A CASE STUDY OF THE IMPLEMENTATION

OF A COMPUTERIZED TRAINING

TRACKING SYSTEM IN A

LARGE MANUFACTURING

PLANT

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CHAPTER I

INTRODUCTION

The need for a training records system can exist in
three areas: volume, records, and cost reduction. The need
must be carefully determined if the system is to function
well over an extended period of time. Volume of courses,
enrollments, and training site information must all be
maintained. Records are also necessary for budgetary
reasons and for planning for new and complex systems and
products. Future job performance may even be predicted from
training records. Regardless of budget limitations,
training can increase productivity which in turn results in
cost reduction (Dosher 1987).

There are also needs for a training records system
which cannot be justified by traditional methods. Some
organizations have a certain dollar level for training and
education which is set aside for those purposes each year.
The purpose is to encourage managers to invest in their
biggest resource -- their employees. If the money is spent,
a system should be in place to track the training activity
(Dosher 1987). An area which has long been neglected has
finally been recognized as a valuable source of information
about an organization's operation.

Statement of the Problem

The problem addressed in this study is the inability of a large manufacturing plant to track training activities and produce meaningful reports.

Purpose of the Study

The purpose of the study was to develop and implement a system for the plant which used a computer to record training activities for individual employees as well as whole departments and to produce accurate and meaningful reports for management's use. The case study method was utilized because its qualitative nature allowed for the portrayal of events in the change process.

Objectives

To accomplish the purpose, the following objectives were obtained:

1. Investigate and aid in the selection of software for use in the tracking of training activities.

2. Design an appropriate application for use by the training personnel.

3. Install software incorporating user-modified application and set up a data base by downloading from the mainframe.

4. Develop documentation for procedures and systems to be used in training the training personnel.

Assumptions

The following assumptions were made regarding the study:

1. The case study interviews would provide adequate, unbiased information on which to launch the study.

2. All interviewees would support the records conversion process.

3. In difficult economic times, all organizations would be concerned about return on investment in all areas.

Scope and Limitations

The scope of the study was confined to one large manufacturing plant which was highly computerized in all areas except that of training records. Five employees who worked with the existing data bases and two who were involved with training provided information to launch the records conversion.

Limitations of the study were the use of a unionized site and the small number of participants.

Definition of Terms

The following are defined as used in this study:

1. Activity - A record of one training and development event in which a person has been involved.

2. ASCII - An acronym for American Standard Code for Information Interchange. It is the standard character set and file format used by most microcomputers.

3. Downloading Data - The process by which reformatted information can be put on diskette and physically moved to a personal computer, or the data can be downloaded over data communications lines to the personal computer.

4. Field - A specified part of a record containing a unit of information.

5. Foreign File - A transfer file containing information from a data base other than one produced by a particular vendor.

6. Import - The process of transferring data from another application into the application currently being used through the software's import utility.

7. Password - A unique code which must be entered to start the program.

8. User-modified application - A program application which can be set up to meet specific needs of the organization.

CHAPTER II

REVIEW OF LITERATURE

The purpose of the review was to present an overview of literature related to the study. While little has been written on training records systems, human resource information systems have been widely described. Since training records are part of that system, certain generalizations between the two can be made. The review consisted of six parts: case study methodology, human resources information services, microcomputer-mainframe link, vendor and software selection, information and records management, and training.

Case Study Methodology

Meaning

A case study is difficult to define because it is not a technique but rather a method for organizing data about the present status, past experiences, and environmental forces which contribute to the uniqueness and behavior of the unit (Van Dalen 1979).

According to Wilson (1979), case studies are particularistic. They show a situation as it exists in reality. They are holistic in that they try to capture as

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many variables as possible showing the interplay of different forces as they relate to the topic, and present views of different groups. They are longitudinal because they tell a story over time. They are also qualitative because they use prose and literary technique to describe and analyze situations rather than quantitative data.

Usefulness

The case study method allows the reader to expand his experience vicariously through sharing other people's experiences. Knowledge is a form of naturalistic generalization achieved by recognizing the similarities of objects and issues in or out of context and is a product of experience (Stake 1978).

The case study adds to existing experience and its characteristics match the readiness of people for additional experience so that they can use it to get things done in their own particular situation.

The case study method does have limitations for future application. According to Wilson (1979), the values and theoretical orientations of readers will determine the case study's usefulness. If it is contrary to the reader's values, it won't be used. The reader's own experience, style, and expertise also affect how the study is received. The question of generalization and context of the reader are also important. The difficulty usually lies in getting the case study to the right people.

Human Resources Information Services

Tannenbaum (1990) defined Human Resource Information
Services as "the system used to acquire, store, manipulate,
analyze, retrieve and distribute pertinent information
regarding an organization's human resources"(p. 27).
An HRIS is made up of people, policies, procedures, data,
and forms as well as the computer hardware and software.
Its purpose is to provide service to its clients to
facilitate strategic, tactical and operational decisions, to
avoid litigation, to evaluate programs, and support daily
operations.

The trends toward decentralization of Human Resource
information throughout organizations, more users with
diverse expertise, and the increasing complexity of the
Human Resource field have begun to change established
procedures and raised expectations among its clients
(Tannenbaum 1990).

Human resources information systems data are different
from other information because they change so often. No
other corporate data system has as many varieties of
information and thus the chances for error and need for
documentation and training (Pasqualetto 1987).

Part of this large system deals with the training and
development of employees. Organizations need a system to
provide accurate employee information regarding both formal
education and internal training and development. The system
could provide information for the purpose of transfers,

promotions, and succession planning procedures. Through it, employees are also provided with incentives to improve their educational levels and other qualifications (Andrews 1989).

Many of the large systems do not meet the needs of training and development. The users' inexperience, limited performance by the system, compatibility problems, and the feeling that computers challenge the very premise of the profession (Hallett 1986) have all limited the usefulness of these comprehensive Human Resource Information Systems.

Microcomputer-Mainframe Link

When the central mainframe operation does not fulfill its responsibilities, microcomputer users begin to generate their own data bases. This can lead to redundancy and should be controlled by the central data processing function (Perry 1985). However, with careful planning, a stand-alone microcomputer with an employee data base can be a great asset (Cross 1987).

The best way to prevent redundancy is through a microcomputer-mainframe link. The link between the mainframe and the microcomputer is a complex one in which data must be formatted in such a way as to be usable by the microcomputer. The programs for file conversion are not always readily available. There are four types of links between mainframes and microcomputers: downloading data, uploading data, virtual diskette link, and direct processing to central data bases (Perry 1985).

This study will only deal with downloading data from the mainframe to the microcomputer. The data in the mainframe is converted through file formatting routines into standard ASCII format. The reformatted information can be put on diskette and physically moved to the computer or downloaded over data communication lines to the microcomputer.

According to Perry, the four steps involved in downloading central data are the establishment of a data policy, identification of downloading requirements, identification of the method for downloading, and the development of a procedure for requesting downloading. These steps should be carefully documented to prevent problems in the future.

Vendor and Software Selection

Wolke (1988) states that more than half of all application software purchased by business is never used by the buyer because of poor planning both before and after the purchase.

The key to success is a proactive plan with communication among all parties concerned. The first step should be the selection of a project leader to be responsible for planning through implementation along with decision makers from human resources and data processing to serve as members of the team. Consultation with those who will enter the data would also be helpful. According to

Wolke (1988), the team must examine the current system, establish hardware and software criteria, and determine the type of system to be used.

There are well over 400 vendor and consulting companies who specialize in the human resource area (Pasqualitto 1987). As a result, selection of appropriate products and services has become a difficult task for the busy manager.

Vendors should be selected based on their history, what their clients say about them (Wolke 1988), training and implementation assistance, maintenance, and after-the-sale-support (Frantzrel 1987).

Software should be judged on applications suitability, practicality, screen design, flexibility for customization, report writing, documentation, and support (O'Connell 1989). Other criteria which are organization specific may also apply.

Purchase of one or more demonstration packages and use of the tutorials will provide experiential learning which will be tremendously valuable in making a final selection (Frantzrel 1987).

Information and Records Management

Documentation can be the key to consistent, efficient and policy-effective use of a human resource information service (MacAdam 1990). Documentation is equally important to the maintenance of training records. There are two types of documentation which help insure the system's success:

procedural and systems. Procedural documentation involves
all procedures that take place before data reach the system
and provides a written reference for all current and future
users. System documentation involves the way information is
moved from input document to screens and how the system
processes data, methods of retrieval and data base structure
(MacAdam 1990). Security of data should be covered in this
documentation and is of utmost importance. Grades, career
development data, course completions, and class schedule
information should all be protected by a password or
multilevel passwords (Dosher 1987).

Another component of information and records management
involves forms analysis and design. Analysis identifies the
user's needs that should be met by the form. Design uses
that information to develop the best possible form (Diamond
1983).

Analysis centers on interviewing the form's requester
and users. Areas of concern are content, usage, and
physical features. Design depends on the analysis of
information and the careful arrangement of that information
in a logical order for the completer and the form's
processor. Preparation and testing of a draft will be
necessary in real-world conditions before final layout,
typesetting, and printing is done (Diamond 1983).

System Training

Teaching the training personnel to use the system is vital in the maintenance and upgrading of the system. It is not a one-time activity but rather an ongoing need and must be part of the overall program. It should be planned just like other training programs are planned (Dosher 1987).

Summary

Use of the case study method for detailing a change process was determined to be the most effective way of relating the experience.

Little has been written on training records systems. Training and the management of its records has only been addressed as a small part of the comprehensive human resource information service. These two systems have much in common and, as a result, certain generalizations can be made. Unfortunately, these large systems are often not responsive to the everyday needs of the training department. In response to the problem, use of microcomputers with employee data bases has proliferated.

The most effective use of the microcomputer comes from a link with the mainframe. In this way, redundancy is reduced, and time and money saved because data bases can be shared instead of recreated.

The selection of a vendor and software compatible with existing hardware should be carefully approached. The use

of software demonstration packages to gain hands-on
experience was highly recommended.

Documentation of procedures must be carried out for
current and future users of the system. Areas as diverse as
security and form design must be addressed before the system
becomes operational. Systems documentation for downloading
data was crucial to the study. Training for personnel using
the system was determined to be vital to the maintenance of
the system and was based on documentation done at the time
of implementation and tutorials from the vendor.

CHAPTER III

PROCEDURES

Introduction

The purpose of the study was to implement a program which would organize training records through the use of a computer. Computerization of training records would provide access to information which had been difficult or impossible to obtain. The manufacturing plant's management had determined that the conversion from a manual to a computerized system was desirable. As a result, the following objectives were set up to guide the study:

1. Investigate and aid in the selection of software for use in the tracking of training activities.

2. Design an appropriate application for use by the training personnel.

3. Install software incorporating user-modified application and set up a data base by downloading from the mainframe.

4. Develop documentation for procedures and systems to be used in training the training personnel.

This chapter describes the procedures used in the study under the following sections: research methodology,

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development and implementation of the case study, and analysis of the collected data.

Research Methodology

The case study method was used because its qualitative nature allowed the events of the change process to be portrayed in a real-life situation -- the high-pressure atmosphere of a large, unionized manufacturing plant.

Development of the Case Study

Procedures followed included setting rules and procedures for the study, locating resource personnel, and developing the objectives and the interview schedules.

Rules and Procedures

Informal discussions with the training associate determined the boundaries of the study as being limited to the plant. All job-related training offered by the organization on a mandated or voluntary basis was to be tracked. Included were such areas as apprenticeship, health and safety, quality, managerial, computer, and technical training, as well as self-development seminars.

Independent work was required due to the training associate's schedule. The responsibilities were outlined as coordination of the change process. The project began on September 18, 1990, and ran through December 14, 1990, and was characterized as a top priority.

Resource Personnel

The population was made up of seven specialists from Operations Analysis and Accounting, Salaried Personnel and Employee Relations, Hourly Personnel, Labor Relations and Safety Section, Facility and Project Engineering, as well as the Employee Relations training associate. Each of these individuals had knowledge about and access to data bases, existing procedures, microcomputer-mainframe links, and training records. These individuals were extremely busy because the ranks of salaried personnel had been reduced.

Additional resource information was provided by the vendor's representative through telephone consultations both before and after the sale.

Recommendations for the vendor and software came from an acquaintance of the training associate who held the same type of position at a larger plant in another city.

Case Study Objectives

The objectives were developed from directly and indirectly related research as well as informal conversations with the resource personnel. The objectives were set up to guide the study but were subject to change as the work progressed.

Interview Schedule Development

Directly and indirectly related research and informal conversations formed the basis for the development of the

interview schedules. Generalizations made from research on human resource information services (of which training records are a part), microcomputer-mainframe links, vendor and software selection, as well as information management were all used as resources.

Zemke and Kramlinger's book, <u>Figuring Things Out</u>, served as a guide for both structured and conversational interviews. Structured interviews consisted of five steps: preparing for the interview, starting the interview, conducting the interview, concluding the interview, and compiling and analyzing the results. Conversational interviews were designed to tap opinions.

Three types of interviews were developed: training, data base, and form design. Each area was covered by a structured interview with more spontaneous conversational interviews used to aid understanding. See Appendix A for examples.

Implementation of the Case Study

Field Procedures

Introductions to resource personnel were facilitated by the training associate in an informal manner. The purpose of the study was briefly outlined in a positive way emphasizing, wherever possible, how the resource personnel might personally benefit from information sharing.

In order to protect individual privacy, note-taking was employed rather than tape recording of conversations. As a result, being a very good listener, being flexible, and having no preconceived ideas was necessary.

Interviewing Resource Personnel

Appointments for structured interviews were made whenever possible. These were always at the interviewee's convenience. Conversational interviews predominated because of the scheduling difficulties with some of the participants.

Unobtrusive Data Collection

Observation of the resource personnel, collection of organizational charts to show interrelationships and communication channels, and access to current training records all provided a rich source of information.

Much of the data collected was sensitive in nature and had to be protected. Only partial access was provided.

Analysis of Data

The approach to compiling and analyzing interview results was to simply total opinions across interviews. That was the result of going back through ones' notes to look for common requests, complaints or ideas (Zemke 1989). Since the number of interviewees was so small and their areas of expertise so diverse, interviews had to be

individualized. That prevented quantifying any of the
qualitative data.

CHAPTER IV

CASE STUDY

The purpose of this study was to develop and implement

a system using a computer to track the training of

individual employees and whole departments in order to

produce accurate and meaningful reports for management's

use. This chapter is organized into five parts:

background, data gathering, change process, documentation,

and training.

Background

Corporate Division

A very large corporation owned the plant and two others

like it, one in Canada and another in a different location

in the United States. The plant produced a specialized

product for the automobile industry and for construction

applications.

The plant employed approximately 1,000 employees, 850

hourly and 150 salaried. Due to the type of manufacturing

processes used, three shifts were needed on a seven-day work

week in half of the plant. The other half worked three

shifts on a five-day work week schedule.

Union Influence

All hourly employees belonged to a national union which helped to negotiate training into their contract with the corporation. As a result, training was encouraged by equal financial contributions from both the corporation and union.

Funding for training was more than adequate. The budget allowed for corporate and union mandated training as well as voluntary training. A committee composed of representatives from each group was set up to oversee the funds and help determine training needs.

Organizational Structure

Managers of four areas within the plant reported to the plant manager. One of the area managers was in charge of Employee Relations. That department consisted of Salaried Personnel with four employees and Hourly Personnel, Labor Relations and Safety which had six employees. Only one individual served as a training associate and reported directly to the Employee Relations manager. That position served as a coordinator of training for both hourly and salaried employees.

Data Gathering

Interviews

Since the number of people participating in the change process was so small, specialized interviews were used.

Certain questions were common to each type and elicited virtually the same responses from the various participants. Interviews were difficult to schedule and short in duration.

   Training. Extant data revealed that the impetus for initiating the tracking of training came from a joint union and corporation review team recommendation. A suggestion was made to centralize and organize training records for compliance with the Occupational Safety and Health Act. Identification of new hires or transferred employees needing various training was almost impossible. Both the training associate and a safety engineer confirmed that computerization of training records with a reporting capacity was a high priority.

   When asked if training goals and objectives were tied to corporate and union goals and objectives the training associate explained that the training going on at the plant was not directly tied to any overall corporate or plant long-range plan. Training was not directly linked to an employee's performance review, skills management process, or instructional system design.

   The committee which was in charge of the training fund usually determined training needs through recommendations from its members or from supervisors on the plant floor. Training was arranged by supervisors, carried out, and went unreported up to 80% of the time, according to the training associate. All training hours were billed to this

individual's budget even though he did not initiate most of the training. Each month, the records turned in to document training did not equal the charges of hours made to the fund.

When asked about formal evaluation of training, both the training associate and the safety engineer indicated that only informal discussion with the supervisors and employees was used.

Training records consisted of sign-in sheets, many with illegible signatures and no social security numbers. The training associate had records dating from 1988 while the safety engineer's records went back to the early 1980's. The records were either placed in files by year or simply accumulated. No reports were ever generated other than the monthly charges for training related expenses. There were no lists of course categories, titles, or numbers. None had been compiled.

Both the safety engineer and the training associate indicated that their role was more like that of a consultant. They could only recommend certain actions.

In response to questions concerning types of training, both the training associate and the safety engineer agreed upon tracking the following seven areas: apprenticeship, computer, health and safety, management and supervision, quality, self-development, and technical. These categories

covered a broad range of training experiences which would provide the plant, corporation, and government agencies with needed information.

The training associate determined that sign-in sheets in a revised form would still be necessary. Use of social security numbers, adequate space for details about the classes, a minimum of 25 lines for participant names as well as the use of blocks to encourage printing were given in response to questions on form design.

Data Bases. A Human Resource Information Service did exist at the plant. However, the information was not located in one data base. Interviews with a programmer from Operations Analysis and Accounting as well as an engineer from Facility and Project Engineering provided valuable insight into the system.

Hourly employee information was on a system which kept track of all hours worked, ran the plant's payroll, and contained a component for recording training. However, the training associate, after having talked to the engineers who installed it, determined that its reporting capacity was not sufficient for training's needs. At the beginning of the study, the safety engineer was considering using that data base to keep his department's training records.

Salaried employee information was kept on a different data base which was accessed through the salaried personnel associate in the Employee Relations Department.

Another data base, which was a joint effort of the union and corporation, contained the records of hazardous communications training. In the training, employees learned about the hazards of the materials to which they were exposed, how to recognize the exposures, and how to protect themselves from those exposures.

A local area network linked employee terminals in all departments. As a result, a hierarchy of privileges and passwords existed to protect the various data bases. Certain employees had access and others did not depending on the requirements of their job. Individual terminals had passwords which changed on a regular basis. All security policy was set from the corporate level. Any change had to be submitted for study to insure uniformity and continued security. According to the programmer, one employee per shift was responsible for the systems.

When asked about downloading from the mainframe to a personal computer, the programmer explained that the procedure had never been done at that plant. There were no stand-alone personal computers except those set aside for employee training. In order to do the procedure, he would have to get permission and then set up the process.

Direct Observation. Employees were very busy. Due to a reduction in salaried employee numbers, clerical support did not exist except on a very limited basis at certain levels. Everyone spent a major portion of their time at

their terminal even when their job required other activities.

Unobtrusive Data Collection. The process included gathering training records, organizational charts, an example of the hazardous communications training records, and an internal memo recommending the change process.

Change Process

The change process, which was difficult, could only occur if there was a real impetus for change with sufficient support. The conversion of existing paper records into an orderly system with a variety of reporting functions had not been perceived as necessary in the past. The emphasis had been on delivering of training, not recording it.

Software Criteria and Selection. Software chosen had to have certain technical, economic, human, and efficiency criteria. Specific criteria are listed in Appendix B. The software had to produce individual and department training histories, provide a variety of reporting options, be capable of importing foreign files, and be adaptable to the plant needs. It had to be uncomplicated and easily learned by the training personnel. The documentation had to be complete and vendor service and support had to extend after the sale. Cost was a consideration but increased user efficiency was the main concern of the training associate.

Through conversations with other training professionals in the area, the training associate had narrowed the field of choices to two different software packages. One set up classes and registration as well as produced individual training histories. This software was used at a plant employing 2,000 in a neighboring city. The training professional there had only good things to say about the software and its use.

The other software package provided records of training for individuals and departments and imported foreign files which would allow downloading from the mainframe. There were standard reports available as well as user-designed report options which would provide any information for training that management wanted.

The training associate was responsible for the records but not for initiating all training and, therefore, chose the second software package for record-keeping and reporting functions. While a local area network version was available, the single-user version was chosen for security and cost reasons.

Hardware Criteria. Either of the software packages required an IBM PC, XT, AT, or PS/2 computer with 384K RAM and a hard disk drive with 3.1 DOS or later. There was no need for new hardware since there were several computers with sufficient capacity available. The engineer provided a

printer and set up the hardware in a space adjacent to the training associate's office.

Application Design and Installation. The software had a user-modified application which was set up for the exact needs of the plant. Questions concerning data collection on employees as well as training activities were included in the interviews with the specialists and are located in Appendix A. The software maker provided an information analysis guide and worksheets which helped identify the necessary field names, types, and lengths. Field lengths were set so that they would match all future downloaded data or provide enough space for data entry. The process developed data dictionaries for both the person and activity fields so that the computer could recognize the information. Examples are located in Appendix C. This was input into the program in an application set-up. The software permitted changes to be made in the application, as needed.

Data Base Development. The information on hourly employees changed daily because of changes in shift and work location, due in part, to lay-offs. There were few changes in salaried employees because that group had previously been reduced in number. As a result, the decision was made by the training associate to download only the hourly employee data at that time. The other data would be entered manually.

The procedure for downloading the data on hourly employees was provided by a programmer in the Canadian plant. Directions for the procedure are available in Appendix C. The procedure could be done as often as necessary to keep records and reports accurate.

In order to import the data, a foreign transfer file had to be obtained. The software would read only Fixed Length ASCII format so data from the mainframe had to be changed so that the software would accept it. That process was carried out by an accountant from the Operations Analysis and Accounting Section. The process was outlined in his memo seen in Appendix C.

After the foreign transfer file was in the correct format, the next step entailed the creation of an import data dictionary to tell the software how to interpret the incoming transfer file. The process required the position and length of each field in the transfer file record to be calculated then entered.

Development of Course Categories and Codes. No lists of course categories, titles, descriptions, or numbers were available. The training associate set up categories and some course titles for record years 1988, 1989, and 1990. All courses were assigned code numbers starting with 100 in their particular category. Much time and effort went into making the existing records conform to the new standards before any of the data could be entered. Some consolidation

of titles occurred as the system took shape. Specific
information on the numbering system is located in Appendix
C.

Documentation

The change process required careful documentation of
each step so that anyone coming into the department could
understand the system and keep it functioning. A notebook
composed of quick references from the software manuals along
with other vital information was compiled and left with the
training associate. Documentation was the key to consistent
and efficient operation. The two types used were procedural
and systems.

Procedural. Procedural documentation involved all
procedures that took place before the data reached the
system and was used as a written reference for all current
and future users.

Since the emphasis was on record keeping activities,
getting the initial report was the key. The Training
Participation Record was developed using Ventura Desktop
Publishing. The software allowed changes to be made on the
form, as used in some classes. See Appendix C for an
example. Getting the forms into the supervisor's hands and
encouraging their use was the responsibility of the training
associate. Training Participation Records were to be turned

in by supervisors after each training activity and the data
entered by the training associate once each week.

The development of course categories and course code
numbers along with the wide variety of information available
on training activities provided the department, plant,
corporation, and union with more documentation than they
expected.

Systems. Systems documentation involved the way
information was moved from the input document to the screens
and how the system processed and retrieved data as well as
the data base structure.

Application design for the initial set-up was
documented through a data dictionary for both the person and
activity fields. An example of a re-setup of the person
field showed how the application could be changed and is
located in Appendix C.

Documentation for foreign file import was based on the
creation of the Import Data Dictionary which gave the exact
position and length of each field. An example of a report
showing that the software field length and import field
lengths match is located in Appendix C.

Steps for downloading from the mainframe and conversion
into ASCII format were vital to future updates to the data
base. That documentation is also located in Appendix C.

Data retrieval was in report form. Standard reports
included lists of names or activities and individual

training histories. User-designed reports were the most useful and offered a wide variety of ways to obtain information. Examples of report definitions are located in Appendix C.

Security for the stand-alone personal computer consisted of a password for access. The computer was not on the local area network and no one other than the training associate could gain access.

Training

After the system had been set up and was fully operational, training began for the training associate. The training was based on responses from an earlier interview in which use of the demonstration package and quick reference materials were chosen as preferred learning methods. The sessions lasted about twenty minutes each and in total, approximately three hours. These served as an introduction to the software and the computer.

The next step centered on the report options available with the software and provided the best learning experiences. Hands-on experience by following guidelines enabled the training associate to develop and save report form definitions which would enhance his efficiency with minimal effort. Most of the time available for training was spent practicing the reporting options.

Support for data base maintenance and downloading was provided by the programmer, accountant, and engineer. Those

specialists were to continue to provide support and training as needed by the training associate.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS,

AND RECOMMENDATIONS

This chapter contains four parts. A summary of the
study is followed by the findings as they related to the
study's objectives. The conclusions are based on the
findings of the study. Recommendations are offered for
present use and future research.

Summary

The purpose of the study was to develop and implement a
computerized system to record training activities for
individuals and departments and to produce accurate and
meaningful reports for management's use. To accomplish
this, the following objectives were obtained:

1. Investigate and aid in the selection of software
for use in the tracking of training activities.

2. Design an appropriate application for use by the
training personnel.

3. Install software incorporating user-modified
application and set up a data base by downloading from the
mainframe.

4. Develop documentation for procedures and systems to be used in training the training personnel.

The case study was conducted in a large, unionized manufacturing plant in the Southwest which had a high-pressure environment. Data was collected through both structured and unstructured interviews with seven specialists from four departments within the plant. Unobtrusive data collection consisted of observations of the specialists, extant data including organizational charts and memos as well as existing training records.

Limitations of the study were the use of a unionized site and the small number of participants.

Findings

1. Choosing the right software that will meet all the criteria for a specific business application is difficult and time consuming.

2. Clear and concise instructions along with vendor support made the creation of a user-modified application relatively easy.

3. The most efficient method of establishing a data base for a personal computer is through downloading from a mainframe.

4. Documentation in all areas of training was incomplete.

Discussion of the Findings

Software Selection

Most software that is purchased for business use is never used. In order to obtain the most appropriate software for a specific application, there must be an analysis of the perceived problem. Those who will use it and those it will serve must define the problem. With over 400 vendors offering software in the area of human resources, errors in software selection lead to expensive and time consuming consequences.

Both formal and informal interviews with the training associate confirmed that their immediate need was in making use of the existing training information and the establishment of a system to keep the records so that they would be useful in the future. Since there was little central control in scheduling training activities, the record keeping and reporting functions were of most concern.

Criteria were developed for both software and hardware selection. Since the plant was highly computerized, there was no problem in locating suitable hardware for the records conversion.

Through conversations with other training professionals, the training associate had previously located two different software packages which offered potential solutions to the problem. Demonstration packages were ordered and loaded into a training computer for testing.

Those proved to be of great benefit. No description from a catalog or conversation with a vendor could have provided the depth of information that was available from a demonstration package. A recommendation for the vendor and one of the software packages was received from a training professional in another city. After a review of the merits of each package, Historian from Silton-Bookman Systems was selected.

Application Design

Information analysis worksheets asked specific questions about the type of information needed to be stored on a long-term basis to categorize and identify people and training activities. By completing the worksheets, fields were developed for both employees and activities. Those, in turn, were assigned field types and lengths. Thus person and activity data dictionaries were completed which fit the needs of the plant and its employees.

Vendor support after the sale was excellent. While the manuals were well written, questions did arise and answers were easily obtained through telephone conversations with the vendor.

Data Base Development

Installation of the software and user-modified application was easily accomplished after a brief consultation with the engineer. Basic computer skills were

necessary but the procedure could be done by anyone with a little help.

Since a vast amount of employee information was already available in existing data bases, printouts were used to determine the nature of the information and what could be imported to training.

The actual downloading process for 850 hourly employees took approximately twenty minutes. It saved many hours of data entry time in a plant where clerical help was limited. Data could be downloaded on a weekly, monthly, or quarterly basis to keep employee information current.

The most time-consuming part of the process involved coordination with other departments. The process was relatively simple, but had not been done there before. Those with the necessary expertise faced deadlines and pressures in their own departments.

Data entry was used to load salaried employee information because it did not change often and the number of employees was much smaller. However, the downloading process from the salaried employee data base would work as well as the downloading from the hourly data base.

Training activity information on both salaried and hourly employees was obtained from the training associate and entered into the computer. In about ten days, the plant had access to a system which showed the type of individual and department training that had taken place and how it related to the budget and to the overall plant operations.

Documentation

The new system which had been developed to record training activities was very good and met established record keeping and reporting criteria; however, no system can function if the information channeled to it is inaccurate or incomplete. While the plant had been in operation almost twenty years, no training records were available before 1984. Most of the records obtained from the training associate were less than two years old. When comparing existing records to hours charged against the training budget, up to 80% of the activities were not reported to the training associate. The development of the Training Participation Record was the first step in improving the record function. The next step included changing supervisors' attitudes and was an on-going process.

Documentation of course categories and code numbers was necessary before any training activity data entry could take place. None had existed before because the need had not been felt. The emphasis had been placed on meeting immediate training needs and documentation of training activities had not been required. After course numbers were set up, the numbers showed that most of the training had been in the technical, quality, and apprenticeship areas.

The software was well documented in the accompanying manuals. Each was well written and easily understood by the training personnel.

Importation of foreign files by downloading from the mainframe as well as the conversion to ASCII format was carefully documented by the specialists who performed the tasks. Any future refinements to the procedure should be documented if consistency is to be maintained.

Conclusions

The following conclusions are based on the findings of the study.

1. Use of demonstration packages along with recommendations from other users of the software are essential in the timely and accurate evaluation of a training records system.

2. User-modified applications are easy to create and insure that the user gets a program which will meet the organization's needs.

3. Training personnel, with limited assistance, can use downloaded data from existing data bases to set up a computerized training tracking system.

4. Accurate and complete documentation of all training activities is necessary for any training records system to be fully functional.

Recommendations

The recommendations which follow are based on the findings and conclusions of the study.

1.   Acquisition of software which is nonstandard for an organization should take place only after an analysis of need has been completed and input received from both training and computer professionals.

2.   Training records software should always include a user-modified application to insure that the organization's needs are met.

3.   Downloading of data from a mainframe to a personal computer should be used to save valuable time and to prevent redundancy of data bases.

4.   Careful documentation is the key to success in any records system and should be supported from the highest levels of the organization.

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APPENDIXES

APPENDIX A

STRUCTURED INTERVIEWS

TRAINING COORDINATOR INTERVIEW I

Background Information

1. Are training goals and objectives tied to corporate and union goals and objectives?

2. Are training records tied to performance appraisals?

3. How is training evaluated?

Records Administration

4. What type of records are maintained and what system is in use?

5. What changes need to be made in this system to make it more useful?

6. What benefits are expected as the result of computerizing training records?

Conclusion

7. Is there anything you would like to add?

SAFETY ENGINEER INTERVIEW

Background Information

1. What type of safety training do the employees receive?

2. How is training initiated?

Records Administration

3. What types of records are maintained and what system is used?

4. What types of reports are generated and how are they used?

Application Design

5. What information needs to be kept on a long-term basis to identify and categorize employees?

6. What information needs to be kept on a long-term basis to describe and categorize the training?

Conclusion

7. Are there other areas that we need to discuss?

TRAINING COORDINATOR INTERVIEW II

Software Selection

1. What criteria must training tracking software meet?
    Cost   Reporting Capacity

    Ease of Use   Adaptability

2. What criteria must the system meet?
    Local Area Network   Stand-alone PC

    Security   Number of Users

3. Has the search for appropriate software begun? If so,
    which programs have been reviewed?

Appllication Design

4. What information needs to be kept on a long-term basis
    to identify and categorize employees?

5. What types of training are the employees taking?

6. What information needs to be kept on a long-term basis
    to describe and categorize the training?

7. Is there information in one of the plant's data bases
    which could be transferred to this program?

Software Installation

8. Where will the software be installed? Will others have
   access to it?

9. Who will be responsible for locating and setting up a
   suitable computer and printer?

10. Is there a programmer or someone on staff who could
    serve as a resource for this project?

Training for Users

11. How do you prefer to learn?
    Use of demonstration package Tutorials

    Following the manual   Quick reference materials

12. Do you have experience with data base maintenance,
    backup, and downloading from a mainframe?

13. How much time will you be able to schedule for
    training?

Conclusion

14. Are there any other areas that we need to discuss?

DATA BASE INTERVIEW

Data Bases

1. Does this plant have a Human Resources Information
    Service data base which contains basic employee
    information?

2. Which data base or bases contain this information?

Downloading

3. In order to build a data base, Training needs to
    download basic employee information from the mainframe
    by creating a transfer file. A comma will also need to
    be added after each employee's last name in that data
    so that Training's software will be able to accept the
    transfer. These operations will require the help of
    someone with programming experience. What specific
    steps need to be taken to accomplish this task?

4. Do any other computers used in this plant have special
    programs and data downloaded to them? If so, what type
    and who uses them?

Policy

5. Are there established in-house or corporate-wide
    policies dealing with security? If so, who is
    responsible for these?

6. How will these policies affect access to training
    records?

Conclusion

7. Is there anything else that you would like to add?

FORM DESIGN INTERVIEW

Training Participation Record

Content

1. What information do you need to collect?

2. What information is the most important?

Use

3. Who will use this form?

4. Where and under what conditions will it be completed?

5. Are there other training record forms in use in the plant?

6. Are there any special requirements to be considered for data entry? If so, what are they?

Size Requirements

7. Will a standard 8.5" x 11.0" form be acceptable?

8. What would be the average number of participant names recorded on this form?

Conclusion

9. Are there any other things to consider in the design of this form that we have not discussed?

APPENDIX B

HARDWARE AND SOFTWARE CRITERIA

SOFTWARE SELECTION CRITERIA

Technical

1. The application should be adaptable to the specific needs of this facility.

2. It should be capable of producing individual employee training histories.

3. It should be capable of producing department training histories.

4. It should be capable of producing activity/class records.

5. It should be capable of producing user-designed as well as standard reports.

6. It should be capable of importing foreign files through downloading from a mainframe.

Economic

1. The software should be as inexpensive as possible.

Human

1. The program must be easily learned by the users.

2. Input and downloading must be as uncomplicated as possible.

3. Documentation must be complete and easily understood.

4. The vendor must offer training and support.

Efficiency

1. The software must increase the users efficiency.

HARDWARE CRITERIA

Technical

Historian single-user version requires the following as a
minimum:

Computer:	IBM PC, XT, AT, PS/2 or 100% compatible
Memory:	384K available RAM
Disk Drives:	Hard Disk
DOS:	3.1 or later

Existing hardware available for use:

Computer:	IBM PC, 80286 processor
Memory:	1 MB RAM
Disk Drives:	21 MB Hard Disk Drive
Floppy Disk:	1.44 MB
Printer:	IBM Pro-2, 9 pin dot matrix

APPENDIX C

PROCEDURAL AND SYSTEMS

DOCUMENTATION

COURSE CATEGORIES AND CODES

The following were designated as areas of training to be tracked:

Apprenticeship	Quality
Computer	Self-Development
Health and Safety	Technical
Management/Supervision	

Course titles were reviewed, clarified, and a numbering system was set up based on 100. Courses were assigned numbers based on the starting date in their area since there were no prerequsites for the classes.

The following numbers represent the course number sequence for the years shown:

	1988	1989	1990
Apprenticeship	100-107	108-123	124-128
Computer	100-100	101-102	103-103
Health and Safety	0	100-100	101-105
Management/Supervision	0	100-101	102-106
Quality	100-101	102-108	109-133
Self-Development	100-100	101-104	105-107
Technical	100-106	107-118	119-143

HISTORIAN UTILITY REPORT

11-07-90

Data Dictionary - Person Fields

Type	Field Name	Length	Comments
N	name	24	
U	soc. sec. number	11	
G	department	4	
A	shift	2	
A	work location	2	
A	job code	7	
A	job class	25	
A	employee status	1	
A	sex/race code	1	
D	date last update	8	
D	import date	8	

HISTORIAN UTILITY REPORT

11-08-90

Re-Setup Person Fields Conversion Table

Target Field	OLD Type	Length	
name	N	24	
soc. sec. number	U	11	
department	G	4	
shift	A	2	
work location	A	2	
job code	A	7	
job class	A	25	
employee status	A	1	
sex/race code	A	1	
date last update	D	8	
import date	D	8	

Source Field	NEW Type	Length	Rule
name	N	24	-
soc. sec. number	U	11	-
department	G	4	-
shift	A	2	-
work location	A	2	-
job code	A	7	-
job class	A	25	-
employee status	A	1	-
sex/race code	A	1	-
date last update	D	8	-
import date	D	8	-
section	A	1	1

1 - new field or deleted field-no data copied
2 - field size changed-pad right with blanks or truncate
    right
    a - field lengthened-pad
    b - field shortened-truncate
3 - field type conflict-no data conversion, no data copied

HISTORIAN UTILITY REPORT

11-13-90

Data Dictionary - Person Fields

Type	Field Name	Length	Comments
N	name	24	
U	soc. sec. number	11	
G	department	4	
A	shift	2	
A	work location	2	
A	job code	7	
A	job class	25	
A	employee status	1	
A	sex/race code	1	
D	date last update	8	
D	import date	8	
A	section	1	

HISTORIAN UTILITY REPORT

11-08-90

Data Dictionary - Activity Fields

Type	Field Name	Length	Comments
A	activity name	40	
A	activity code	10	
D	activity date	8	
A	vendor name	35	
A	vendor address	40	
A	vendor phone	15	
A	gross cost	9	
A	contact hours	3	
A	instructor name	20	
A	int/ext	1	
A	location	20	
A	equipment	40	
A	remarks	40	
D	date last update	8	
D	import date	8	

Import Data Dictionary

Name: Hourly DD

	Position	Length
person	0001	0025
soc. sec. number	0026	0012
department	0038	0004
shift	0042	0002
work location	0044	0002
job code	0046	0008
job class	0054	0027
employee status	0081	0002
sex/race code	0083	0003
date last update	0086	0008
import date	0094	0008
section	0102	0001

PROCEDURE FOR DOWNLOADING DATA
FROM MAINFRAME COMPUTER

Memo from Canadian Plant

Subject: System data to floppy

1.   Run inform job to create printout with printer offline
     (recipient's name). After job has finished, go to print
     server and do the following:

2.   Type in the following:
     CD\SYS\NET (enter)
     Comes back to you as
     CD\SYS\NET>
     CD\SYS\NET>DIR (enter) This will display file names and
     at the bottom of screen (probably) you will see a file
     called.....(example: PQ596 SPL 504 10-14-90). The SPL
     in this line stands for spooler so if you wanted to
     display this spooler file on console you could type in
             copy PQ596 con (enter). This will display on the
     console screen the data in this print file.

3.   If the above file is what you want then to write this
     file onto a floppy disc drive do the following:
             copy PQ596.SPL A: (enter). This will copy to
     drive A disk.

4.   To delete this F18E from spooler:
     type NET (enter)
             4 (enter)
             1 (enter)
             4 (to cancel).
     To get back to print server screen do:
     CD\ (enter).

PROCEDURE FOR CONVERSION OF DOWNLOADED
DATA INTO HISTORIAN

1. Take the data that has been downloaded via INFORM into a
spooler file, and import it into the "person" database
in dBASE III+. dBase commands

   - sign on to dBASE, and make the person file active

   - append from _____.spl sdf

2. Take the new dBASE file and delete any headers from
file, and add commas between the last and first names.

3. Save the edited person database to a text file

   - copy _____.dbf sdf (will add text extension)

4. Save the new text file to the person.imp file on the
hard drive (on the training computer) under
C:\hist\person.imp

5. Now you are ready to sign on to Historian and import the
data.

TEST PROGRAM RUN BEFORE DOWNLOADED DATA
WAS IMPORTED INTO HISTORIAN

FFTESTER - Foreign File Test Program

The Foreign File Import Option includes a program you can
use to check the layout of an import file. It is useful
when you need to discover what data appears in what bytes,
and if the file is in fact a fixed length file.

The records MUST end in a carriage return and line feed
(ASCII 13, ASCII 10).

To run the Foreign File Tester, insert this disk in drive A.
Type:

        A:\TEST\FFTESTER filename   and press enter

where filename is the name of the file which contains the
import data, including the full DOS path.

Each record in the import file is printed on the printer in
a chart format, byte by byte, with spaces replaced by
periods for ease in reading.

When you have printed enough records, press Esc to quit.

Example 1. To test the file DATA.IMP in the directory REG
on drive C:

        A:\TEST\FFTESTER C:\REG\DATA.IMP

Example 2. To test the file MYFILE.IMP in the directory
HIST on drive C:

        A:\TEST\FFTESTER C:\HIST\MYSELF.IMP

FOREIGN FILE IMPORT REQUEST

Foreign Import File History Report 11-14-90

The import options chosen are:

    Import file type - Foreign Import File
    New people will be added to the data base.
    Activity records will be matched by ACTIVITY DATE only.
    No log will be printed.
    An error file will be created.

HISTORIAN Import Table

	Import Field Name	Import Length	HISTORIAN Length
Person	name	25	25
Person	soc. sec. number	12	12*
Person	department	4	4
Person	shift	2	2
Person	work location	2	2
Person	job code	8	8
Person	job class	27	27
Person	employee status	2	2
Person	sex/race code	3	3
Person	date last update	8	8
Person	import date	8	8
Person	section	1	1
Activity	activity name	1	40

record length = 103

*import unique key

USER-DESIGNED REPORT DEFINITION FORM

12-07-90

Report Name: Summary of All Training
Title: Summary of All Training

By: Activity   activity name A 40
    ID: ID:
By: Activity   activity code A 10
    ID: ID:
By: Activity   contact hours A 3
    ID: ID:
Column Headings:
Course   Course Code Hours
Print Fields:
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA AAAAAAAAAA AAAAAA
Sort:
Beginning Activity Date: 01-01-88 Ending Date: 12-31-90
GR:Activity   activity code A 10 (restricted)
GR:

        Press ENTER to work on a line.

USER-DESIGNED REPORT DEFINITION FORM

12-07-90

Report Name: Summary of Apprentice Training
Title: Apprentice Training

By: Person   department   A 4
    ID: ID:
By: Person   name   N 25
    ID: Person-soc. sec. number   A 12 ID: Person
                                              job class A 27
By:
    ID: ID:
Column Headings:
Class   Code   Date   Hours
Print Fields:
AAAAAAAAAAAAAAAAAAAAAAAAAA AAAAAAAAAA DDDDDDDD   AAAAAA
Sort: Person   name   N 25
Sort: Person   department   A 4
Beginning Activity Date: Ending Activity Date:
GR: Activity   activity code A 10 (restricted)
GR:

Press Enter to work on a line.

USER-DESIGNED REPORT DEFINITION FORM

12-13-90

Report Name: Summary of Quality Related Training
Title: Summary of Quality Related Training

By: Activity   activity code A 10
    ID: ID:
By: Activity   activity code A 40
    ID: ID:
By: Activity   contact hours A 3
    ID: ID:
Column Headings:
Course   Course Code   Total Hours Trained
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA AAAAAAAAAA AAAAAAAAAA
Sort: Sort:
Beginning Activity Date: 01-01-88 Ending Date: 12-31-90
GR: Activity   activity code A 10 (restricted)
GR:

                Press ENTER to work on a line.

USER-DESIGNED REPORT DEFINITION FORM

12-13-90

```
Report Name:    Summary of Technical Training
Title:          Summary of Technical Training

By: Activity              activity code A 10
    ID:                                      ID:
By: Activity              activity name A 40
    ID:                                      ID:
By: Activity              contact hours A   3
    ID:                                      ID:
Column Headings:
Course                              Course Code    Hours
Print Fields:
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA  AAAAAAAAAA  AAAAAAAAAA
Sort:                               Sort:
Beginning Activity Date: 01-01-88  Ending Date: 12-31-90
GR: Activity              activity code A 10 (restricted)
GR:
```

Press ENTER to work on a line.

USER-DESIGNED REPORT DEFINITION FORM

12-07-90

Report Name: List of Training Activities by Department
Title: Training Activities by Department

By: Person   department A 40 (restricted)
    ID: ID:
By: Person-soc. sec. number   A 12
    ID: ID:
By:
    ID: ID:
Column Headings:
Employee   Job Class   Activity Date   Hours
Print Fields:
NNNNNNNNNNNNNNNNNNN AAAAAAAAAAAAAA AAAAAAAAA DDDDDDD AAAA
Sort: Person   name N 25   Sort:
Beginning Activity Date: Ending Activity Date:
GR:
GR:

Press ENTER to work on a line.

USER-DESIGNED REPORT DEFINITION FORM

12-13-90

Report Name: Employees Completing TECH000131
Title: Employees Completing TECH000131

By: Person   name   N 25
    ID: Person-soc. sec. number   A 12   ID:
By: Person   department   A 4
    ID: ID:
By:
    ID: ID:
Column Headings:
Name   Date   Hours
Print Fields:
NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN DDDDDDDD AAAAAAA
Sort: Sort:
Beginning Activity Date: 01-01-88 Ending Date: 12-31-90
GR: Activity   activity code A 10 (restricted)
GR:

              Press ENTER to work on a line.

STANDARD REPORT

Individual Training History Report 11-30-90 (example)

Doe, J. D.
```
     soc. sec. number:        430-87-4609
     department:              2200
     shift:                   2
     work location:           1
     job code:                2571372
     job class:               MACHINE REPAIR-APPRENTICE
     employee status:         A
     sex/race code:           3
     date last update:        11-14-90
     import date:             11-14-90
     section:                 C
Activity 1
     activity name:           MACHINE SHOP INTRO
     activity code:           APPN000127
     activity date:           02-05-89
     vendor name:             VO-TECH
     vendor address:
     vendor phone:
     gross cost:
     contact hours:           040
     instructor name:
     int/ext:                 E
     location:
     equipment:
     remarks:
     date last update:        11-28-90
     import date:
Activity 2
     activity name:           GEARING
     activity code:           APPN000120
     activity date:           11-05-89
     vendor name:             VO-TECH
     vendor address:
     vendor phone:
     gross cost:
     contact hours:           020
     instructor name:
     int/ext:                 E
     location:
     equipment:
     remarks:
     date last update:        11-28-90
     import date:
```

Training Participation Record

PRINT Last Name	FI	MI	Social Security Number	Dept. #	Shift

Class	Cost Per Person	Start Date
Provider of Training	Instructor	Class Hours

Comments

Attach any additional information and return to Gerald Bradley

Office Use Only

Code	Int\Ext	Location	Remarks

PRINT	Last Name	FI	MI	Social Security Number	Dept. #	Shift

VITA

Elizabeth Ann Craig

Candidate for the Degree of

Master of Science

Report: A CASE STUDY OF THE IMPLEMENTATION OF A
COMPUTERIZED TRAINING TRACKING SYSTEM IN
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