A SYSTEMATIC APPROACH TO ADP TRAINING

by

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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

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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 indust1 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 future 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 referred 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 train-
ing 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: assess-
ment 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. (2

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
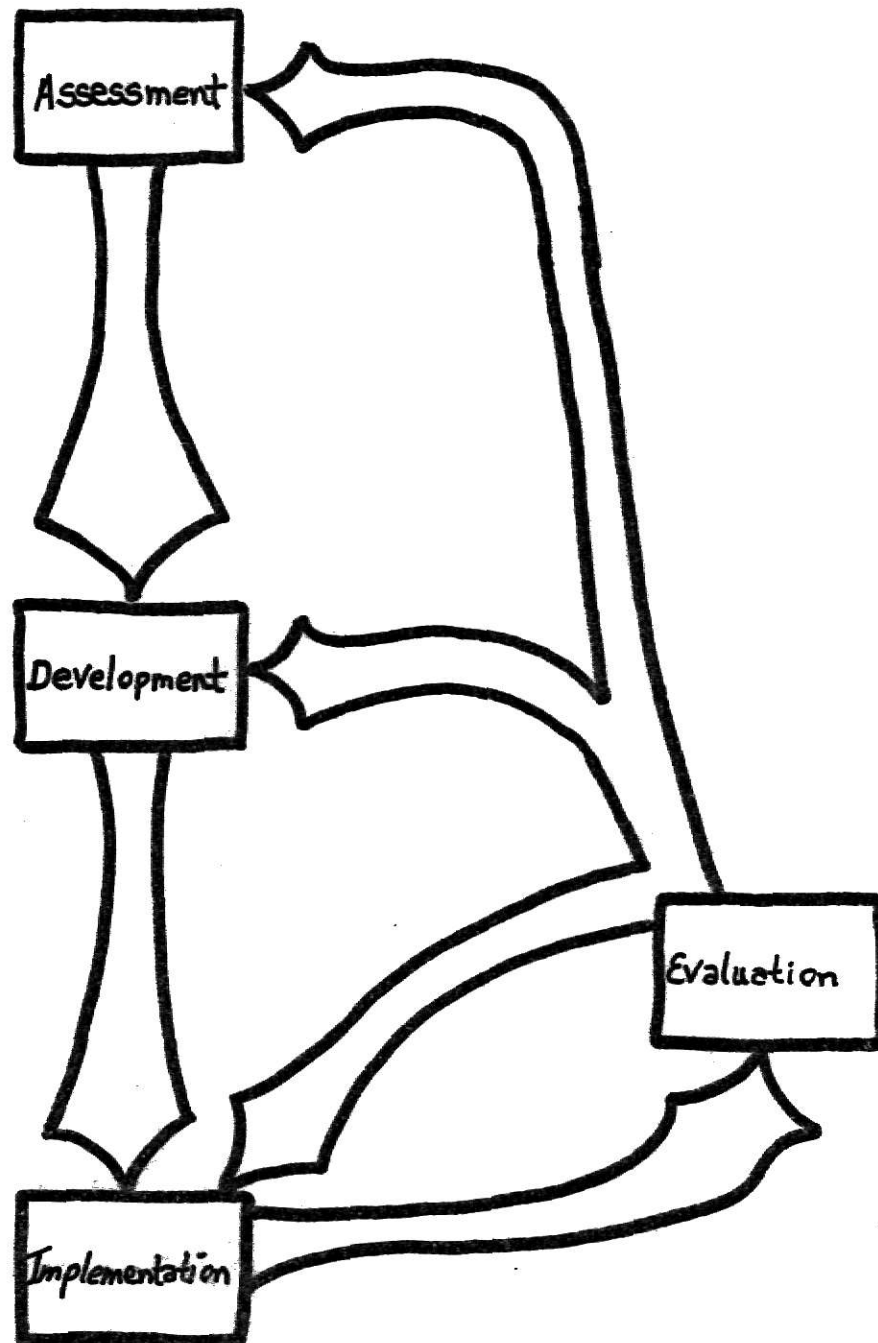
Figure 2.1 A Basic Training Model

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

is important that the training coordinator not be in the training department.
The training department, if there is one, should be regarded simply as one
potential source for the purchase of training. If the training coordinator
were part of that organization, there would be a conflict of interest
situation which could easily result in empire building. (21)

If the ADP organization does not have a training coordinator, the first
action to be taken in establishing a training function will be the selection
of a training coordinator. In this paper it is assumed that a training
coordinator has been designated and recommendations for assignment of
responsibilities are made.

3.3 Organization.

Traditionally, management has thought of ADP as a tool to facilitate
the performance of a single transaction process. As a result, ADP often
has been the organizational captive of user departments and/or under the
control of the controller. Although this approach seems to have worked well
in the early and mid 1960s, rising costs, the introduction of third
generation equipment and software and the need for coordinated decision
making information to deal with the complex business problems of the 1970s
have led many managements to consolidate, reorganize and relocate the ADP
function in the corporate structure. Increasingly, companies are establishing
quasi-independent corporate ADP departments reporting at the same level as
other functional departments.

A systematic analysis of the firm's operating environment and inter-
departmental relationships combined with a cost-benefit comparison of the
current system and the proposed organizational alternatives will help
management optimize the potential benefits of effective ADP. (18)

No matter how the ADP function is organized or where it is located
within the organization, the ADP strategy of the organization must be well
established. The internal organization or structure of the ADP element of

the organization should then be a reflection of this strategy. There is no one organizational structure for an ADP element that satisfies all strategies. The organization must be assessed in terms of its ability to provide the desired services to supported activities in the manner required by the basic ADP strategy.

The documentation of this ADP strategy, the organization chart for the total organization, the organization chart for the ADP organization, the published objectives of the organization and the objectives of the functional departments supported by the ADP element should be provided to the training coordinator. If these or similar documents do not exist, they should be created. Of particular importance is the ADP strategy documentation. If this does not exist or if the ADP strategy has not been evaluated for a lengthy period of time, action should be initiated with the involvement of top management to schedule an ADP strategy planning conference. Periodic ADP strategy reviews are a means of insuring that strategy remains dynamic and responsive to the needs of the organization. This, however, is not a recommendation for annual reorganization of the organization's ADP function.(1(

3.4 ADP Employee Training Records.

Training records should be established for all ADP employees at the time they are hired. These records should be initiated and maintained by the training coordinator. These records may be a part of an automated data base of employee personnel data which is maintained for all employees in the company or may be manually maintained by the training coordinator for the ADP employees. Technique and procedure are not the primary concerns. An important thing is that the training coordinator can reference the training history for each ADP employee.

These training records should be created initially by interviewing the employee to obtain information regarding training received prior to

being employed. The training received prior to employment may be of two types---training received while working for another organization and training received in public and private institutions. The training received should be made a matter of record by the training coordinator for use in developing a training plan for the employee. The training recorded, to the extent possible, should be in detailed terms such as descriptive titles and abstracts of courses taken rather than degrees received. (6)

In addition to pre-employment training, all training received by employees should also be recorded as a part of the ADP training record. If training records have not been maintained for the ADP employees, the records should be created. The process of creating the records should include review of reports and records maintained by the ADP organization as well as conducting interviews with the employees, testing the employees and requesting supervisor evaluations of employees. The purpose of the record creation project should be to develop as clear a picture as possible of the employee training history.

As a part of the training records the costs of all training received should be computed and recorded. In all cases this may not be possible, but to the extent possible the cost of the training should be recorded. Also, employee and employee supervisor feedback on the applicability and value of the training should be requested after the training and recorded as a part of the training record. If a formal training program has not existed in the organization, it is unlikely that most of the historical information will be available. All that is available should be gathered and recorded.

Figure 3.1 is a sample training profile format for use in recording employees' training and experience. Key elements which are provided for

TRAINING PROFILE

EMPLOYEE EXPERIENCE

1. Date Hired:__/__/__. 2. Name:_____

3. Employee ID:_____. 4. Office:_____

Personal Data

10. Previous ADP Employers:_____

_____

_____

11. Previous ADP Job Titles:_____

_____

_____

12. Hardware Employee Has Worked With:_____

_____

_____

13. Programming Languages Employee Knows: (Indicate years of experience and year last used for each language)_____

_____

_____

14. Description of Management Experiences:_____

_____

_____

15. Training: (List all ADP Training)

Course Title	Where Taken	Text Used	Year	Course Length

16. Date of Last Review:_____

17. Employee's Intitials:_____

Figure 3.1 Training Profile

on the profile are job experience and courses taken to include title of courses, textbooks, grades and when and where courses were taken. It is also important that each employee periodically review this information. A place should be provided for recording the last employee review.

3.5 Job Descriptions.

As a part of the development of a training program for each employee, it is necessary to have a description of the job the employee is expected to perform, and this information should be provided to the training coordinator. If written job descriptions do not exist, any information which categorizes the duties expected of the occupant of a position should be provided. This information may include organization and function manuals for the various elements of the ADP organization or operations and procedures manuals. Also, information used to advertise for position vacancies may be of value in establishing a word picture of the duties associated with each position or each type of position.

A job description should be prepared for each employee as an input to the development phase. The job description should be written in terms of skills and knowledge expected and conditions under which the job and specific skills are expected to be performed. It becomes a most difficult task to accomplish due to the requirement to specify the conditions under which the tasks are performed. It is important to list in rather specific detail what tasks the individual must be capable of performing (See Figure 3.2 for an example).

Examples of tasks and conditions under which the tasks are performed follows. An application programmer's job description might include: Prepares JCL required for program tests of application programs to be tested. The conditions under which this task is accomplished might be: with the use of the vendor system manual and organization procedures manual. A

```
SAMPLE JOB DESCRIPTION

JOB TITLE: Application Programmer A

OFFICE: Programming Branch
```

___   Other Administrative Information   ___

```
DUTIES: 1) Codes programs in COBOL, FORTRAN and PL1 using
           design specifications and vendor manuals for
           COBOL, FORTRAN and PL1.40%

        2) Assists system analysts in documentation of
           design specifications for program modules using
           documentation standards manual of organization.5%

        3) Codes COBOL programs using structured programming
           techniques specified in structured COBOL manual
           of organization.

        4) Prepares unit test data for assigned programs
           using design specifications and guidance from
           system analysts.10%

        5) Assists assigned lead programmer is preparation
           of schedules and machine time requirements for
           compiles and tests using design specifications,
           test plan, guidance from lead programmer, and
           machine time estimating manual for organization.

        6) Prepares program documentation and maintains
           documentation for all assigned programs using
           documentation standards manual of organization.

        7) Tests programs and provides test results to
           systems analyst for approval using unit test
           manual of organization.5%

        8) Submits weekly status report to lead programmer
           using organization status report guidance.5%
```

___   Duties would be continued   ___
                   until all were listed

Figure 3.2 Sample Job Description

system analyst might have a task of: Prepare test conditions for system testing and the conditions might be: using the functional and design specifications for the module to be tested.

The method of obtaining the job description will probably determine the level of detail and how useful it will be in developing the training program. If the job descriptions were previously written and are being revised at this time, it is probable that they will be of more detail than descriptions being initially created.

It is difficult to prepare quality descriptions in mass volume. Also, if the descriptions are written by the supervisors of the positions, the quality of the effort will vary among the supervisors. To alleviate this problem, guidelines and a sample job description should be prepared for distribution to supervisors. The sample job description should be one prepared for an actual position in the organization. The job description should list as many skills possible and the knowledge required to be effective in the job. The best place to obtain this information is from the occupant of the position. A good method is for the supervisor to advise each of the employees of the requirement to prepare or update the job descriptions, ask the employees to give the matter some thought and then to prepare a list of the skills and knowledge that they feel are required for their job.

In some cases the skills and knowledge for several positions will be identical. In these cases it is beneficial to have the more experienced employee participate in developing the job description and upon completion have the other employees review the job description and suggest additions or modifications to improve it. The supervisor and employee should jointly develop a draft description with the supervisor ultimately preparing the final job description. After several reviews, updates and modifications

the job descriptions will become more accurate. Extreme effort to make

the first iteration of the job descriptions perfect is generally not worth

the effort.

3.6 Summary.

Assessment is the first step required to create a systematic training

program. Assessment involves studying the whole organization, gathering

information about the organization, and preparing for the task of developing

a training program by establishing records of training and experiences of

all employees, establishing job descriptions for all employees, and estab-

lishing a training coordinator if necessary. Upon completion of the

assessment phase, a training coordinator exists and has gathered information

on the ADP strategy of the organization, the structure and policies of the

organization, the training and experiences of employees for training

records and detailed descriptions of jobs. Assessment phase of the model

for developing a systematic approach to training is presented in Figure 3.3.

ASSESSMENT PHASE

Organization with an ADP Function

Assessment Phase Functions

- Designate Training Coordinator
- Establish and Update Training Records
- Develop and Document General Organization ADP Strategy
- Prepare and Modify Job Descriptions
- Create and Maintain Organizational Chart

Outputs

- Training Coordinator
- Training Records
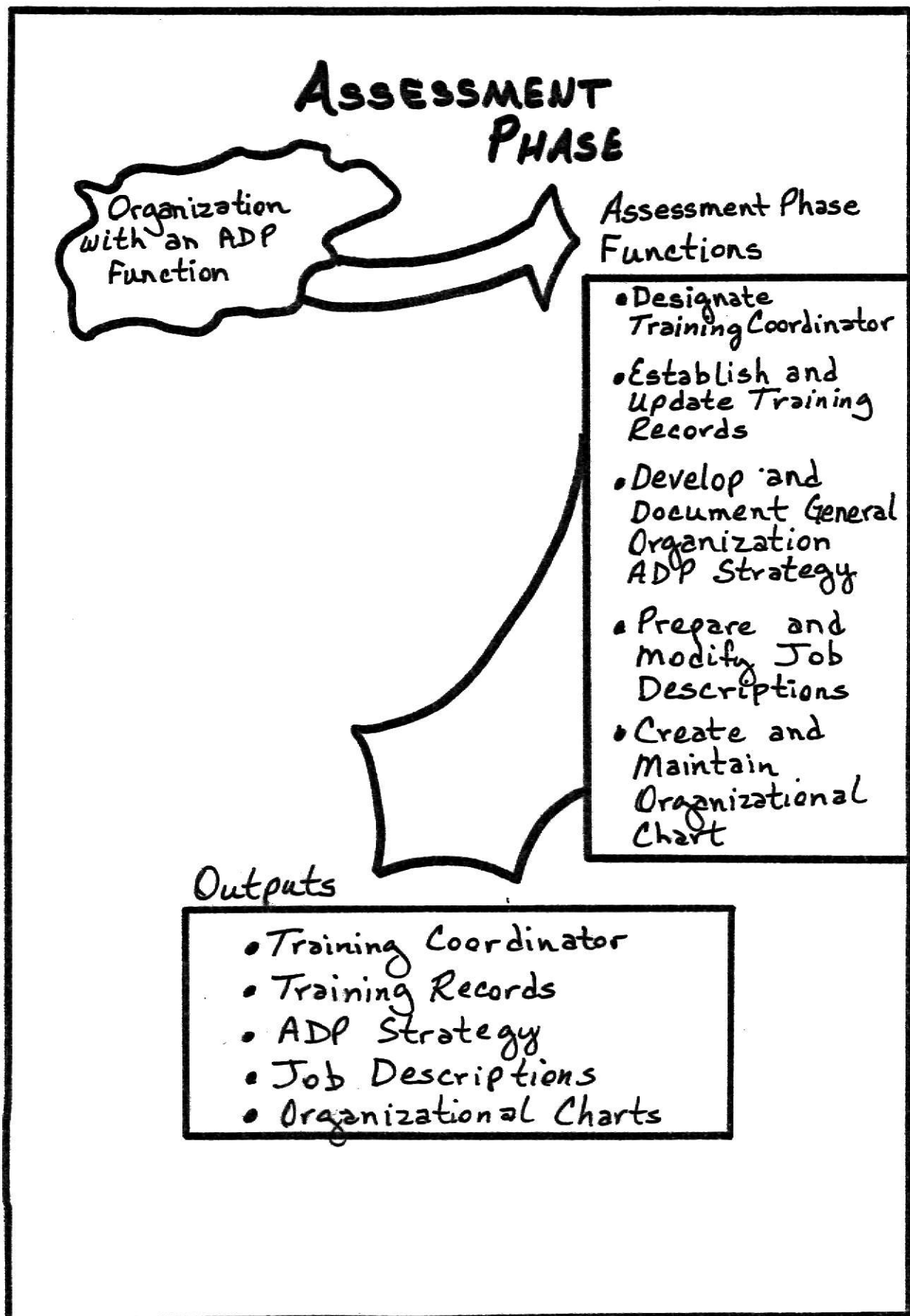- ADP Strategy
- Job Descriptions
- Organizational Charts

Figure 3.3 Assessment

Chapter 4

Development

4.1 Introduction.

After the organization, its environment and its people have been

assessed, development of the training program is started. It is envisioned

that the training coordinator will be assigned responsibility for the

development of the training program. It must be remembered that during

the assessment, deficiencies such as no known or formal ADP strategy or

no published job descriptions may have been identified. Before taking

action described in this chapter, corrective action should be initiated

and completed to correct the existing deficiencies. The products des-

cribed as being required from the assessment phase as input to the

development phase are essential to good management of an organization and,

therefore, efforts to create such products will be beneficial to the

overall management of the ADP organization as well as providing input to

the development phase.

4.2 Skills and Knowledge.

To begin the development of a training program requires recapitu-

lation of the skills and knowledge for which the succession of planned

experiences is intended. The first step in accomplishing this is

analysis of the individual job descriptions. The personnel within the

ADP organization should each have a job that can be categorized under a

functional title and at a skill level with the functional area.

The following functional groupings are provided as a guide. Large

Computer centers will most likely have most of the categories of personnel

and should be able to classify all personnel into the specified functional

areas. Smaller ADP operations may very likely have jobs which are less specialized and combine several classifications into one job.

Data Processing Management includes the Manager, Assistant Manager, Technical Assistant, Training Coordinator and Scheduler.

Systems Programming includes the Systems Manager and Systems Programmers.

Applications Programming includes the Programming Manager and Applications Programmers.

Systems Analysis includes the Manager of System Analysis and System Analysts.

User Services includes the manager of User Services and User Services Consultants, Librarians, User Education Specialists, Data Specialists, and Technical Writers.

Computer Operations includes the Operations Manager, Computer Operators, Tape Librarian, Control Clerk/Scheduler, and Data Conversion Machine Operators

Within each of the above areas it is expected that there will be a range of proficiency among the employees. Figure 4.1 provides a representative categorization, but again the size of the organization will determine how many levels are appropriate. (12)

The above functional groupings and the skill levels in Figure 4.1 are provided as examples. Within organizations other terms may be used to accomplish the categorization of employees. The specific titles are not important. The important aspect is that some logical grouping of employees as presented does exist. If no such grouping exists within an organization the above examples should provide a guide for the establishment of the functional groups and skill levels within the groups.

After the groupings are established, classification descriptions are written for each classification. As an example, under the functional

EMPLOYEE SKILL LEVELS

CATEGORY	SKILL
Manager (Supervisor)	Usually in full charge of all activities of a section or department. May personally supervise the operations or direct the operations through subordinates.
Lead	Usually considered the assistant manager when an assistant manager does not exist or may be a line supervisor with full technical knowledge but added duties of assigning, instructing and checking other section members.
Senior	Usually competent to work at the highest technical levels of all phases of the activity. Works on own most of the time but may give some instructions to lower classifications.
A	Works under general supervision. Usually can work on own in most phases of the activity. Requires some general direction for the other phases.
B	Works under direct supervision. Usually fairly competent to work on several phases of the activity with only general directions, but needs some instruction and guidance for the other phases.
C	Works under immediate supervision, generally on only one activity. The work is checked carefully.
Trainee	Usually a probationary employee who has no previous experience in the activity.

Figure 4.1 Employee Skill Levels

grouping of Application Programming, a description of duties assigned to an application programmer should be prepared. This should be general enough to be applicable to all application programmers in the organization. The description is expanded for each skill level applicable to the organization such as Manager of Application Programming, Lead Programmer, Senior Programmer, Programmer A, Programmer B, Programmer C and Trainee Programmer. These descriptions should specify the duties normally expected of an employee occupying a position of the particular classification, such as Lead Programmer, but should be general enough to be applicable to all positions within that classification.

The job descriptions should be used to assist in the preparation of classification descriptions. The classification descriptions and job descriptions should be finalized and published as a composite document for the ADP organization. This document will be referred to as a classification manual. Using these final descriptions, a summary of the skills and knowledge required within the ADP organization can be prepared. This is done by taking all skills and knowledge listed in the descriptions and preparing one master catalog of skills and knowledge with a reference to each job requiring each skill and knowledge. Once the recapitulation is completed, the tasks requiring training have been established in their initial form.

In preparing the descriptions, particular attention should be paid to the managerial descriptions. A good ADP manager must be competent in many areas. He often has to work with users of widely diverse interests and backgrounds. He may also be responsible for security of a large

capital investment and invaluable information. The following seven topics
are considered essential background for an ADP manager. (1)

Programming techniques: Significant experience in one high-level
language; survey knowledge of commonly used high-level languages, such
as FORTRAN, COBOL, BASIC, ALGOL, APL, and PL1; and some experience with
assembly language and exposure to microprogramming.

Computer Applications: Experience in at least one computer applica-
tion, such as numerical methods, systems design, MIS, or CAI; knowledge
of computer applications, usually in business, research or manufacturing;
and ability to define, evaluate and use existing application programs.

Systems Software: Knowledge of operating systems concepts: TOS,
DOS, OS/VS, multiprocessing, multiprogramming, batch and time-sharing;
some experience in systems software, such as system generation procedures,
diagnostics and system module functions; and a broad knowledge in available
systems software and their characteristics and applicability to hardware
systems.

Computer Hardware: Understanding the logic, architecture, and
organization of contemporary hardware; a background in the functions and
operations of the functional hardware blocks, such as the arithmetic-
logic unit (ALU), control unit (CU), and memory; background in computer
specifications and characteristics; ability to select a hardware system
to meet application demands; and knowledge of teleprocessing hardware
and other peripheral devices.

Personnel Management: Background in behavioral science; understanding
of each category of staff job functions, such as operator, data clerk,
applications programmer, systems programmer, systems analyst, and group
supervisor; ability to recruit and assign proper jobs; knowledge in the
managerial functions of planning, organization, direction and control; and

knowledge of managerial techniques, such as in scheduling, evaluation, and leadership styles.

Financial Management: Background in statistical analysis; ability to project future needs; ability to manage and propose a fiscal budget; and ability to understand the financial and economic functions of and techniques used by an organization.

4.3 Career Paths.

The second major action required in developing the training program is that of establishing career paths. Career paths are an organized plan for development. Since many companies do not have career paths established this step may be considered optional, but it is suggested that career paths be established for the ADP personnel if paths do not exist.

Lawrence F. Peter provided a message regarding personnel development in t principle. According to his principle, the people in any organization tend to be promoted until they rise to their level of incompetence. An example might be an excellent programmer that is selected to be a project leader. The programmer is a poor project leader. The result is that management can be certain the Peter Principle is true, and they have lost an excellent programmer and gained an inefficient supervisor in the process. The Peter Principle is true when management fails to train the employees promoted to management positions prior to their assuming the new duties. Without the proper training and guidance, the employee probably still thinks the most important job is to design and code programs when in fact the most important job for the employee now is to provide leadership for other people. (17)

The Peter Principle assumes that people fall neatly onto a scale of competence or incompetence. The fact of the matter is that practically everybody falls somewhere in between the two extremes. There are a few

good people who are so competent that they can move into any job and
perceive the objectives and start performing well. These people are
referred to by such expressions as "natural leaders" or "born leaders".
There are also a few people who are so incompetent that no matter how
much guidance they are given, they are never able to handle some
jobs. Most people, however, when properly directed, shown what the
objectives are, and given the training needed for the job can do a good
job. (17,22)

If the Peter Principle is true, it is a result of failure by managers.
With an organized plan for the advancement of employees combined with the
development of employees according to a systematic plan and given the training
necessary to do the job, the Peter Principle normally will not be true. Train·
ing in accordance with an organized plan for advancement is the primary
management tool available to insure that the Peter Principle is not
true in an ADP organization. (22)

Planning a career program can start at any time in the occupational
life of an ADP professional and without regard to experience, education,
seniority, or present job classification. The plan can be made by finding
the person's present position on a chart and evaluating the career paths
that are available on the chart. Employees should be encouraged to develop
personal goals and career plans for advancement. A partial sample career
path chart is shown in Figure 4.2. Career paths will vary from organiza-
tion to organization. Salary at the various career levels is a consideration
in constructing an actual career paths plan.

In some cases ADP experience will qualify programmers and systems
analysts for positions in a corporate department with which they have
been working for several years. The direction a person will take will
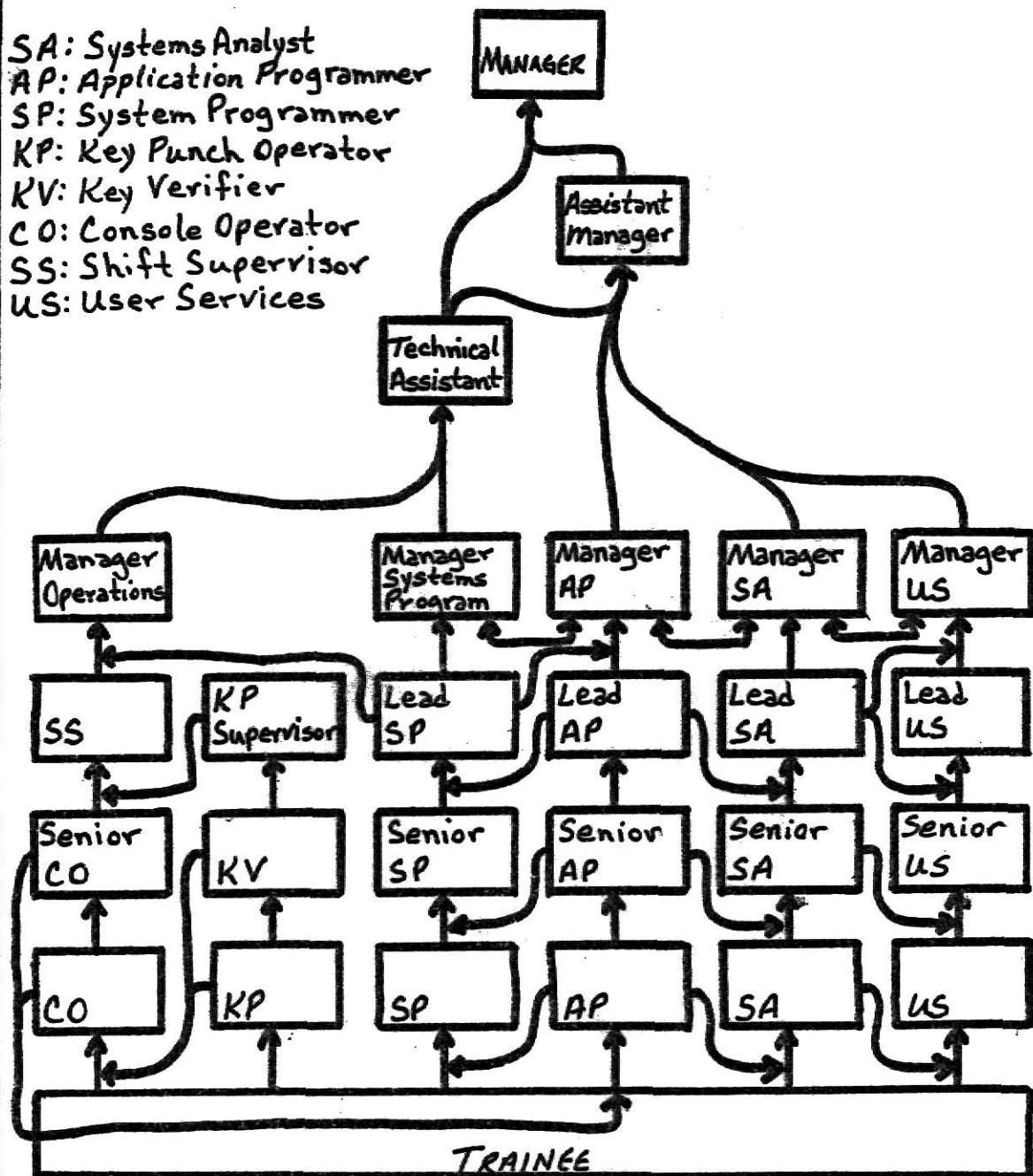depend on the person's qualifications and ambitions, as well as on

Figure 4.2 Sample Career Paths

corporate requirements and policies. It is usually enough that a person is given an opportunity to advance. A successful career path requires long-term planning and a commitment on training by both the firm and the employee. (21)

After the career paths have been established they should be reviewed to determine if there are career paths which are desirable to encourage thorough training. As an example, if it is decided that one of the best sources of people for application programming is computer operations in the skill levels A and B, then these categories of people should be offered some type of introductory programming training. After analysis of the career paths and adjustments, the career paths should be published and provided in the classification manual. This manual should then be distributed to all units as necessary to insure that interested employees can have easy access to the career paths and job descriptions of every job. This will encourage career planning and act as a motivator for many employees.

4.4 Analysis of Training Tasks.

The catalog of training tasks prepared as a recapitulation of skills and knowledge provides the input to the third major step in developing the training program, analysis of training tasks. Each task should be documented in the analysis phase as a training topic. This documentation should include task, conditions, standard, support, time and positions. (7)

Task is a statement of the skill or knowledge required. An example is "Demonstrate an understanding of the goals of the organizational element for which software systems are developed and maintained.", or, "Write a program using structured COBOL."

Conditions specify environment and constraints under which the task must be performed. For example, the conditions for the above task

of writing a structured COBOL program could specify the references that were to be used in writing the program. These references would in fact define what structured COBOL is for this firm.

Standard gives the criteria for successful completion of the task. This could include specification of the number of errors allowed or some description of the completed task. For example, the COBOL program above could have a standard which specifies what the program is to produce and that to successfully complete the task requires the program to compile and execute using the constructs specified in conditions and produce the correct results.

Support specifies the facilities and equipment required to train for the task. To continue the example of the COBOL program, the support would include copies of the references, access to a computer to compile and execute, and normal office space for working on the program.

Time would be the length of time normally expected to be required to teach the task and have the employee be able to accomplish or demonstrate the task as specified in the standard.

Positions is a cross reference to the positions within the organization for which the occupants of the positions are expected to be proficient at the task.

4.5 Training Alternatives.

The fourth and final requirement in developing the training program is the process of evaluating training alternatives. It must be decided how each of the documented training topics will be taught or for that matter if it is possible to teach the topic. Training is available from hardware vendors, software vendors, education vendors and professional societies. Training can also be provided in-house and the bulk of the planned experiences needed to train the employees will involve some

in-house training. Sources of training and training material are the sub-
ject of chapter 6. These sources should be reviewed to determine which
alternatives are available and feasible for the training documented as
training topics.

The documentation of training topics prepared as step three in
development should now be expanded to include the possible sources of
training for each training topic. The training topic documentation will
then include the task, conditions, standard, support, time, positions
and sources for each training topic.

4.6 Summary.

Development is the second step required to create a systematic train-
ing program. Development is comprised of four steps: a recapitulation of
the skills and knowledge required within the ADP organization, development
of career paths for the ADP organization, analysis and documentation of
the training topics, and selection of possible sources for training of
each training topic. Upon completion of the development phase, a training
coordinator exists and has gathered and documented the ADP strategy for
the organization, training records for all employees have been prepared,
job descriptions for all employees have been prepared or updated, career
paths for the ADP employees have been established, training topics have
been documented to include sources of training. Publication of this informa-
tion as reference material for employees and supervisors will provide a
valuable tool for career development without even having given any training.
This documentation should be of assistance in counseling and evaluating
employees. Development as a part of the model for developing a systematic
approach to training is presented in Figure 4.3.

DEVELOPMENT PHASE

Inputs

- Training Coordinator
- Training Records
- ADP Strategy
- Job Descriptions

Development Phase Functions

- Delineate Skills and Knowledge by Job Classification
- Develop Career Paths
- Develop Potential Training Topics
- Identify Training Sources

Outputs

- Skill and Knowledge Catalog
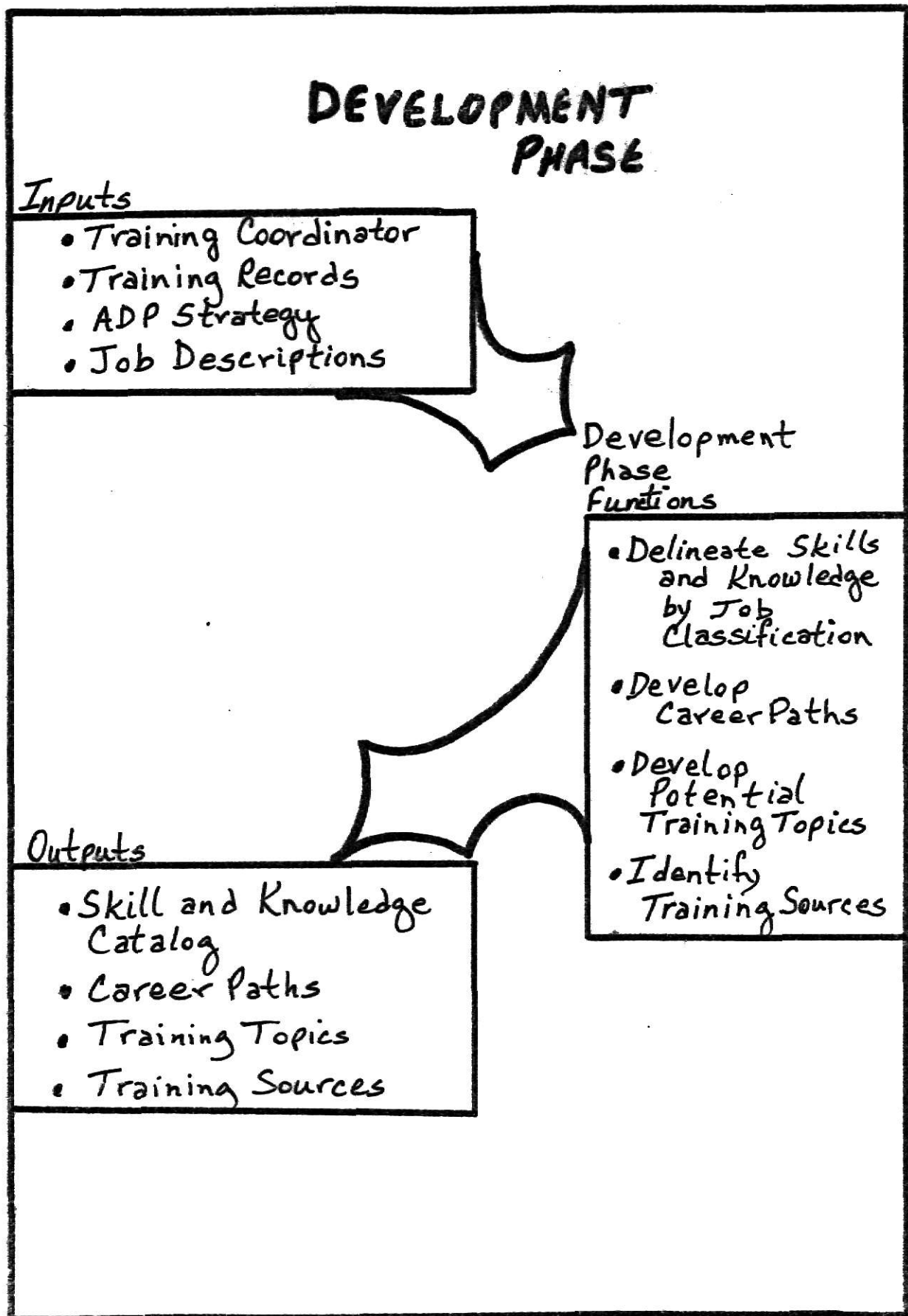- Career Paths
- Training Topics
- Training Sources

Figure 4.3 Development

Chapter 5

Implementation

5.1 Introduction.

Upon completion of the Development Phase, a great deal of documentation has been prepared. This documentation will make the task of personnel development more systematic. It is possible using this documentation to better answer the questions presented as problems earlier of who to train, when to train, where to train, how to train and what techniques to include. This chapter will address these questions and provide methods for answering them.

To start the implementation of the training program, it is suggested that the training be started at the "Top". Any good training experience received by supervisory personnel has multiple benefits. The higher the individual is in the organization, the number of areas in which the individual is expected to have some skills and knowledge is increased. A supervisor can make changes to procedures and implement new practices that will have an influence on the proficiency of many employees. When a supervisor or manager has a training deficiency in the form of lack of required skills and knowledge, the total organization can suffer. Therefore, start at the "Top".

5.2 Selecting Topics for Training.

The process of selecting training topics involves, to a large extent, the evaluation of the needs of the employees. Basically, the training topics to be presented should be determined by self-evaluation and supervisor-evaluation of each employee. This can be accomplished by comparing the employee's demonstrated capabilities to the job descriptions of the employee's current position and to the next position in the career path.

For example, if an employee is currently in a Senior Application Programmer position the employee's training plan could be developed based on evaluation of the job descriptions for a senior and a lead programmer. The training requirements developed based on these reviews should be forwarded to the training coordinator for review and consolidation.

In an effort to prevent an excessive workload in preparing the training requirements, a schedule should be recommended which will distribute the requirement for the reviews and evaluations throughout the year. For example, all employees at the skill level, lead, could be evaluated during January, those with skill level, senior, during March, those with level, A, during May, those with level, B, during July, and level, C, during September. Supervisors and managers could be evaluated during November and trainees would be evaluated at fixed periods during their training, such as after thirty days and after six months of employment. The exact schedule will vary for different organizations depending upon the skill levels selected and other requirements for personnel evaluation that are in existence. This process of evaluating the individual training needs of employees is an in put to the next year's training plan for each employee. An annual evaluation of employees is a topic of further discussion in the chapter on evaluation.

One result of the review and evaluation of the needs of the employees is a training plan for each employee. An individual training plan is a series of planned experiences for an individual employee. Once the training coordinator receives the training plans for all employees at a particular skill level, action can be taken to develop proposed training courses based on the aggregate needs of the employees. Some analysis will be required to determine the content and timing of the training to

maximize the benefit to the organization as a return on the training investment.

The managers in each functional area and the training coordinator must be continually alert to new techniques which will have benefit to the organization if implemented. Implementation of new technology and techniques may require training as preparation for the implementation. Changes to procedures associated should not be undertaken until adequate training has been provided to the employees impacted by the change.

The training coordinator must also receive guidance from the ADP manager regarding necessary training. This list of training should include topics associated with changes in the ADP strategy of the organization; changes to the organizational structure or objectives and goals; changes in technology and techniques to be implemented; and corrective action in response to performance measurements monitored for the ADP operation.

With the aggregate needs of the employees for a particular skill level, new technology and techniques, guidance from the Manager, and the previous list of training requirements, the training coordinator can prepare a new list of training requirements. This will be accomplished approximately every two months as the phased evaluation and definition of employee needs is accomplished. Each time a new list is prepared, it should be arranged in prioritized sequence by importance of training. The list should then be presented to the management staff for approval. Once approved the training coordinator has a list of what is to be trained in order of importance for the next year. This provides the ability to project needed training a year in advance, but allows for update and revision every sixty days, if necessary.

A final note on selecting topics for training is appropriate. Do not allow a training organization to "sell" the ADP organization training. Using the systematic training method, training needed and desired has been tabulated. Develop or buy only the training required.

5.3 Selecting People for Training.

If managers are lacking in the necessary skills and knowledge, they should be scheduled for formal training as soon as possible. Lack of qualifications by managers are not easily corrected on the job. Any lack of qualification rapidly appears in an inefficiently run installation, evidenced by low throughput, late delivery, high turnover, systems failure and dissatisfied users. (1)

For additional thought on possible training for managers, a parable of eight common games played by ADP managers is provided as an appendix. If these games are recognized as being played by supervisors and managers, serious consideration should be given to contracting for management training for all managers in the organization.

A very important consideration in selecting people for training is official commitments to employees. If a promise for training has been given to an employee as a condition associated with his accepting employment, for example, then it is essential that this employee be given the promised training. Also, employees who were hired from within the organization and possessed less than the needed qualifications for the job must be monitored closely and action to insure required training is provided must be taken. Failure to schedule these types of employees for training will result in adverse personnel feelings regarding the organization and the

training program. Commitments, official or implied, must be scheduled and accomplished.

Training should be scheduled in conjunction with expected advancement. Training should not be given to an individual if the training will prepare the individual for job advancement and there are no advancement vacancies for the individual. Adverse reaction can result from training an individual for a job that cannot be provided.

There may be a limit on the number of people that can attend courses presented at remote locations due to operational requirements and dollar limitations. Decisions regarding which employees are allowed to attend the training should be made by the supervisors in conjunction with the training coordinator. The training coordinator must insure that good people are not always unavailable for training due to operational requirements. The training coordinator is responsible for monitoring all training programs and insuring that the training selection process is equitable and that all employees have a regular opportunity to attend needed training.

When new technology and techniques are planned for implementation, action must be taken to insure all personnel associated with the change are given the required training.

5.4 Budgeting.

Methods of budgeting are beyond the scope of this work. However, the manager must remember that training requires resources. Depending upon the detail and lead time required for budget submission, schedules for defining training requirements may be imposed earlier than desired. A two-phased approach helps to alleviate long lead times on planning. The initial phase involves estimating the general types and approximate amount

of training required without regard to specific individuals. The second phase occurs closer to the time training is scheduled and involves the definition of specific individual employee training.

The results of the budget process may include less money available for training than is required based on the process specified, above, for selecting topics and people for training. The budget then becomes a constraint on the amount and possibly type of training selected. The priority of training previously approved by management should be the guide for selecting the training to be provided from that which is required.

5.5 Selecting Training Alternatives.

The training alternatives were discussed in section 4.4 of the development phase, and the training alternatives for each training topic were documented as a part of the training topic documentation. The selection of the best alternative will depend upon the cost of varying alternatives, whether in-house capability exists, number of employees requiring the specific training and whether training is available from a source other than in-house. There should not be a predetermined source for any training. Each time a training topic is required the alternatives should be evaluated based on the conditions existing at that time and the best selection should be made for those conditions.

Training classes should be segregated by skill level to the extent possible with the training presented to each level being tailored to the standard required for their use of the skill being trained. Theory presented without illustrating application is seldom effective. Introduce material as it is needed by the people receiving the training. Illustrations, samples and examples used repeatedly enhance learning. Remember,

meaningful learning often depends on what the learner does, not on what he sees, hears or reads. (22).

5.6 Establishing Successful In-house Training.

With the establishment of a systematic training program, some in-house training capability is normally recommended. The amount should be a function of cost-effectiveness. This in-house training will be of both forms----formal and informal. Development of in-house capability will require additional personnel to be assigned to the training function. Generally, the training coordinator function will have to be expanded and instructors selected. Again, this may be on a part-time basis. In smaller organizations and probably the majority of ADP organizations, the commitment of several people to a full time training role is not possible. However, it is still desirable to establish an in-house training function for some topics. It is often possible to accomplish in-house training by selecting in-house personnel as part time instructors for those areas in which they have expertise. In fact, it may be desirable to send selected personnel to training outside the organization with the specific intent of their subsequently training the rest of the organization.

Whether full time or part-time, the role of instructor is obviously critical in ADP training. Just as some people are not cut out to be programmers, some people will never shine as teachers. The selection of instructors should be from among the successful ADP practitioners with an eye to the qualities that make for successful teachers: good verbal skills, ability to listen to and understand questions, a talent for abstracting and organizing technical material and, above all, a genuine desire to teach. (21)

Training topics related to knowledge of the organization are good topics for development of in-house training. The training topics document

should be reviewed by the training coordinator to develop a list of topics about the organization which employees have a need to understand in order to more effectively perform their jobs. This is a relatively inexpensive action to accomplish since the information is normally readily available within the organization. It is simply a matter of getting the information to the people.

The organization and the ADP element may already have prepared information explaining the organization and the role of the various elements of the organization. If so, this should be reviewed to ascertain if the information existing satisfies the requirement.

Representatives of the ADP element are often required to advise others in the organization on the use of the ADP capability to support the objectives of the organization. Every organization has goals for existence and objectives that are consistent with that goal. If an organization is in the business of making a product and selling the product for profit, then the company may have objectives such as making the best product available or making the lowest priced product available. The difference in these objectives could influence the approach other elements take in accomplishing their objectives. Understanding this type information is essential in most cases if advice to be given by ADP personnel to others is to be appropriate. (8)

Training about the organization should be oriented toward insuring that the ADP group has a grasp of the objectives and goals of the total organization and the specific goals of the other elements of the organization receiving support and assistance from the ADP element. This may mean that having the latest state-of-the-art hardware within the ADP activity is not appropriate. It may mean a number of other things all summarized by the following goal: the ADP

element should be committed to providing superior support within the limits established by organizational needs.

There are a good many operational systems which are very poor. Training can be used to eliminate this situation. Systems often fail because they are too sophisticated and too ambitious, or because ADP personnel assumed and users abdicated responsibility for system design, or because the application automated is not sound, or because the system was designed to replace the user rather than support the user, or because the implementation is overly optimistic. (22) There are other reasons for systems failures, but the above reasons cover a majority of the systems failure. These failures can be avoided by the ADP personnel understanding the needs and capabilities of the users combined with a willingness to keep systems simple. ADP personnel must understand that ADP systems are tools which provide better information for increased productivity or better decisions by people. (22) Training can perform a significant role in developing this understanding.

If the user support is desired in making systems successful, then the user must be involved. Within the ADP element of the organization and particularly those in contact with the system users, there needs to be an understanding of this principle.

For courses presented in-house, planning timing for operational requirements may mean that classes have to be scheduled several times in order for all personnel to have an opportunity to attend. Special consideration should be given to the time training is presented if the organization has operations personnel that work night shifts regularly. Consideration should be given to scheduling training at times these employees

do not consider the middle of their night even though it is within the training coordinator's normal work time.

An alternative that is becoming increasingly popular for in-house training is the self-study environment. Often this is effectively combined with class presentations either in-house or by a vendor. One of the major advantages of the self-study environment is that individual employees can study the subjects they require at a time that is convenient for their work schedule. In the self-study environment it is very important to insure that adequate technical assistance is available to resolve problems confronted by students. A consideration, however, that must be evaluated is the cost of audio visual equipment and training programs. Many organizations are finding these expenses relatively small and a very worthwhile investment. (6)

5.7 Informal Training.

The vast majority of ADP education and training is obtained on the job. Even at the lowest levels of pay and technical skill, such as input preparation, the majority of training comes by imitation or trial and error on the job. Moving up the scale of skill and compensation to such positions as programmer and system analyst, the preponderance grows. (21) Such hapazard training can be expensive. How many millions of dollars charged to "reruns" should more accurately be posted to the ledger of "training"? How many tens of millions in undetected inefficiency should be laid on the account of "training"? No doubt the costs of these kinds of "training" are an order of magnitude greater than the recognized kind, and the first step toward an intelligent management position is to recognize the true costs of training, the costs of obtaining it and the costs of ignoring it.

The second step is to acknowledge the existence of the informal training so that its great mass can be harnessed or at least directed toward

beneficial goals. At the very least, the intelligent ADP manager should know how to recognize when training is taking place so that he does not destroy it. No formal training is going to provide ADP personnel with all the knowledge they need to perform their duties. A more enterprising approach is to encourage training activities initiated by employees on the job for effective informal training and is a good training investment.

Automatic training may take any one of a number of forms. For instance, the entire practice of egoless programming can be viewed as a training process of the most automatic kind. The chief programmer team provides a master-apprentice situation which can provide the type of training that has classically served in many other professions. Just the simple provision of an experimenting budget of machine time under a special account number can demonstrate to programmers and operators that management is behind their efforts to advance in knowledge. Or, for the cost of a few manuals, or copying a few pages, or taxi fare to a meeting, alert management can purchase what would cost a great deal more if purchased in more conventional ways. (13)

Once the training coordinator has scheduled formal training, there will generally be training topics which were proposed by supervisors and which did not have a high enough priority to get scheduled. The supervisors should review the recommended training topics for each employee and determine if there is a job experience which will assist in providing the needed learning experience. In other words, the supervisors should attempt to use the informal training to the maximum possible extent to provide training needed but unable to currently be scheduled. Also, the supervisors to the extent possible should use the informal training

to reinforce and supplement the formal training which is accomplish-
ed.

5.8 Summary.

Training should be used as a part of a larger integrated development
program, not as an isolated reaction to personnel deficiencies in day
to day work. If the only training is in reaction to personnel breakdowns,
it is similar to only performing maintenance on hardware when it breaks
down. It is agreed that maintenance as well as training must be applied to
overcome breakdowns, but more important is the preventive maintenance and
training which is accomplished in a systematic way in an effort to prevent
breakdowns in either equipment or people.

If the implementation of training is successful, the product of this
phase is better trained personnel and personnel with a plan for developing
themselves.

The implementation phase of the systematic approach is depicted in
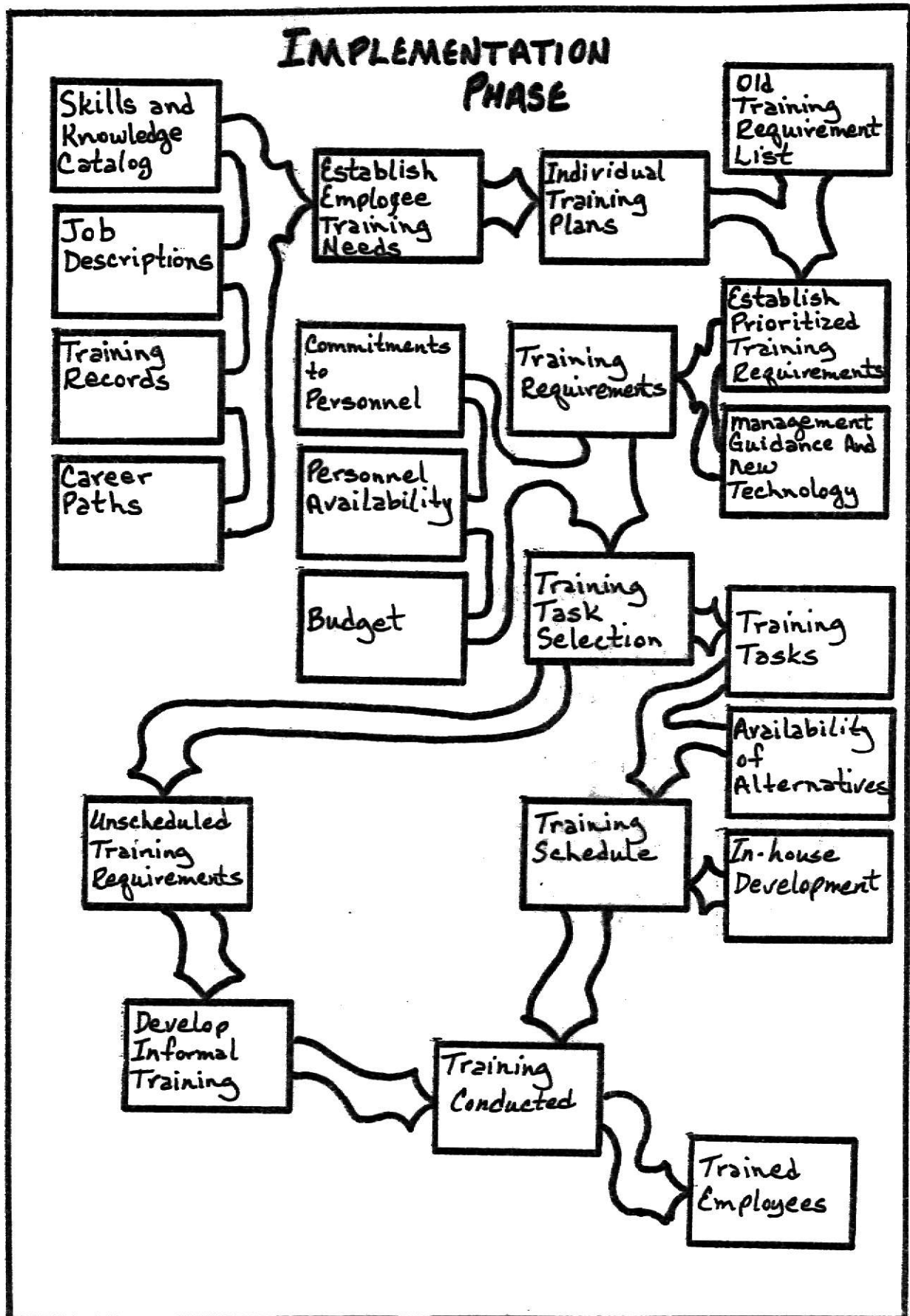Figure 5.1.

Figure 5.1 Implementation

Chapter 6

Sources of Training

6.1 Introduction.

This chapter provides information on training sources and sources of

training material for use in the development of the ADP training program.

Companies offering training material and training courses often advertise

through direct mailings to computer service centers. This material should

be continually reviewed to determine trends in ADP training and for actual

courses which are required by the organization. In this chapter sources

of training are presented which may not be the subject of direct mailings

received by a computer service center. Recommendations on the use of some

training material are presented.

The sources of training and training material offered are extensive

and varying in quality. Therefore, it is recommended that a library of

information regarding training and training materials be established and

maintained for use in comparing available offerings and selection of

training materials. In this chapter, references to the appropriateness

of inclusion in this library of items will be made. This library of

training literature should be maintained in the ADP unit of the organization

and be accessible at least by the training coordinator and ADP managers.

6.2 Pre-employment Training.

One of the major sources of training for the ADP employees will be

the education received prior to employment in ADP subjects. In fact for

many trainee employees, this may be the total of their ADP knowledge at

the time they are hired. The quality of ADP training received from

pre-employment sources varies extensively, depending on the type of

institution attended and even the specific institution attended. The principal institutions providing pre-employment training are high schools, trade schools, community and junior colleges, colleges and universities, and a variety of education-for-profit companies. ADP training has been slow in coming to the high schools, partially because of the expense of such a program. With the increasing availability of used ADP equipment and time-sharing services, ADP training in high schools has in recent years experienced rapid growth. This equipment lag often reflects itself in a training lag, so that rarely is the high school graduate ready to step directly into meaningful ADP employment. Naturally, the lag is less pronounced in those areas where equipment changes have been neither great nor rapid, such as tabulating machines, keypunches, and key verifiers. Nevertheless, few high schools can provide a multi-station key-to-disk system for keystroke training. Also, the training provided is often primarily for individuals who are honor students in subjects such as mathematics. These students often receive programming training as preparation for continued education at the university level.

Colleges and universities have been in the business of ADP education longer than the high schools, but in most of these institutions the faculty are not the product of a university education in ADP. One consequence of this faculty composition is the diversity found in the placement of ADP education within the academic structure. Though the predominate name for ADP training is computer science, the computer departments are found on the graduate and undergraduate levels in such diverse places as physics, management, mathematics, electrical engineering, or as a separate department or school. Moreover, computer programming and systems analysis courses are often even more scattered throughout academia, with

courses frequently given by such departments as anthropology, sociology, political science, biology, geology, geography, as well as those mentioned above. Furthermore, most university computing centers offer a variety of credit and noncredit courses in the practical aspects of ADP. (21) To the outsider, the diversity of college and university training may be concealed behind a veil of published formal curricula such as ACM's "Curriculum 68" and "Report of the ACM Curriculum Committee on Computer Education for Management". These reports tend to provide catalogue copy for courses, but universities are notorious for their failure to follow catalogue copy. A better indication of course content will generally be the textbook used, though with the publication of "official" curricula, textbooks are beginning to appear which are designed to match the catalogue copy.

In spite of the dearth of evidence of the value of university education in ADP employment, personnel practices seem to be moving inexorably toward requiring college degrees and even advanced degrees before a candidate will even be considered for programming or systems work. It may be more important, however, to take a close look at the academic program offered in the institutions prospective employees have attended. Of even more importance is to recruit from colleges and universities which provide academic programs that equip students with a sound education in ADP and with the skills desired for the particular job being considered.

At the present time, many non-degree holders are turning to a variety of trade and education-for-profit schools in an attempt to gain entry into the ADP profession. Education-for-profit schools do not have a long tradition in ADP because of the historical role of the manufacturers' training programs which were normally restricted to the employees of hardware customers and prospects. In the past, the normal entry to ADP

education was first to get a job and then to be sent to the manufacturers'
schools. With the unbundling of education, manufacturers' schools were opened
up to nonemployees but often at costs so high as to create a niche for the
education-for-profit schools and trade schools.

The resulting proliferation of the ADP schools was often accompanied by
unscrupulous or incompetent operators taking advantage of the desire of people
for high paying jobs in the computer field. As usual, the victims of these
schools were primarily those students who could least afford to lose their
tuition. Although many schools promised placement services, few could actu-
ally obtain jobs for their graduates, who were often convinced that jobs
would come easily if they took additional courses. But the students were not
the only victims. Legitimate, competent, and conscientious school operators
found themselves painted with the same black brush so that it may be a long tim
before education-for-profit in ADP can clear its reputation. In 1968 the
Association for Computing Machinery (ACM) formed an accreditation committee to
monitor these schools with the U.S. Office of Education. Eventually these ef-
forts should improve the situation, though employers should scrutinize the clai
of ADP schools about their graduates. The smart manager will also realize that
some graduates of poor ADP schools might make excellent employees. (21)

There are many variations in the type, quantity and quality of ADP edu-
cation among the different institutions providing ADP education. Good employee
can be found in all of the institutions. However, a continual supply of
good employees may only be found in a relatively few institutions. It is
important therefore that institutions, particularly in the close geographical
area, be evaluated and studied and an attempt made to identify those good ADP
training institutions. These institutions should be the target of advertising
and recruiting activities.

The source of ADP pre-employment training is a consideration, but a
more important consideration is the knowledge and ability the individual

possesses and the ability of the individual to translate this knowledge and ability into productivity for the organization. This is fully determined only after the employee starts to work. An evaluation of the employee's strengths and weaknesses needs to be accomplished and provided to the training coordinator for the purpose of evaluating the effectiveness of the employee's pre-employment training and for the development of an individual training plan for the employee. If the organization has a systematic training program and the resources, it is possible to develop excellent employees from all pre-employment training sources.

In order to gain insight into the capabilities of students from particular universities, consideration should be given to the possibility of recruiting students to work during the summer months. Conditionally, full time employment can be offered after graduation if the student's performance as a trainee is satisfactory. These students may also be able to refer additional students to the employer.

In summary it must be recognized that pre-employment training in ADP can be very valuable. However, some pre-employment training may be better suited to the needs of an employer than other training, so educational institutions should be evaluated in addition to evaluating prospective and on-board employees.

This section has dealt with pre-employment training. The remainder of this chapter addresses post-employment training sources and training material for post-employment training.

6.3 Vendor Training.

Because of the strong educational ideas of T.J. Watson, Sr., and because IBM Corporation quickly became the dominant factor in the ADP

industry, most hardware manufacturers have traditionally found themselves in the training business. Initially, such training was free or rather, the the costs were hidden in equipment costs so that the organization which failed to use the manufacturers' schools was paying for a service it was not receiving. While some manufacturers' training remains "free" it is seldom the bargain it appears to be on the surface. In the first place, a manufacturer normally trains only in the use of its own equipment. Even in "general" courses or "concepts" courses which are often given to executives, the general concepts will usually be heavily biased toward the manufacturer's own specific sales features.

In the second place, even when training in specific equipment is desired, heavy reliance on the manufacturer tends to lock an organization into that manufacturer's equipment, since retraining such narrowly trained employees adds to the burden of conversion. Thus, small organizations may find themselves locked into a particular manufacturer for an extended period of time.

On the more positive side, the manufacturers bring course development resources to the small organization which it could never afford on its own, and availability of course offerings in both quality and quantity should be a major factor in hardware decisions for small organizations. In addition, the manufacturer has the incentive of wanting the user to learn to use the equipment effectively. Yet, even this incentive may be tainted by suspicion that efficient use of the equipment is not in the manufacturer's best interest, especially if the equipment is on an extra-shift rental plan. In the long run, however, the manufacturer who fails to inculcate efficient use of its equipment through its training programs will

be vulnerable to forays by other manufacturers into its customers'
ADP centers.

The subject of manufacturers' training cannot be concluded without
touching on the quality of texts and manuals provided both for courses
and self-study. Such materials often suffer the same disadvantages and
gain the same advantages as courses, but may have the additional handicap
of a tradition of inaccuracy and lack of user orientation. The same may
be generally said about some audio-visual courses that are becoming more
widespread. While such materials theoretically have the advantage of
being collected works of the best talents available, they are often no
more that automated live courses without the merits of changing quickly
with changing technology. (21)

The inaccuracy of documentation, with some exceptions, is even more
pronounced in the training materials of software vendors, perhaps because
of their recent entry into the ADP market. Often, initial training of
user-personnel is a standard feature of a software package which may be
more a result of poor documentation than devotion to education. Without
such training and the resulting person-to-person documentation, a size-
able proportion of marketed software would be unuseable. (21)

In general, then, the ADP training provided by software firms has
the same disadvantages as that provided by hardware firms. To the extent
that software firms are smaller than hardware firms, they may suffer from
less capital investment in their educational packages, though their small
size often means that the initial users of a software package have the
advantage of being trained by the package's developers. Moreover, to the
extent software is closer to the user than hardware, software companies'
training may be closer to user realities. Perhaps this closeness

accounts for a trend toward a broadening of the educational scope of some
software houses into courses not directly supporting their products, or
perhaps such broadening is simply a strategy to broaden the capital base
underlying their education services, or even to obtain a continuing supply
of new products. Whatever the reason, in the future software firms can
be expected to be a growing factor in ADP training services. (21)

It should be recognized that some training can best be provided by
the vendors. This is particularly true for initial training on new hardware
or software products. It is important to remember that vendors have a
major capital investment in their training services and as a result can
provide some training that small service centers may not have the capital
to develop, however, vendors should be but one source considered for any
training. Vendor training should be used when it is the only alternative
and when it is the most cost-effective alternative.

6.4 Associations and Societies.

Most of the professional societies with interest in ADP have a chart-
ered concern for the education of their members. To this end, they publish
journals, conduct meetings, provide seminars and courses, and in the case
of Data Processing Management Association (DPMA) provide for certification
of data processing professionals.

Two professional associations recommended for membership by at least
one managerial employee of the ADP organization are DPMA and ACM. Both of
these associations are oriented toward the ADP professional and are committed
to the improvement of ADP education. In this regard, training and educational
seminars are provided by both organizations. Employees who are members of
these associations can often attain knowledge of and use of the training
offerings for the organization.

Computer expositions and trade shows, though primarily market places, do
provide some educational function. They can be especially useful in

providing a broad view of ADP possibilities in a short time. Many an attendee has returned from a meeting with one new idea or fact that saved the organization thousands of dollars. A regular diet of such meetings should not be substituted for more solid training. It seems unlikely that the average employee can benefit from attendance at more than two national meetings per year. However, consideration should be given to having the maximum number of employees possible participate in at least one national or regional association sponsored meeting each year.

The major educational benefit of local society meetings is not normally the invited speakers, but the face to face contacts with other ADP personnel. Through contact made at local association meetings, it may be possible for companies to combine assets in the development of training for which there is a common need.

Certification provided to members such as established by DPMA may provide an increased incentive in the future for involvement in associations and particularly DPMA. Today, there is no apparent benefit associated with certification, however, there is an increasing trend in the support for the ideas of certification. (19)

Professional societies and associations are invaluable in providing information to ADP professionals through their publications, seminars and meetings. Local meetings contribute by bringing ADP professionals with common interests and problems together.

6.5 Educational Firms and Institutions.

Another growing factor in ADP training is educational or consulting educational firms specializing in custom courses for industry. These courses may be live or audio-visual packages. If the latter, they tend to be more professionally done than such courses obtainable from other

sources, since firms profit only from continuing use of the courses
themselves. (21) While such firms seem to be the same as the education-
for-profit schools previously mentioned, an important difference results
from dealing with institutions rather than individuals. In order to secure
continuing relationships with their clients, custom education companies
must provide a continuing high level of training. This feedback does not
insure that every course will be of high quality any more than the gen-
eralized courses need to be low quality.

One consulting firm which provides custom training as well as
generalized training is the Auerbach Corporation. The Auerbach Corporation
is a systems-design and consulting organization whose area of specialty
is information---its collection, processing, storage, retrieval display,
dissemination and use. Auerbach provides consulting services to assist
in the development of in-house training programs, and they also provide
training programs. Information regarding consulting and course offerings
from Auerbach can be obtained from the corporate headquarters located
at 121 North Broad Street, Philadelphia, PA 19107.

Another important source of training is from colleges and univer-
sities. Continuing education through many universities is provided by
offering classes in the evening. In some cases, these classes offered
as continuing education may vary from the normal courses offered by the
universities and in some cases may be workshops and seminars on topics
of special interest in the ADP profession. For those companies located
close enough to such a university to take advantage of these offerings,
consideration should be given to providing financial assistance for the

cost of the courses, seminars, and workshops for as many people as
desire to attend.

In addition, some colleges and universities are willing to establish
off campus educational programs for companies or groups of companies to
provide college credit courses to employees if the number of employees
participating is sufficient to justify the cost of the program. Establish-
ment of such a program can provide employees the opportunity to continue
their formal education and work toward a degree as well as to provide
training for employees. Some universities may even establish a cooperative
program with a corporation to provide for students who have completed
certain minimum requirements to complete a degree program. The federal
government has used such programs for many years.

6.6 Training Material.

Training resources discussed in this section are those intended to
support and assist in the development of in-house training. Though train-
ing must always be internally coordinated by the training coordinator, the
decision to provide the actual training itself internally should be made
as is any other purchase or decision. There are many organizations which
would never dream of building their own computer, but never give a
second thought to their ability to do their own training. Everybody is an
"expert" in education. Naturally, for teaching employees the particulars
of their own organization, internally supplied training is the only way.
Much of this training may not differ for ADP personnel from that given to
employees in other functions. At the other end of the spectrum, training
in specific hardware must originate with the vendor, even if it is passed
into the in-house training program through vendor training of select
personnel.

An important element for the training program is making available
periodicals and journals for reading by employees. Consideration should

be given to establishing a reading area possibly near the break area where
reading material is available to the employees. Employees should be en-
couraged to take the reading material home with them with the condition
that it be returned for the use of other employees. It is not proposed
that every ADP publication be placed in the reading area. However, some
effort should be made to provide an assortment of publications. Follow
up survey of employees can determine the applicability and desirability
of providing certain publications.

More and more training courses are being offered in the form of
audio-visual packages. Some of these courses include self-pace instruction
in the form of problems and readings with audio-visual sessions. The
student reads the readings, then listens and watches the videotape, and
then works problems and possibly completes a quiz for each lesson with a
course divided into lessons. Audio-visual courses are available from
vendors and educational firms and institutions. One such organization
offering audio-visual courses is AMCEE. AMCEE offers provide courses
for continuing education by students unable to attend classes on campus.
The courses can be taken for credit or noncredit. AMCEE, a non-profit
association of 17 universities to increase the national effectiveness of
continuing education, currently offers 14 graduate and undergraduate level
courses in computer science. Information regarding the AMCEE courses
and a catalog of courses may be obtained by contacting AMCEE at Room 204,
Engineering Science and Mechanics Building, Georgia Institute of
Technology, Atlanta, GA 30332.

A guide to audio-visual instruction for data processing to include
listings of courses offered by the three leaders in the field, Deltak,
Advanced Systems and Edutronics, as well as other audio-visual vendors is

provided in the May 1978 Computing Newsletter for Schools of Business from the University of Colorado by writing to Computing Newsletter, Cragmor Road, Colorado Springs, CO 80907.

Audio-visual training has been used very successfully as the basis for an in-house training program by many firms. The trend seems to currently be toward increased use of audio-visual training for classes as well as individual self-pace instruction. One company having favorable experience with audio-visual training is the Chemical Bank of New York, the seventh largest bank in the United States. (9)

A very important area for development of in-house training is the procurement of textbooks for use in developing the courses of instruction and for use by the students. There are a lot of books published every year on ADP subjects, and selection of the best books for a particular firm can be a difficult task. Assistance, however, is available. Publishers provide catalogs of books in publication by functional area such as computer science. As an example, the catalog for computer science published by Prentice-Hall for 1977 provides listings of well over 100 books on ADP subjects. For each book listed a description of the contents and features of the text are provided. A very comprehensive guide to textbooks can be established by requesting these catalogs from the major publishers and other known publishers of ADP books. A small company specializing in publication of ADP textbooks is Anaheim Publishing Company. A copy of their catalog of computer textbooks can be obtained from the company located at 1120 E. Ash, Fullerton, CA 92631. A very complete and useful catalog of available ADP textbooks was published in the January 1978 Computing Newsletter for Schools of Business by the University of Colorado.

The newsletter contains lists of books and an index to publishers of ADP textbooks. Copies of the newsletter can be obtained for $4.00 from Computing Newsletter, Cragmor Road, Colorado Springs, CO 80907. Additionally, an index to ADP textbooks is available from and textbooks can be ordered through the American Management Association Bookstore located at 135 West 50th Street, New York, NY 10020. Use of good textbooks in the development of training programs can be critical to the success of the classes. Special effort should be expended in procuring catalogs for and shopping for the best books for the classes to be developed.

6.7 Summary.

It is proposed that the quality of the training program for an organization may have a direct relationship to the effort expended in selecting training and training material. The information presented in this chapter should provide a great deal of assistance in the selection of training sources and training materials. Once selected, however, training and materials must continually be evaluated to determine if selections are still the best alternatives.

Chapter 7

Evaluation

7.1 Employee Evaluation.

The ADP manager needs to understand that the particular training possessed by his employees today is but a passing moment in a continuing educational process that began long before their employment and must continue unabated if the ADP function is to remain healthy. In order to achieve a perspective on the current state of training, the ADP manager must recognize that ADP is the youngest of professions and a fast changing technical field. This requires management to continually evaluate the employees' capabilities with reference to current practices. An employee that does not stay apace of the changing technology will become obsolete very quickly. (21) The training program should prevent this from happening. However, employees must be continually evaluated to insure that training is providing the desired results.

The employees should be evaluated through self evaluation and supervisor evaluation. The skills and knowledge required for each job category such as Lead Programmer should be established as evaluation criteria and published as an evaluation form. Each skill and area of knowledge listed in the job description should be represented in an evaluation item on the evaluation form. There will be a different form for each job category. The standard whi provides the criterion for successful demonstration of skill or knowledge should be established as the proficiency required for a satisfactory rating. Inability to achieve the standard would result in a needs-improvement rating. One method is to have each employee complete the evaluation form himself and then meet with the supervisor to discuss the ratings. The supervisor

would counsel the individual on the areas they agree as appropriate for the needs-improvement rating. They would rank the items requiring improvement according to importance in the job performance and employee goals. Then goals for improvement during the next rating period would be developed. Training considered essential for the attainment of these goals would be provided to the training coordinator as input to the employee's training plan. The supervisor would then evaluate the ability of the individual to assume duties at the next higher skill level and counsel the employee on areas needing improvement for advancement. As proposed in the preceding chapter, these evaluations would be accomplished for all employees at the same skill level during the same period of time. This would require the supervisor to review and study the job description and standards for that skill level. As a follow up to the evaluations, all supervisors for a particular category of employees should submit proposed changes and updates to the job description and standards. This would result in an annual evaluation of each employee, establishment of goals for each employee for the coming year, and a review and update of job descriptions and of performance standards annually. (4) A potential problem which must be avoided by establishing policy is the case of an employee who has deficiencies identified and included on the training plan, but who does not receive the training for reasons out of his control. Is the employee held accountable for correcting the deficiency during the evaluation period or is correction of the deficiency the responsibility of the organization? The evaluation of employees is depicted in Figure 7.1.

7.2 Evaluation of Training.

Training is provided on the basis that the employees receiving the training will become more proficient at their jobs. Training does not
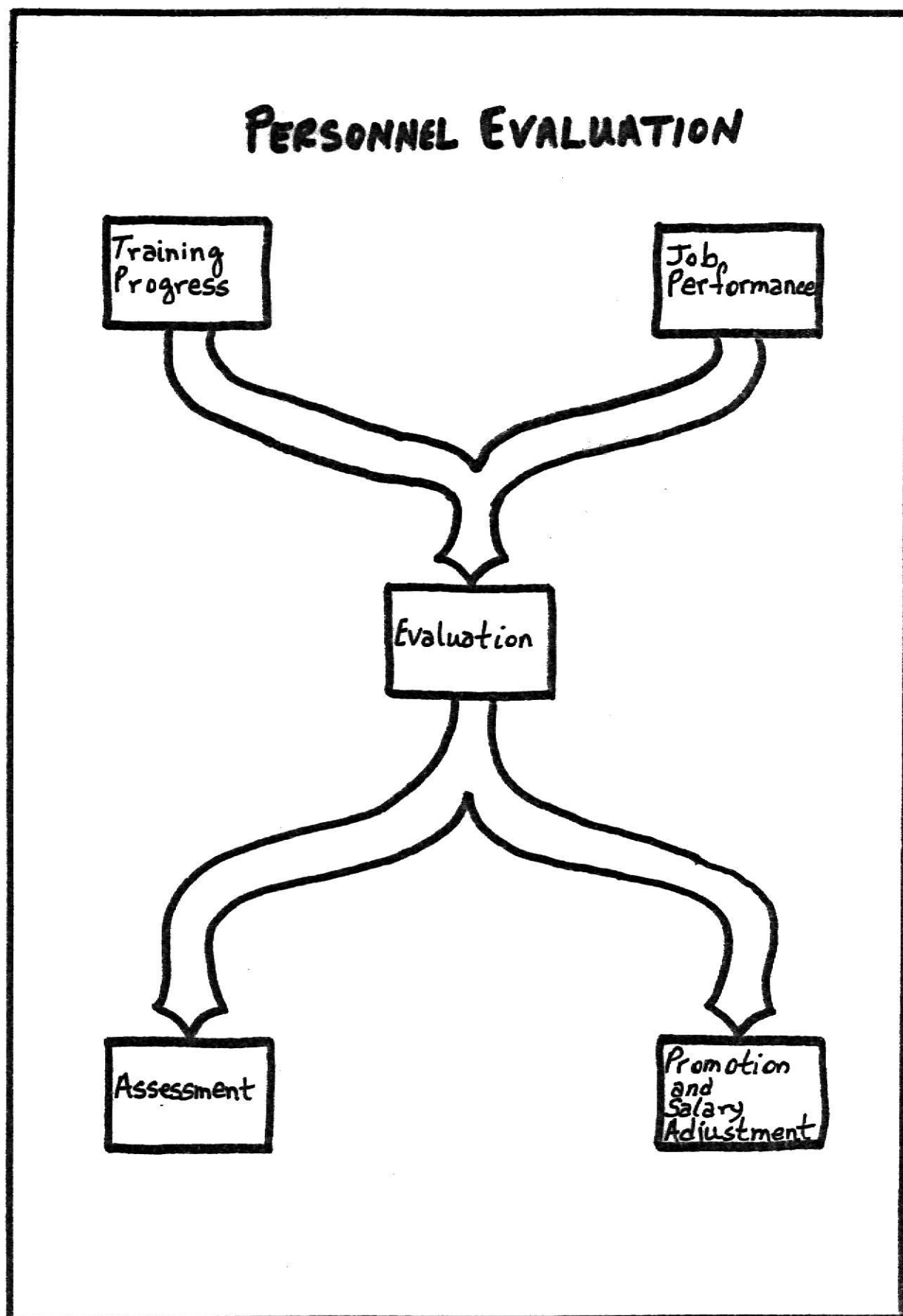
Figure 7.1 Personnel Evaluation

always accomplish this goal. The training provided must therefore be con-
tinually evaluated to insure the training is meaningful and appropriate. This
requires feedback from the employees and an evaluation of the results of their
training. Scores on final examinations are not an adequate measure of success
or failure. Performance on the job is the most useful benchmark. Performance
feedback from students is more likely to be found when a specialized education
firm contracts to in-house training. The reason is simple; the outside
firm must demonstrate its performance in order to continue receiving con-
tracts and good references. Each new course is a new financial decision
for management, while strictly in-house training courses go on and on
sometimes without being reviewed. One of the great benefits of having an
outside firm do ADP training from time to time is the alertness it instills
to management about the education function in general. No contract for
training should be written without specifying in advance what operational
criteria are to be used for judging the effectiveness of the program. In
such a field as ADP, where job performance measures abound, adequate
measures of performance should be established.

Cost effectiveness is a legitimate concern as is cost benefit analysis
when training is evaluated. What is cost effectiveness in training and what
benefits justify what cost? These are questions that will not be adequately
answered in this paper, but are questions which must be raised by ADP manage-
ment. There are limits to the amount of training that will produce benefits.
Depending on the individual and the functional area it is possible to over tra
by training too long or too frequently. Training must be spaced to allow
sufficient time for the skills and knowledge taught to become a part of the
individual's usable skills. The purpose of training is to improve pro-
ductivity, but it is possible for training to decrease productivity, i.e.,

by removing the individual from the job for too long. By evaluating the performance criteria established for the organization, the ADP manager can determine if the training is improving the performance of the organization.

Training can produce problems and reduce the productivity of the organization in some cases. Great care must be paid to synchronizing educational advancement with job advancement. It is important to train an individual before promotion, but morale problems can develop if training for increased responsibility is not followed by a job assignment with the appropriate increase in responsibility and authority. (22)

Another problem can be created by trying to substitute training as a motivational factor in place of such things as salary, benefits, working conditions, responsibility and appreciation. Training is important but it will not provide the necessary level of motivation if there are significant deficiencies in one or more of the other areas of motivators e.g. salary, benefits, etc. (10)

Often after training is received, employees perceive their skills have been improved enough to justify a higher salary. If a timely increase in salary is not provided, the organization may find that it is training employees for other organizations. The evaluation of training is depicted in Figure 7.2.

7.3 Summary.

Feedback is an important aspect of the systematic approach to training of ADP personnel. As the ADP employees and the training program are evaluated, the training program should be modified in response to the feedback. If productivity is not improved as expected, evaluations should be made and appropriate modifications should be initiated.

Once the training program is established, it, like any other program, must be maintained. Periodic reviews of the organization's ADP strategy,
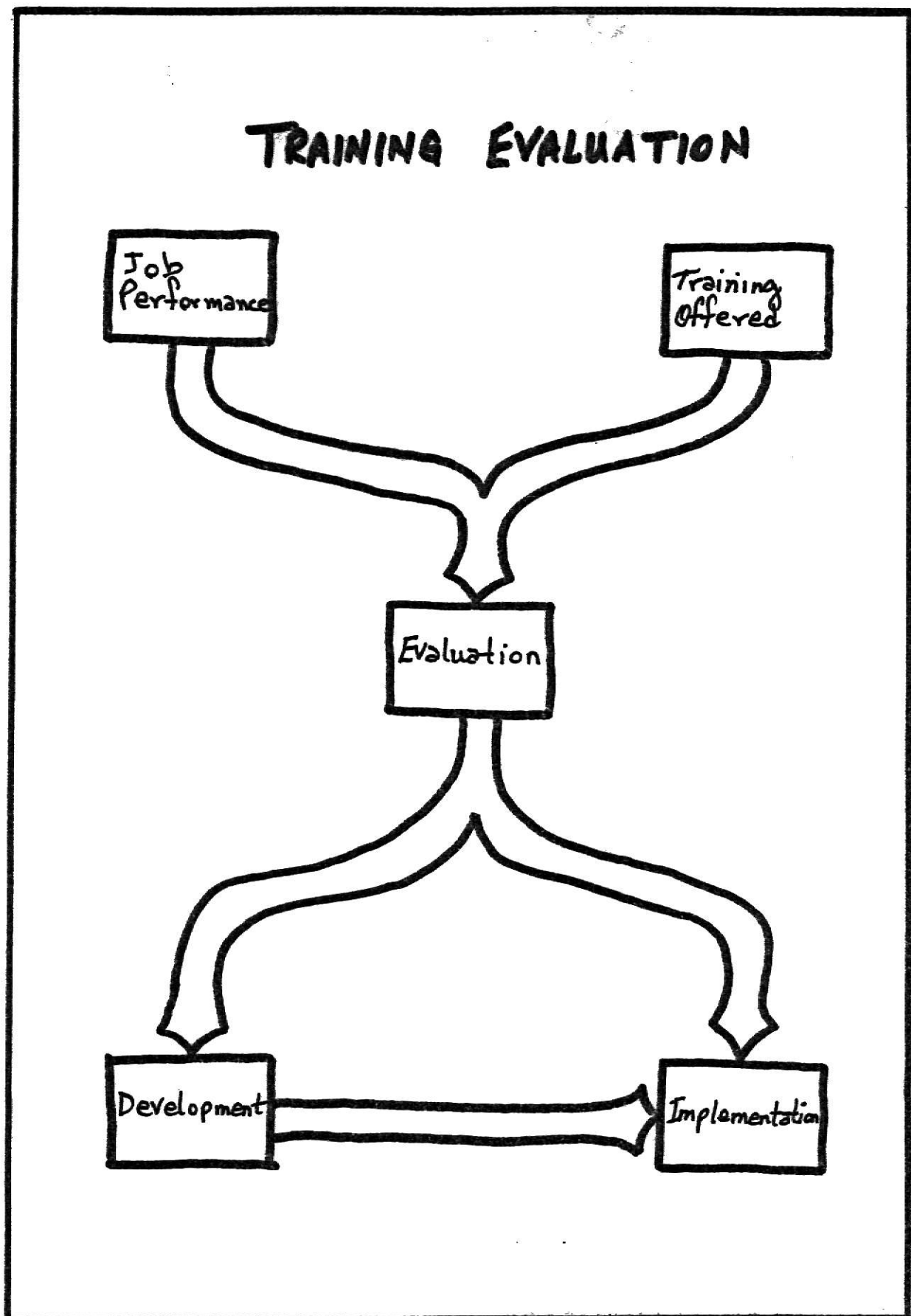
TRAINING EVALUATION

Figure 7.2 Training Evaluation

policies and procedures, job descriptions, career paths, training topics, alternative sources for training, personnel evaluation forms, and methods of scheduling training must be made. The appropriate training can only be defined if the program is maintained, for the training appropriate today will not be appropriate for tomorrow. The model for a systematic approach to training is depicted in Figure 7.3.

A Systematic Training Model

Assessment
- Training Coordinator
- Training Records
- ADP Strategy
- Job Descriptions

Feedback

Development
- Classification manual
- Training Topics
- Training Sources

Feedback

Feedback

Evaluation

Implementation
- Trained Employees

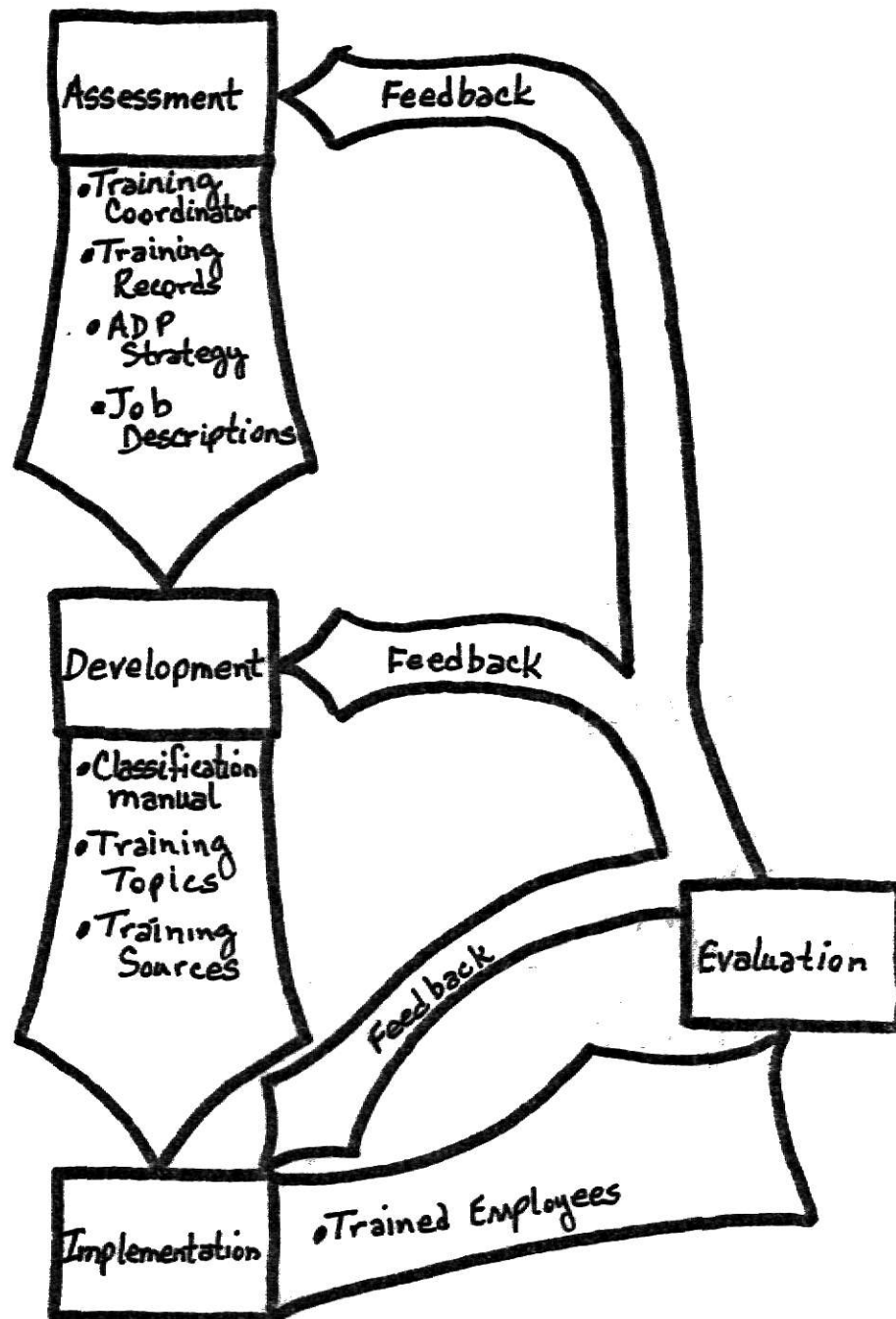Figure 7.3 A Systematic Training Model

Chapter 8

Conclusions

8.1 Contribution.

In the proposal for research, lack of published guidelines in the area of personnel development through training caused major problems. As a result of this research, it is concluded that training is considered a major management responsibility. However, there are no guidelines in the literature reviewed on how to establish the training program. The research did find that there are firms with good training programs for their ADP personnel, (9) but it appears these programs were created without the use of a set of guidelines. This means each new firm establishing a training program probably will make.some of the same mistakes others have made. Training is an important area for ADP organizations and there should be more "how to do it" literature available. Currently, managers are taught or can read that training is one of their major responsibilities in the development of their people, but they are not taught now and would have difficulty finding guidance on how to establish such a program.

There are also lists of training available and sources of training in the literature. But given the type of training available, how does the manager select appropriate training? Emphasis should be placed on selection of the training for an individual at the right time if training is going to be continually productive. This report hopefully can be an initial model for organizations designing training programs.

8.2 Further Research Needs.

This report is an attempt to provide a model for managers to follow in establishing and administering a training program. Some of the proposals presented in this paper have not been validated as a part of this project. A validation test might find better ways to accomplish the task or may point out shortcomings in the model. Such a test should provide very valuable information needed to revise the model for a systematic approach to ADP training and result in a very useful management tool.

Another area not covered by this research that merits additional attention is the question of how much training is the right amount of training. Training should result in people being better motivated and satisfied with the ADP organization they are working for with a resultant increase in personnel productivity as well as reduction in personnel turbulence. These items are cost savings in the total personnel costs. However, training is not free. Logic says that too much training can be accomplished and the added expense would result in the firm perhaps being better off from a cost-benefit analysis point of view if there had been no training at all.

Cost benefit analysis of training would be another valuable area of research if it resulted in a series of relations or some other model which a manager could use to decide what percent of his personnel budget should be spent on training. The lack of a training model makes it very difficult for managers to justify the training costs in their budgets, and during austere periods this is an item the managers are very likely to find reduced in the budget process by their superiors. The managers need better support for defending a reasonable amount of training in their budgets.

Another problem area noted in the research for this report was the lack of standardization which exists in the literature. It is difficult

to know what a person's job is by knowing the job title. (19) There are applications programmers that code programs and could more appropriately be called by titles such as COBOL Coder. There are also applications programmers that design the structure of the programs and develop, code and test the programs. There is a need for standards to be developed within the profession that will define categories of ADP personnel and be useable as a certification base to certify ADP employees. With such a technique, when people say they are Lead Application Programmers, and are certified, then everybody would know what to expect in skill and knowledge. Additionally, this would give managers criteria against which to train. Managers would have an obligation to provide the training and resources necessary for their employees to maintain their certification. Acceptance of such standards will probably not occur soon. However, search to develop a set of standards would be a step in the right direction.

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Appendix

Games Managers Play

The following parable of eight common games for ADP managers was adapted from a book on Authentic Management by Stanley M. Herman and Michael Kerevich.

One day a semi-wise man of ideas came to ADPville. He was called consultant, and he was semi-wise because he knew a lot about some things and was quite ignorant about others, and he didn't always know which was which. (If he had, he would have been a very wise man, indeed.)

After being in ADPville for a short time, the semi-wise man of ideas received a call from another semi-wise man of action who was called ADP Manager. They agreed to a meeting and, as was the custom, the semi-wise man of ideas went to the somewhat elegant office of the semi-wise man of action at the appointed time, and after greetings were completed and coffee cups filled, the two semi-wise men sat down to speak together.

"I am sorely troubled, O Consultant," said the ADP Manager, "and that is why I have decided to spend some of my time with you."

"So I expected," replied the Consultant wisely, and as he lit a large pipe with a curved stem and then appeared even wiser. "Tell me your dilemma, and I will listen."

"In ADPville," said the ADP Manager, "are numerous subordinate managers and project leaders who must each day confront and decide on many issues that come before them. If their decisions are good, ADPville prospers; if they are poor, ADPville suffers."

"So it is in many ADP communities which I visit," said the Consultant.

"I'm sure that is true," said the ADP Manager, "but here there is

another thing that happens or, more correctly, does not happen. For the decision makers of this town too often make neither good nor poor decisions. Rather, they do not make decisions at all. And so ADPville suffers as much---and sometimes I fear more---as if the decisions were poor. Tell me, O Consultant, if you can, something that you know about these matters that I may find useful."

"I will," said the Consultant as he puffed his curved pipe slowly, "speak to you of eight common games for managers and you may judge if that is useful or not."

"That I will do," replied the ADP Manager, "for I am spending valuable time to hear your counsel and it is fitting that your words be useful."

And so the semi-wise man who was called Consultant began. "The first game is called More-Data-Needed. It is a delicate game but not difficult to play. When there is a choice to be made between alternatives and that choice is not crystal clear, the manager may say such words as 'our information is inadequate' or 'we must wait until the trends are clearer' or 'the study is insufficient in quality or quantity.' And so by playing More-Data-Needed, the manager may easily delay deciding on a choice."

"Oh, of course," exclaimed the ADP Manager. "I have seen such a game played. I shall note it down so as to more clearly observe it the next time it is played."

"The second game," said the Consultant, "is called It-Never-Should-Have-Happened-In-The-First-Place. It is a game that is especially appropriate when facing difficult and unpleasant emergencies. When the manager cannot readily think of any attractive solution to the problem, he may say 'If my predecessor, or my superior (or whoever else may be

convenient), had done his job with more competence this problem would never have arisen!' A variation of this game is called It's-Not-My-Problem, It's-Theirs, which may be played between elements of ADPville or between ADPville and agencies outside ADPville."

"Yes," sighed the ADP Manager, "I have certainly seen both versions played in ADPville. It is not new to me but I will note it down anyway so that I will be reminded."

"The third game," continued the Consultant, "is called Power, Power, Who Has The Power. When action must be taken that requires some degree of departure from standard procedures or a change in conventional policies, words may be heard such as 'yes, I think it would be a good idea, but it would take somebody higher up to swing it,' or 'well, we might do that but no one in this group has the authority.' Some very high level managers have been known to play this game."

"This game too I have heard about indirectly," said the ADP Manager rather quickly, "I'll make a note of it while you tell me about the fourth game."

"The fourth game," said the Consultant, "is known as Waver, and it is most often played in meetings. Waver is a subtle game and requires more skill and precise timing than most. It has the advantage, though, of being visible only to the keenest eyes. The object in the game is for a group who wishes to avoid making a decision to cycle back and forth between two or more alternatives without ever quite coming to a conclusion. The test of skill, of course, is to see how close to a decision they can come and still not quite make one. Thus, to the observer, and at times to the group themselves, their deliberations appear cogent, relevant, and purposeful, except at the final instant, they are able to switch to a different

track. Championship-caliber Waver players may make the game last for weeks
or even months."

"Hmmm," said the ADP Manager, "I can remember sitting in for awhile
at a meeting of my primary subordinate managers recently. They never quite
completed their discussions. If I'm not mistaken, they were playing Waver
then. I'll make a note of this game too."

"What will Harry Think," said the Consultant, as he tapped the ashes
from his pipe, "is the name of game number five. It is a very simple one
that may be played by any number of players and needs no special court of
field. Where courage or trust are low among managers and anxiety or
suspicion are high, a course of action may be delayed at least for a short
while by worrying about what Harry would think. Harry may be a superior or
peer; and no one, of course, takes the trouble to ask Harry what he would
think, for that would defeat the game. Instead, the players speculate on
his reaction and so may find many reasons to avoid reaching a conclusion
for awhile. If the players wish to extend the game, options are available,
for once the question of what Harry would think is finally decided, they
may ask what Martin, Mary or Joe would think as well."

"Yes indeed," smiled the ADP Manager. "I have seen this game played
often, and it has just as often annoyed me very much." And he noted the
fifth game.

"The sixth game," said the Consultant, "is called Yeah, But..., and
is frequently a competitive game. The play is basically in two strokes.
Player number one proposes an idea, or the solution to a problem, or an
action to be taken, and his opponent responds, 'yeah, but...' and then fills
in one of several reasons why the idea, solution, or action won't work, or
is not quite adequate, or has been tried before and failed. The game is
often played by group members in response to ideas proposed by others

outside the group. If it is played well, those in the group can successfully resist the penetration of any new ideas. There is another interesting version, too, played most often by those who ask for help or advice from others while at the same time being firmly determined not to change their present styles. As the advice is given by player two in response to the apparently sincere request of player one, player one 'yeah, buts...' each offer. Played skillfully, player one may frustrate any number of advisors, either concurrently or sequentially, to the point of distraction and then walk away complaining sadly that no one in the world can solve his problem. Which does, of course, make his problem a very superior one to the run-of-the-mill variety most of us have."

"Well," said the ADP Manager, "there's another one that I am only too familiar with in both versions. I certainly want to note this game."

"The seventh game," said the Consultant, "is a sad one. It is called Wash Out, and it may be played by a single player or a group. It is usually played when there is a lack of confidence in a person or an organization and sometimes when there is a lack of hope. The game goes like this: an individual or group faces a problem or requirement to be met and come up with an idea or approach. But unlike the yeah, but... game, they need not wait for an opponent to contest or diminish the worth of the conception. Instead, they do it themselves. Wash Out is the game of self-defeat, the game of unworthiness and despair---the game that ends in loss before it has begun."

"I have seen it, too, over the years," said the ADP Manager, "and my heart has been heavy every time I watched it played. I wished there had been something I could do," and he noted down game number seven.

"Before I go on to game number eight," said the Consultant, "there is something I would like you to tell me, O ADP Manager."

"Yes," asked the ADP Manager as he glanced up curiously from his list, "what is it?"

"I would like to know your judgment of the usefulness of those things I have so far told you. Has what I have said of the seven games been worth the time you have spent with me?"

"That," replied the ADP Manager after several moments thought, "is a difficult question to answer. Your explanation of the games has been interesting and well put, though I must say that most of these things I knew before, and, in truth, I see these games about every day played within ADPville." The semi-wise man of action paused to ponder. "Yes, I must admit that I am hard put at this instant to say whether you are worth my time or not. Perhaps your explanation of the eighth and last game will tip the scales one way or another."

"Very well," said the semi-wise man of ideas, "I will continue. The eighth game is the game of Consultant. It is usually played only by those who are very high within an organization, for only they can afford the time or money that this game costs to play. Consultant may be a useful game if it is not played too often or too long. But when it is played as a substitute for doing what needs to be done or because others are pressuring you to play it, it is not at all useful. Consultant, after all, is a game of talking and listening and not a game of doing. Therefore, Sir, my words and your notes of them may indeed be interesting and well put, but if you do no more with them than you have so far with your own experience in ADPville, Consultant will be no better a game than any of the previous games."

The preceding parable deserves some further comment. Reality, of course, is that there aren't merely eight common games, there are probably

dozens; and if individual styles and variations are considered, probably hundreds can be identified. Also, not just managers are good at playing these games. A great many analysts have been known to engage in these games very successfully with users.

A SYSTEMATIC APPROACH TO ADP TRAINING

by

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AN ABSTRACT OF 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

ABSTRACT

This report describes a model for a systematic approach to the training of ADP personnel. Training is defined as a succession of planned experiences intended to bring the skills and knowledge of the ADP employee closer to the future needs of an organization.

The basic model proposed for a systematic approach to training consists of four phases. These phases are assessment, development, initiation and evaluation. Assessment would normally 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 the time and budget limitations and the actual training occur in the initiation phase. The last phase, evaluation, occurs after training is complete. The effectiveness and benefits of the training are evaluated with multiple benchmarks. 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 external changes.

The report is concluded with a summary of the results and provides suggestions for future work in validation and refinement of the proposed model.