a luxury. As a necessity it is essential that there be a systematic approach to training. Being systematic, of course, requires planning and a concerted effort to analyze and structure. Of course, this requires resources. Unfortunately many ADP managers are so busy doing today's job that they never get to the task of developing people for tomorrow. The results of their ignoring that developing people for tomorrow is a critical part of today's job are obvious. It is natural for managers to resist establishing a systematic training program since all too often they are not systematic. The most universal human drive is a seeking for significance and "fire-fighting" is a heroic role. There are many ADP managers that are not ready to face up to the problem of managing with a system. They thrive on "fire-fighting", i.e., living from crisis to crisis. (

There must be a systematic approach to ADP training. This approach must provide for the development of employees as preparation for tomorrow's challenges, whether that be as a result of changing technology or employee advancement. If time is taken today to develop people, tomorrow will not be a crisis. Through personnel development, managers can break this part of the crisis management cycle.

2.5 A Basic Training Model.

The model proposed in this paper as a systematic approach to training consists of four phases, each of which is the subject of a chapter in this paper. The phases are assessment, development, initiation and evaluation.

Assessment involves studying the whole organization, gathering information about the organization and preparing for the task of developing a systematic training program. As a system the training program requires certain specific input. This input which is defined in the next chapter is either gathered, or modified if necessary, during the assessment phase.

During the development phase the training topics applicable to the ADP organization are determined and documented. No training is conducted as part of this phase. It is primarily oriented toward defining what training is required and how it can be accomplished.

During the initiation phase the training is actually scheduled and conducted. As an essential part of initiating the training, an individual training plan is prepared for each employee and training is conducted in accordance with the aggregate of all employee plans.

Evaluation includes evaluation of the training being conducted and evaluation of the benefits received from the training. As information is gathered in evaluating the training, feedback is provided to the other three phases to insure that the assessment, development and actual training are continually upgraded and improved.

The basic model is pictured in figure 2.1. The model presentation will be expanded as information is provided in subsequent chapters.

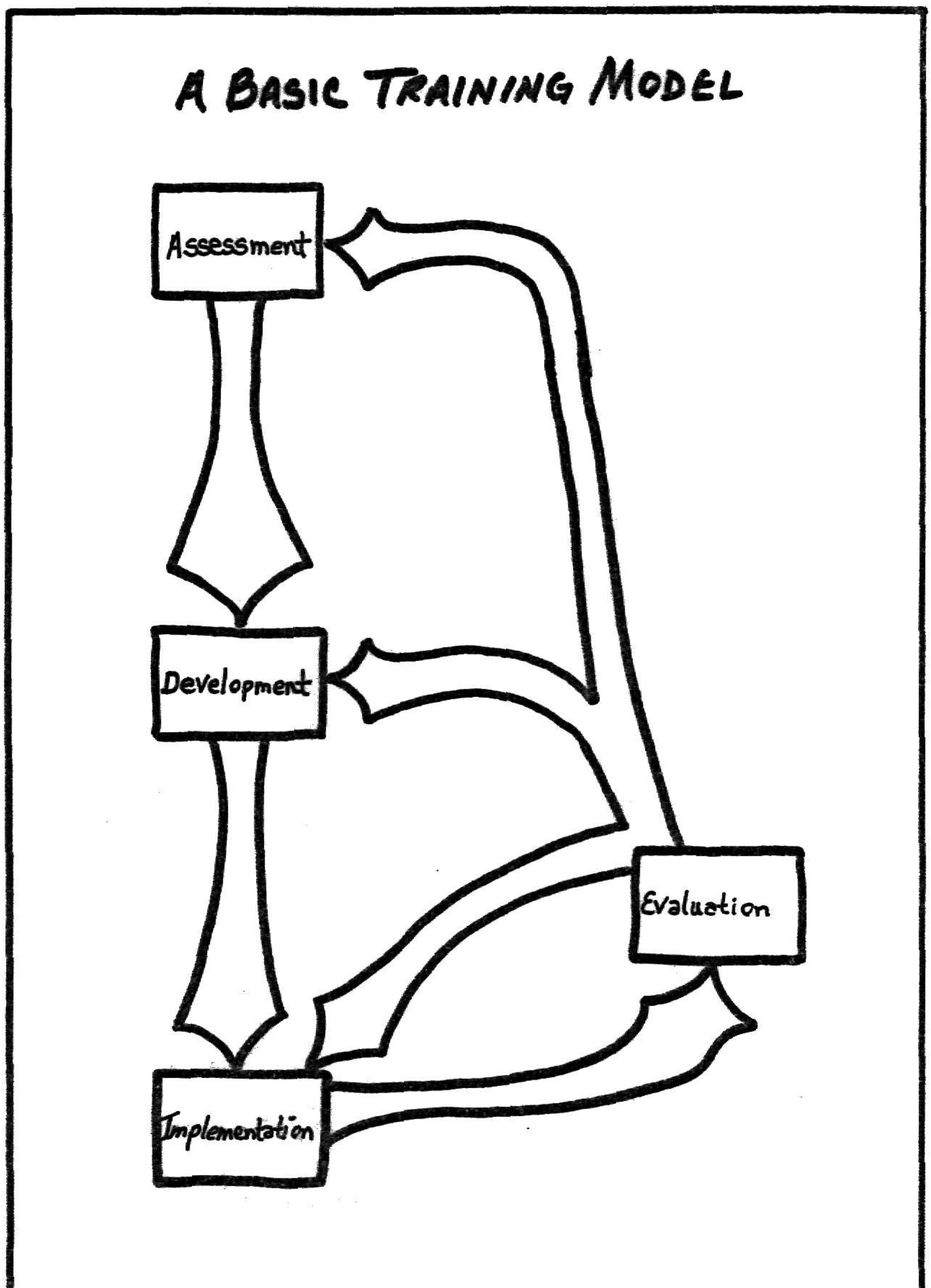
A BASIC TRAINING MODEL
Assessment
Development
Evaluation
Implementation

Figure 2.1 A Basic Training Model

Chapter 3

Assessment

3.1 Introduction.

The assessment phase of the systematic approach to ADP training includes the gathering and preparation of inputs required for the development of the training program. In addition, assignment of responsibilities must be established for the training program. The first and most important step in this phase is the designation of a training coordinator for the ADP element of the organization. Section 3.2 discusses the responsibilities and organizational position of this individual. The information which must be gathered and/or prepared includes organizational structure and goals, individual employee training records and job descriptions. Each of these topics is discussed in a subsequent section of this chapter.

3.2 Training Coordinator.

The decision to create a training function within an organization is often made on grounds which are oblique to the main function of training. For example, a training program may be established for the prestige which this gives, or one may be discontinued because of lack of manufacturing space. This decision is confused by the general lack of understanding of the role of training in an organization. Too often, training is thought of as giving courses, when in reality, training is a succession of planned experiences intended to bring the skills and knowledge of the ADP employee closer to the future needs of the organization. (21)

The overall responsibility for training within the company should be established. This responsibility may be within the personnel department or within a separate element such as a training department. The training coordinator for ADP training should not be a part of the training department. The training coordinator for ADP training should be located within the ADP element and be a staff representative of the ADP manager. The ADP training coordinator should have staff responsibility for coordinating ADP training requirements with the training department, monitoring the training needs of ADP employees, insuring that all personnel receive training, maintaining training records for ADP employees, developing in-house training, and developing, implementing and evaluating the ADP training program. The ADP manager would have live responsibility for training and for supervision and direction of the training coordinator.

The minimum staffing requirement for training is one person who serves as training coordinator---though in a small organization, this may be only a part time function. If the training coordinator is a part time job, it should be assigned to a person within the ADP department who has demonstrated managerial capabilities. The training coordinator has overall responsibility for each ADP employee with respect to the maintenance of skills, just as others have responsibility for maintenance of other capital items.

Since ADP employees are generally not managed directly by the training coordinator except perhaps at the beginning of their employment, there is always potential for conflict between the training coordinator and the employees' current manager. Conflict between manager and training coordinator regarding the amount and timing of training is no different conceptually from conflict over the amount and timing of any other maintenance. Operating managers, if left to themselves, might run equipment into the ground. Though skills once acquired do not deteriorate if used, they become obsolete quite rapidly in advancing fields such as ADP. Without an actively coordinated training program, the ADP function will steadily become obsolete and nonresponsive to organizational need

The training coordinator not only monitors the training needs of the ADP employees but is also responsible for selecting the source of training. It