End-user training of post-graduate students in the use of CD-ROM databases with special reference to the University of the North

by

PHEGELLO ZACHARIA LETSHELA

submitted in fulfilment of the requirements for the degree of

MASTER OF LIBRARY SCIENCE

in the

Department of Information Studies

at the

RAND AFRIKAANS UNIVERSITY

SUPERVISOR: PROFESSOR P.A. VAN BRAKEL

1995

SUMMARY

This research investigated the problem of multiple bibliographic interfaces that end-users face when conducting searches. A situation analysis was conducted which provided a profile of the situation under investigation. Based on the results of the analysis an end-user training programme for adoption by subject reference librarians at the University of the North Library with regard to bibliographic CD-ROM databases is formulated. This programme is proposed to address problems that end-users experience with these databases and in the process to improve their search abilities. Finally, areas for further investigation with regard to the situation, learner and learning situation are also suggested.

DEDICATION

This dissertation is dedicated to the late Mrs. Vaidah Lindeni Tsebe who died on the 26th December 1994. She initiated an organized end-user training programme and established the CD-ROM bibliographic databases unit which was the focus of this research project.

ACKNOWLEDGEMENTS

Work of this magnitude is largely of a co-operative nature. I am greatly indebted to the following people without whose contribution this research would not have been possible.

- Professor P.A. van Brakel, chairman of the Department of Information Studies at RAU, and promoter, for his constant and constructive advice and support.
- Mr J.K. Tsebe, the University Librarian, for his support and understanding during this research when I had deadlines to meet.
- Professor J.M. Nchabeleng, Director of Research and Development, University of Venda, for urging me in the right direction when things got out of hand.
- Professor J.E. Nel, Department of English at the University of the North, for his patience in editing this research.
- The late Mrs V.L. Tsebe, Head of the Subject Reference at the University of the North, for allowing her section to be the focus of this research and also for the interviews she granted.
- Colleagues in the Subject Reference Section for their co-operation during the interviews and also for keeping the ship afloat in my absence.
- Mr M.P. Mashangoane, of the University of the North Library, for his typing skills and tolerance when pushed beyond limits.
- My family, for their support when they were called upon to provide it.
- The University of the North for the financial assistance they provided.
- Finally, my wife Wendy for her unwavering support and patience in enduring many lonely nights when I was busy working.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

1. INTRODUCTION

1.1 BACKGROUND

The CD-ROM industry, research indicates, is growing rapidly and will probably continue to grow (Nicholls 1992:36). Not only is it growing, but its products are gaining widespread use (MacDonald 1990:87). This growth and an ever-increasing assortment of software interfaces and command sets are becoming a serious problem to organizations such as academic information services, where eager end-users experience difficulties in using these products. In the past, searching online bibliographic databases was the exclusive domain of the information professional, whereas today CD-ROM databases are generally searched by end-users themselves (Zink 1991:16). The fact that end-users are using bibliographic CD-ROM databases is taken for granted. What is of concern is the effectiveness of the searches end-users conduct on these databases.

The search problems of end-users are caused by a number of reasons, including end-users' levels of computer literacy; lack of knowledge on bibliographic sources or, in general, lack of information skills; and unfriendly user interfaces used by various CD-ROM vendors. Because there are many database vendors involved in the industry, every vendor tries to develop a unique interface, which leads to the proliferation of CD-ROM interfaces and the manner of using the products. This development is to the disadvantage of end-users. Information professionals are therefore faced with dual problems, namely, choosing which databases to use; and choosing which skills to teach to end-users if one set of skills is not applicable to all situations, or interfaces.

In addressing the problem of different interfaces, database vendors have constructed what is regarded as a "user-friendly" interface. Despite these user-friendly interfaces, recent research still indicates that effective results are not achieved (Steele 1992:56; Nipp 1991:45 & Nash 1991:87). This is illustrated by the various database vendors producing manuals with each so-called easy-to-use interface. Steele makes the following interesting remark:

> "Why, if the interfaces have been well designed, should many producers feel the need

> for vast amounts of training documentation in the form of manuals? The answer is that despite major advances in the design of 'user friendly' systems, products which are capable of enabling an untrained end-user to produce a thoroughly comprehensive search, are still some way off" (Steele 1992:56).

Thus, the issue of user-friendly interfaces remains an ideal and the need to address end-user problems still remains. It was the intention of this research to investigate end-user interfaces in order to arrive at suggestions that would help end-users cope with the various interfaces and search commands and, in so doing, enhance their search results.

1.2 PROBLEM STATEMENT

When online searching was implemented, information professionals had to master at least nine online searching protocols (Reifsnyder 1990:96). Unlike information professionals end-users did not have much experience in using online databases or, in some instances, the benefit of training at colleges and, as a result, grasping various protocols was even more difficult for them. Interfaces are the only difference among different databases, such as, for example, ERIC from Silverplatter, DIALOG and OCLC (Rosen 1990:101). Therefore, the problem identified in this project could be formulated as:

> "What must be the nature of a training programme to teach students how to do literature searching on CD-ROM databases?".

The first sub-problem that could be identified was the status and nature of current CD-ROM interfacing. The proliferation of interfaces presented a problem in that end-users had to contend with different communication modes and search strategies which affected the usability of CD-ROM databases.

Related to the first sub-problem was the dissimilar approaches needed to use the various interfaces. It was, as a result, important to identify characteristics which must be considered in designing training programmes to help end-users cope with multiple interfaces.

The third sub-problem was concerned with establishing the basis of the various training programmes. This sub-problem dealt with establishing a scientific foundation for end-user training programmes.

The fourth and the last sub-problem dealt with the actual design of an end-user training programme after various issues raised in earlier sub-problems had been dealt with. The programme designed utilized results of a situation analysis at the University of the North (UNIN) and its Library.

1.3 RESEARCH METHODS

Literature surveys were conducted to investigate the status of user interfaces with bibliographic CD-ROMs. In this survey the nature of different interfaces was investigated and similarities and differences amongst the databases were identified. A second survey was conducted to investigate the nature of training programmes which have been designed worldwide for bibliographic CD-ROMs in an attempt to solve end-user problems. Amongst other things, this study investigated issues such as identifying end-user needs, formulating educational outcomes and methods, and identifying media which were advocated in the various training programmes.

A third study investigated the basics of the various training programmes, that is, establishing the scientific base upon which the various training programmes were based. Determining the base was necessary, since it would guide attempts at future programme design.

The three literature studies conducted were concerned with the conceptualization part of this research.

The operationalization phase of this research was covered by two methods of research, namely, informal interviews and a syllabi analysis. Informal interviews were conducted with the head of the subject reference section of the Library at UNIN. These interviews dealt with current policies governing the use of the CD-ROM unit and future plans which were envisaged for this unit. Another set of informal interviews was conducted with subject

reference librarians to solicit their views concerning present training of students, changes that they would like to make concerning the unit and their views about students using the CD-ROM unit.

A syllabi analysis of the Honours curricula in the Faculty of Arts of UNIN was conducted to support the informal interviews conducted. This analysis dealt with establishing curriculum requirements for students. Information pertaining to curriculum requirements was necessary because it would explain student behaviour with regard to their use of the CD-ROM unit.

Finally, the researcher's general knowledge of the situation was utilized to support the other methods of research mentioned above.

1.4 SUMMARY OF CHAPTERS

Chapter 2 is a report of the attempt to understand the dilemma of different interfaces. In trying to provide an overview of the dilemma, the following issues are discussed: origin of user interfaces; and the developments occurring in the interface industry. An attempt was made to identify issues related to user interfaces which made searching by end-users such a difficult activity.

In Chapter 3 trends regarding training end-users to search effectively on CD-ROM databases are looked at. Training programmes were analysed in terms of aims and objectives, content matter, and how they were implemented. This part of the research was an attempt to form an informed view of practices in end-user training on CD-ROM databases.

Chapter 4 deals with the process of curriculum development. It addresses the various models of curriculum design. Finally, a model suitable for this research is given.

In Chapter 5 a situation analysis of UNIN is considered with specific reference to post-graduate students. This situation analysis exposed discrepancies, gaps and needs of the situation under investigation. It dealt with establishing what post-graduate students at UNIN

knew in terms of searching on bibliographic CD-ROM databases, discovering their shortcomings and finally their tuition needs to make them competent CD-ROM database users. Based on the findings of the situation analysis a curriculum was designed for post-graduate students at UNIN. This curriculum covered aims, goals, objectives, content and methods, and media to be utilized.

In Chapter 6, which is also the concluding chapter, recommendations with regard to the situation, students and future studies which might be carried out at the UNIN Library are discussed.

1.5 SUMMARY

This chapter identifies the various sub-problems related to bibliographic CD-ROM databases. Based on these problems a situation analysis was conducted. The results of the situation analysis were ultimately utilized to design an end-user training programme for bibliographic CD-ROM database at the UNIN.

2. PHENOMENON OF USER INTERFACES WITH CD-ROMs

2.1 INTRODUCTION

The purpose in this chapter is to discuss the nature and status of user interfaces in the CD-ROM industry. User interfaces have been identified in the previous chapter as one of the factors which contributes towards the quality of searches by end-users. A clear picture of what user interfaces are and how they are developing would help to identify the measures needed for improving the search results of end-users.

To provide this picture, which is necessary for understanding user interfaces and why end-users experience problems, the following elements with regard to interfaces will be discussed: Firstly, it is important to define what is meant by user interfaces. Since there is no single agreement upon a definition, it is important to develop a working definition of user interfaces, which will be used throughout this report. Secondly, a brief history regarding the origin of and developments within the CD-ROM industry is necessary to establish whether any attempts have been made to improve the usability of interfaces. Characteristics of user interfaces will form the last part of the discussion and it is this part which will help to provide an overview of the real problems experienced by end-users. Characteristics of CD-ROM interfaces will be established from various discussions as provided in the literature.

2.2 DEFINITION OF A USER INTERFACE

Literature with regard to user interfaces spans the fields of computer science, engineering, information science, psychology, artificial intelligence and several other disciplines (Li 1991:261). Definitions provided below therefore came from any of these disciplines and, since each individual discipline concentrates on its own field of study, they are dissimilar. For instance, computer science defines interfaces more from the hardware point of view whereas information science and psychology emphasize the human aspect.

Notwithstanding the mentioned difficulty of defining user interfaces, this researcher

endeavoured, through the process of analysis and synthesis, to come up with a working definition for user interfaces which could be applied throughout the research. Edmonds (1992:5) maintains that the provision of a definition of user interfaces is so difficult that some authors simply omit it.

That providing a definition of user interfaces is difficult is further illustrated by Helgerson (1992:18) when she asserts that this concept is a "rubber band word" which may mean different things to different people. To come to a definition, a number of definitions in the literature will be analysed in order to establish the various elements that make up an interface. Most of the definitions used are from the information science discipline and hence will depict a bias towards this field. Elements which are identified will be deemed to be characteristics of an interface.

Definition 1

"The user interface is the domain where users formulate their requests and transmit them to the system, and where the system conveys its responses and messages back to the users. User interface design includes, but is not limited to, how users interact with the system, how the system expresses its responses and how the responses are shown on the terminal" (Chiang 1991:1).

Definition 2

"As a minimum, the user interface ought to refer to the means by which the user interacts with the program and data (dialogue transaction) command language, menus, or direct manipulation (icons, links, etc.). This, in turn, raises questions about the display fractures (screen layout, colour and response time) and the interactive devices (keyboard, mouse, etc.). User assistance (error messages, on-screen help, tutorials and printed documentation) should also be included in any discussion of user interfaces" (Large 1991:203).

Definition 3

"The term 'user interface' specifies how the program and the user communicate. Everything seen on the screen, read in the documentation and manipulated with a keyboard (or mouse) is part of a user interface" (Powell 1990:3).

Definition 4

"Oversimplifying, the user interface consists of the microcomputer screen displays and keyboard commands provided to CD-ROM users. It is through the user interface that the user learns what is on a disk, finds and retrieves desired information, and manages whatever is done to process the information thereafter" (Miller 1987:39).

Definition 5

"The user interface is that part of the CD-ROM software through which users give their instructions to the system and the system displays results, messages and explanations" (Jacso 1992:9).

Definition 6

"From the user's perspective, the interface can include some or all of the following:

- HARDWARE
  - Keyboard
  - Mouse or often pointing device
  - Display screen (can be touch screen)
  - Floppy disk drive slot, if the user must or may insert floppy
  - Hard drive, if the user can access it
  - CD-ROM drive slot, if user must or may insert disc
  - Printer

- SOFTWARE

  - Floppy disc(s), if the user must or may insert it
  - CD-ROM disc(s), if the user must or may insert it
  - Microcomputer operating system
  - CD-ROM search and retrieval engine
  - All programs that can be used to process retrieved results (word processors, spreadsheets, network software, and many others)

- SCREEN DISPLAYS THAT:

  - Show how to begin
  - Display options and explain how to select them
  - Show what commands have been entered
  - Report what command is being or has just been executed
  - Report the results after a command has been executed
  - Display the results of a search request
  - Help users learn or recall how to use the system" (Helgerson 1992:81-82).

It must first be acknowledged that, concerning the wide field covering user interfaces, the provided definitions represent a selection of those available in recent literature.

The phrases or words used in coining the various definitions make interesting reading in that generally speaking most of them use non-prescriptive terms, or are non-committal. None of the above definitions explicitly mentions what the elements of a user interface are, for instance, Def. 1 "includes but it is not limited to"; Def. 2 "as a minimum"; Def. 3 "everything"; Def. 4 "oversimplifying"; and Def. 6 "can include some or all of the following". This approach, without doubt, instead of explaining interfaces, rather makes issues more difficult for the researcher. It is because of this non-prescriptive approach that some definitions provide questionable explanations and elements that are not exactly part of the user interface. The first definition identifies two elements which it regards as forming

the user interface, namely, interaction between user and the system and eventually how the system responds to user requests. Interaction means dialogue and system responses can only be shown on screen. Thus two elements - dialogue and screen - are identified. However, it must be noted that the definition further hastens to add that these are not the only elements of the interface. Large (1991:23), in the second definition identifies dialogue transaction, display features, interactive devices and user assistance devices as forming the interface. By "dialogue transaction" is meant the way in which the machine and the user engage one another. Some of the well-known dialogue types are command, menu or direct manipulation. Display features refer to how effectively screens are used. Interactive devices, such as the well-known keyboards and mice, are input facilities that the user can use to transmit his messages to the computer. The final element from Large's definition is user assistance devices. User assistance devices refer to tools that the interface utilizes to support users during their searches, for example, tutorials, printed documents and on-screen help facilities.

As in the second definition, the third definition also identifies four elements as forming the interface. How the program and the user communicate, everything seen on screen, read in the documentation and manipulated by the keyboard are identified by the third definition. Miller (1987:39) also identifies screen displays and keyboard commands as elements of the interface. Jacso's definition does not identify particular elements but communication is emphasized (Jacso 1992:9). Finally, Helgerson (1992:81-82) names hardware, software and screen displays as elements of the interface.

An analysis of all these definitions reveals that Powell and Large's definitions are similar; they both identify four elements. For instance, dialogue transaction as advocated by Large is similar to how communication is entered into; display features include screen aspects; interactive devices are similar to documentation. The two definitions, therefore, in essence identify four elements. Chiang's definition identifies two elements which are both advocated by Powell and Large. Screen displays are also identified by Miller and Helgerson in their definitions. Of interest are the other elements which both Miller and Helgerson identify because, up to this point, they were not mentioned. Miller identifies the keyboard as an element, whereas Helgerson includes hardware, under which the keyboard is included. This is in contrast to the other definitions which identified keyboards, not as elements of an

interface but as interactive devices. The difference is that Miller and Helgerson's keyboard, in contrast to that of the other authors, seems to assume the status of an element but not of a tool to use.

To further explain this difference and to explain the viewpoint of this research, the following statements from the definitions will also be analysed:

Def. 2	"and the interactive devices"
Def. 3	"manipulated with a keyboard"
Def. 4	"and keyboard commands"
Def. 5	"through which the user gives their instructions".

Statements 2, 3 and 5 identify the keyboard as a tool which can be used in the communication process, whereas the same cannot be said of Definition 4. In this research the keyboard is not regarded as an element of the interfaces, as in the context of Definition 4, but rather as a tool which facilitates communication. Coats and Vlaeminke (1987:20) regard keyboards as part of the input process and it is in this context that they are being regarded in this research. Dehning (1981:72) rightly maintains that keyboards are input facilities which are not directly related to the interface. Keyboards are therefore discussed under characteristics of interfaces as interactive devices, and not as Miller and Helgerson regard them.

Apart from keyboards, from the provided definitions it seems that there is consensus with regard to the elements which constitute an interface. It can be concluded that the manner of dialogue, screen devices, documentation and keyboards, when regarded as interactive devices, can be included in the discussion of interface characteristics. For the purpose of this research and based on the above definitions, user interfaces can be defined as that part of the software program which allows interaction between the user and the database by utilizing various interactive devices, such as a mouse, using suitable screen features and, finally, providing ample support features for users to consult.

From this definition the following are identified as elements of an interface:

- dialogue which can take place through different types and different levels
- interactive devices
- display features
- user assistance.

These elements will be discussed in the discussion of characteristics of interfaces as, in actual fact, they are characteristics.

2.3 ORIGIN AND DEVELOPMENT OF CD-ROM INTERFACES

In discussing the origin of user interfaces with CD-ROMs, it is important to appreciate the fact that this cannot be done without considering the whole interface industry, that is, from online databases to what is available on CD-ROMs today. Kehoe (1985:490) traces the development of user interfaces, as seen in the online industry, as dating back to the 1970s. She further traces the development through three phases: online user interface gateway software; and, finally, the expert system. Edmonds (1992:6) regards the pioneer of interfaces to be William Newman. The first commercially available online interface was established in the 1980s. Prior to this period there were attempts towards designing interfaces. An example of these prior attempts is an experimental interface by Richard Marcus in 1973. Charles Meadow and colleagues are credited as having designed the first commercially available interface (Kehoe 1985:490). Gateway software, the next phase in the development of user interfaces, is traced back to around 1983.

Determining a date for the third phase is difficult because of terminological problems. It is accepted that literature on expert systems proliferated after 1982 (Kehoe 1985:494). Developments during these stages were geared towards designing systems which could function as intermediaries between the user and various databases. For instance, gateways were developed to address the problems of logging-on, dialling and translating user requests into the language of the system, which were functions that caused problems to users. Thus, unlike today, the early emphasis was on intermediaries or certain devices performing searches on behalf of users.

CD-ROM interfaces date back to approximately 1985. Research indicates that some of the earlier CD-ROM interfaces were replicas of their online counterparts, whereas others were newly designed for CD-ROMs. Miller (1987:39) supports this and points out that some interfaces emulate well established mainframe originals, whereas others were designed anew. Since their inception, CD-ROMs have grown exponentially and so have the number of user interfaces which users have to contend with. Nicholls (1992:36) explains that the number of CD-ROM titles have doubled annually. Forecasts are being made that in future more types of interfaces will be available for CD-ROM databases than online, thus increasing yet again the number of interfaces (Nicholls 1992:36). Figure 1 indicates the growth of CD-ROM databases.

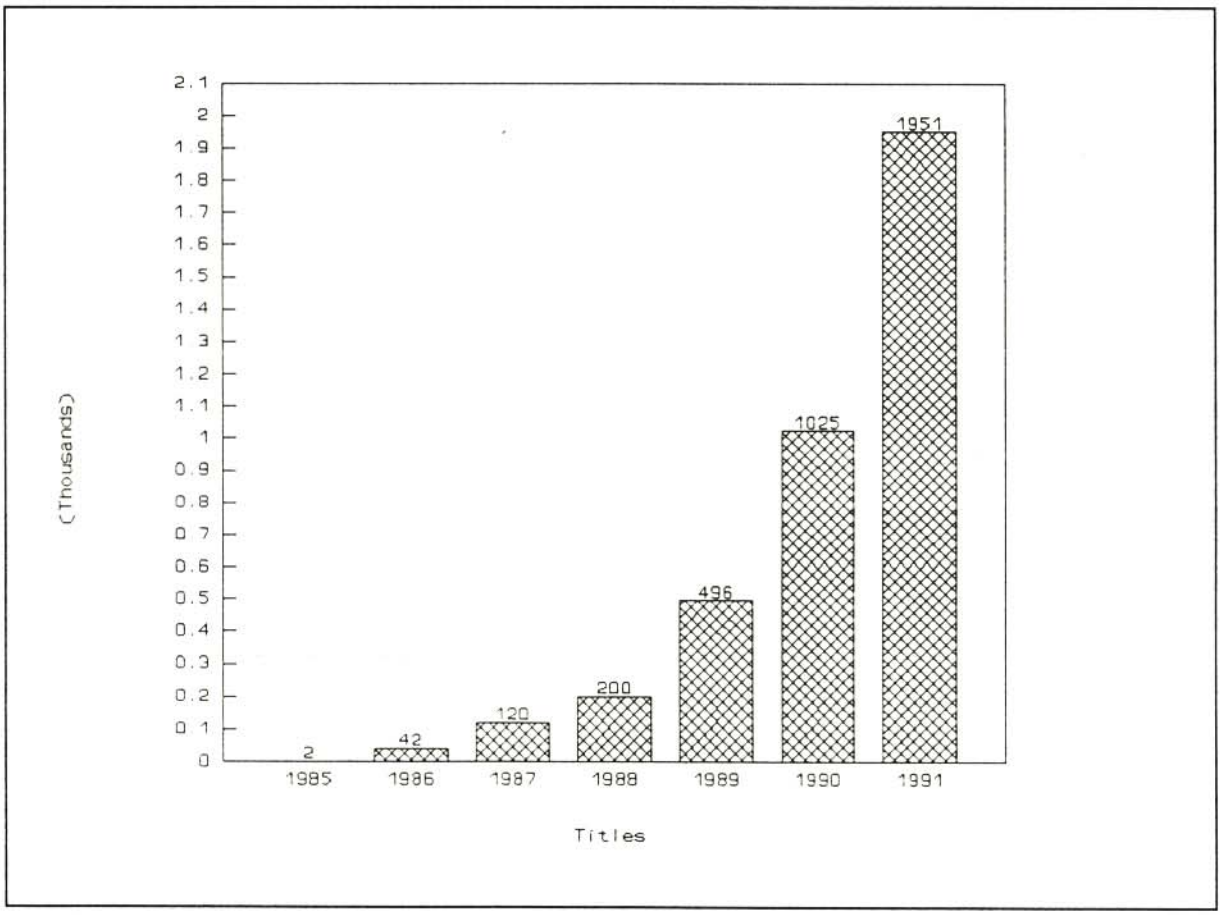


FIGURE 1: COMMERCIALLY AVAILABLE CD-ROM TITLES (Nicholls 1992:37)

As the situation stands today, the development of consistent interfaces that can be used by all databases does not seem to be possible. As Tufte (1992:15) rightly maintains, competition is focused on interfaces and, without doubt, this will continue to be the case.

The rapid development and competition between various databases are of particular importance to this research since they affect end-users. Growth means end-users have to deal with more interfaces. As Nicholls (1992:42) explains, variety means people make choices and mistakes and eventually they have to learn to handle more retrieval packages. It is as a result of variety that end-users are experiencing problems. The development of interfaces has brought with it two aspects, namely, a shift in emphasis towards the users of interfaces and, finally, proliferation of interfaces. It is the second aspect which is of interest to this research.

2.4 CHARACTERISTICS OF CD-ROM INTERFACES

A number of elements were identified in the discussion of definitions and it was mentioned that those elements will be dealt with in the discussion of characteristics of interfaces. The following characteristics, based on earlier identified elements, will be discussed:

- Types of interaction (e.g. command language)
- levels of interaction (e.g. novices)
- mode of interaction (e.g. mouse)
- ergonomic issues (e.g. use of colours)
- help and tutorial facilities (e.g. flipcharts).

Type, level and ease of use have to do with how communication is entered into; mode deals with interactive devices; ergonomic issues address screen elements; and help tutorials deal with devices designed to help users during their searches.

2.4.1 **Types of interaction**

By types of interaction, reference is made to the manner of communication between the user and the system itself. It is the method through which the user is able to retrieve data from the program, following the instructions or steps that the program prompts him to perform. There is no unanimity in the literature with regard to the types of communication. Some authors refer to what is regarded as a style of communication, as forms of communication.

Tenopir (1989:80), for instance, identifies command, menu, form fill-in and function keys as the various types of communication, whereas Jacso (1992:9) regards function keys not as types but styles of communication.

The researcher's views concerning function keys were made clear during the discussion of keyboards and, as such, function keys are not discussed under this heading. Except on the use of function keys as a style of communication, there is consensus on the other types of interaction. Because of the uncertainty in terms of how many forms of communications are available, comparisons between authors were made with regard to types and eventually the following types of interaction, which will be discussed, were identified:

- Command language
- menus
- form fill-in
- direct manipulating
- natural language
- questions and answers.

It must be made clear that in practice all these types of interfaces work together, that is, one may experience more than one form of communication in the same program. Lindeman (1989:16) maintains that the optimal interface frequently combines several of the techniques.

2.4.1.1 **Command language interfaces**

Command language interfaces comprise a vocabulary and rules on how the vocabulary should be assembled and transmitted into the program as a request. The rules may be with regard to one word or a string of words which the program will be able to understand. Most command languages do not provide supporting information. The user enters commands in the designated space in the program. For illustration purposes Figure 2 is an example of an interface which utilizes commands.

```
Command Search

Dialog User Interface as Audio/Visual Work.
Copyright (c) 1986 Dialog Information Services, Inc.
Portions (c) 1987, 1991 Digital Library Systems, Inc.

ERIC  -     CIJE  &     RIE   1983  -     MARCH, 1993

      Set               Items       Description
      ---               ------      ------------

?USER (W) EDUCATION/DE


>>>Unrecognizable Command
```

FIGURE 2: COMMAND LANGUAGE INTERFACE

For novice users this interface represents an unfriendly approach since they are not adequately guided on what to do. There is, for example, no information regarding procedures to start the search. The same is true when the user has completed a search - there is no indication on what to do next and users may be stranded while using this mode of communication.

(a) Advantages of command language

Because they do not provide supporting information, command languages are economical in their use of screen space. To expert searchers, command languages are highly regarded as they allow a number of searches to be performed. They offer searchers flexibility in that the interface can accommodate sophisticated searches (Sutcliffe, 1988:74; Large, 1991:204). Command language interfaces also eliminate the need to go through unnecessary menus because they only do what has been transmitted to them (Norlin 1992:13).

(b) Disadvantages of command language

One of the best known disadvantages of a command language interface is that it is difficult to learn, use and program (Sutcliffe 1988:74). Not only are they difficult to learn and use but their users also need substantial training before they can be used.

Norlin (1992:12) maintains that they also have limited search tracking, error handling and suggestive prompts. With the proliferation of databases, it means more command languages have to be learned and, as Large (1991:204) points out, languages not only need to be learned but also practised and remembered.

The applicability of this type of communication to end-users raises important issues. For example, by expecting users to master the various commands used by the various databases one is contributing to the dilemmas of end-users. This type of interface is more suited to expert searchers. However, expert searchers are not the primary purpose of this research. Training in the use of different commands should be provided to assure effective use by end-users.

2.4.1.2 **Menu-driven interfaces**

A menu refers to a list of options from which the user makes a selection. A menu can also contain further menus to choose from, as illustrated by Figures 3 and 4.

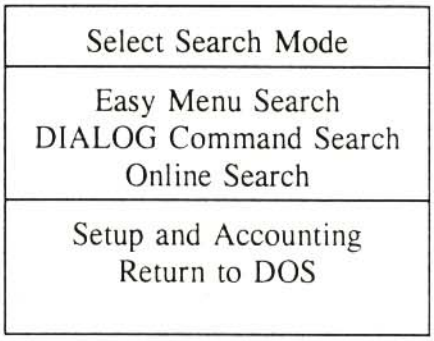


FIGURE 3: MENU-DRIVEN INTERFACE

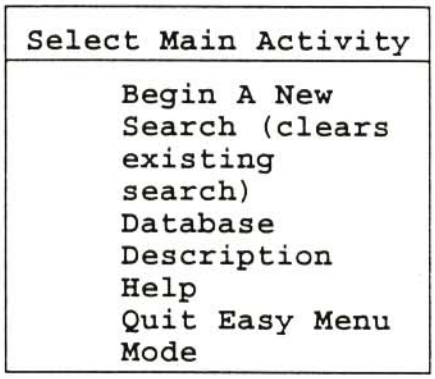


FIGURE 4: MENU WITHIN MENU-DRIVEN INTERFACE

Menus come in many styles; horizontal and vertical pop-ups, pull-downs, lotus style and full screen are among the most popular (Powell 1990:152). Menus, unlike command language interfaces, guide the user on what to do or the steps to be followed. Unlike command language interfaces, users need not necessarily know the language or commands of the system. Usually selection is made by a single character or digit code, the number or letter being displayed beside the option description (Sutcliffe 1998:69).

(a) Advantages of menus

Because they do not require learning of a specific command language, menus are easy to use. Compared to command languages, menu-driven interfaces require minimal or no training (Norlin 1992:2). Menus also encourage exploration and permit dialogue (Powell 1990:152-153; Norlin 1992:12). Users do not have to practice commands and, as a result, the user's memory is not burdened (Powell 1990:152-153).

(b) Disadvantages of menus

Unlike command language where sophisticated searches can be made by the language of the interface, when conducting a sophisticated search with menus, users have to go through the various menu stages, which may be time-consuming (Large 1990:20; Norlin 1992:12; Sutcliffe 1988:70). The power of the computer, with regard to speed of retrieving information, is traded for ease of use (Norlin 1992:12). To some extent users are not allowed to think independently since appropriate options are provided at each decision point.

2.4.1.3 **Form fill-in interfaces**

Form fill-in interfaces are also regarded as template-driven interfaces. Their function is to provide a form on the screen with various fields which can be searched. Some authors regard this interface as part of the menu interface (Jacso 1992:10). Data can be entered in the appropriate fields. Figure 5 is an illustration of a form fill-in database.

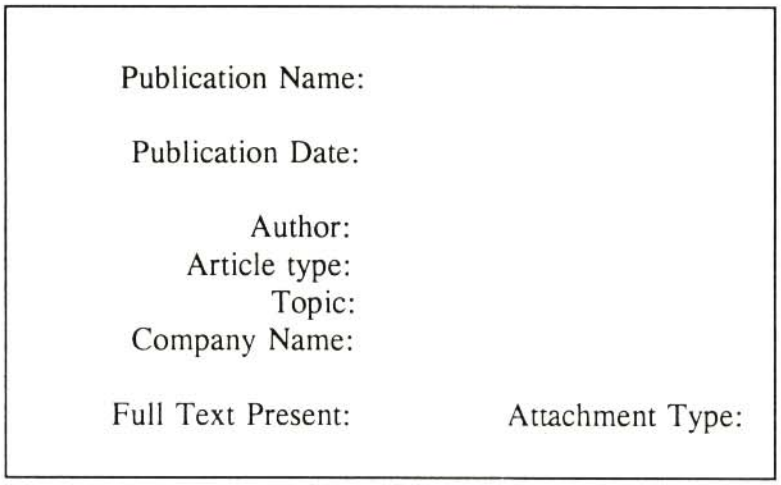


FIGURE 5: FORM FILL-IN DATABASE

(a) Advantages of form fill-in interfaces

Form fill-in interfaces are easy to learn and use because users are presented with the options that they can use (Sutcliffe 1988:72). Users are further saved the inconvenience of having to recall which options can be used to search the database (Jacso 1992:10).

(b) Disadvantages of form fill-in interfaces

The successful use of this interface depends on how the program interacts with users. For instance, if the program functions on the basis of the user responding to one question after another, an important aspect, namely that of backtracking or going forward, will not be provided (Kirakowski 1988:138). Form fill-in interfaces also utilize forms which may occupy a lot of space on the screen. Sophisticated searches will be hampered by this interface since the user will have to go through the steps offered which may not be appropriate for sophisticated searching (Schneiderman 1987:58; Sutcliffe 1988:72).

2.4.1.4 **Direct manipulation interfaces**

Direct manipulation, also regarded as icons by Sutcliffe (1988:71), utilizes pictures or icons to represent functions on a menu-like display. The user is presented with diagrammatic

representations which can be selected. A mouse, light pen or even the arrow keys of an ordinary keyboard can be utilized (Kirakowski 1988:130). Objects are selected by pointing rather than being referred to. Direct manipulation is based on the idea that users should see what is happening to the system as a result of their direct involvement.

(a) Advantages of direct manipulation interfaces

This interface is easy to learn and use (Sutcliffe 1988:72) because it resembles menus. Users make selections from a number of provided icons. It does not utilize language and, as a result, will be more suitable for novices.

(b) Disadvantages of direct manipulation interfaces

Not only is its use dependent on a sophisticated computer capable of employing high-quality graphics, but it also consumes screen space because a lot of icons have to be displayed (Kirakowski 1988:130; Sutcliffe 1988:72; Linderman 1991:4). To retrieve information users have to follow a preordained route decided upon by the designers and hence this will be of a disadvantage to expert searchers (Large 1991:210).

2.4.1.5 **Natural language interfaces**

These interfaces are ideally suitable for human computer communication because the users use their normal language, such as English, to communicate with the machine. Information can be retrieved by either using speech directly or through typing natural language at the keyboard. These interfaces obviously do not burden users with command languages that they have to master before using the CD-ROMs (Schneiderman 1992:167).

(a) Advantages of natural language interfaces

Because it utilizes the language of the user, it is not necessary to master the language of an interface (Sutcliffe 1988:75). As compared to other interfaces, such as commands, little learning will be required for the use of this interface.

(b) Disadvantages of natural language interfaces

The importance of metaphors and simile is not appreciated; it is difficult to tell when a word is being used literally or as a metaphor (Kirakowski 1988:146). Successful use of natural language is also dependent on how the query is formulated (Pritchard-Schoch 1993:36). Users may use whatever terms they want and their ability of formulating questions may be affected. Users may be deceived by the use of natural language and, as Pritchard-Schoch (1993:36) explains, develop into fuzzy thinkers. Finally, this interface is regarded as ambiguous and difficult to program (Hildreth 1986:9; Sutcliffe 1988:75).

2.4.1.6 **Question and answer interfaces**

This interface functions on the basis of the computer providing questions to the user and the user answering. The answers are usually restricted to "yes" or "no" (Y/N), although at a complex level numeric and alphanumeric answers can be provided (Sutcliffe 1988:68). The responses provided to the user restrict dialogue and sophisticated searches obviously cannot be performed on this interface.

(a) Advantages of question and answer interfaces

For novice searches this is an easy interface to use and learn (Sutcliffe 1988:68). Programming is also considered to be easy because users are not really given the freedom to experiment or explore but are only allowed to answer either yes or no (Sutcliffe 1988:68).

(b) Disadvantages of question and answer interfaces

They are not suitable for expert searches since they are not sophisticated. They will also be slow because users always have to respond before the next action can be taken (Sutcliffe 1988:68).

To retrieve information from CD-ROM databases, end-users are faced with one or a combination of these interfaces. It was established that some are difficult to use, whereas some are relatively easy. Of concern to this research is whether users can, on their own, keep track of the variety of interfaces or whether they need to be assisted. That assistance is needed is unquestionable, considering what users have to learn. What is difficult to determine is what help is needed and how it should be provided. This will be the concern of the next chapter. For now it is proper to say much has to be learned and, in some cases, difficult aspects need to be learned if information professionals are to be successful in making end-users successful searchers.

2.4.2 **Modes of interaction**

Styles of interaction refer to the manner in which end-users transmit their queries to the system. Jacso (1992:14) identifies two styles of interaction, namely, bar and menu modes. Jacso's views are confusing since in his discussion on function keys the styles regarded as styles of communication but, surprisingly, there seems to be no confirmation of this view when he discusses styles. Styles of communication are therefore considered in this research to refer to the mode of communication. Tenopir (1989:80) identifies the

- keyboard
- mouse
- touch
- speech

as the most commonly used modes of input used today, or expected to be in use in the near future.

2.4.2.1 **Keyboard**

Keyboards are some of the earliest forms used to put data into the computer. Since then a number of keyboard layouts have been designed in competition to the QWERTY standard

designed by Christopher Latham but none of them have really caught on (Kirakowski 1988:23). Problems regarding keyboards are brought about by a lack of standards with regard to positioning of keys. Keyboards normally have 10 to 12 function keys arranged along the top or down the left hand side. The same arrangement can be observed with numerals (Large 1991:212). The fact that users have to deal with more than one layout is disturbing. Dyer and Morris (1990:92-96) identify five different layout formats: firstly, the well known QWERTY, followed by the Dvorak layout, then the Maltron keyboard, the alphabetical layout and finally the velo-type layout. Without doubt, all these layouts compound user problems when information needs to be put into the computer. Various factors of the keys can further affect the ease of use of a keyboard. For instance, factors like key separation, key-top area, special-purpose keys, numeric keypads, the break key, frequently used keys and, finally, cursor control keys have a bearing on how the user is going to perceive the particular keyboard (Dyer & Morris 1990:99-101).

2.4.2.2 **Mouse**

The mouse as an input device was originally developed by Rank Xerox in the development of their Star computer program (Kirakowski 1988:26). The mouse is basically a hand-held device that turns hand movement across a surface into equivalent cursor motion on a computer screen. Connection between the computer and mouse is by means of a lead. In designing a mouse, the size and shape should make it possible to hold the mouse between the thumb and index finger. Problems concerning the use of the mouse are prevalent. For instance, most mice do not accommodate left-handed people and prolonged use has been found to lead to complaints with regard to cramped hands, stiff fingers and soreness on the heel of the hand (Large 1991:212; Dyer & Morris 1990:104).

2.4.2.3 **Touch**

Touch as an interactive tool refers to the use of fingers to point at desired actions on the screen. The basis of this method of interaction is that screens are divided into areas by the programs and, depending on which area of screen is touched, different sets of data will reach the computer (Kirakowski 1988:26). Touch screens are suitable for use by novice searchers

since no commands need to be remembered (Dyer & Morris 1990:103). Problems of touch screens include, among other things, frequent cleaning of the screen. Touch screens also lack flexibility because they provide no choices to users, they are also expensive to produce and eventually users do not have the assurance that the computer is busy with their transaction as they would be when using 'enter' on the keyboard (Dyer & Morris 1990:103; Kirakowski 1988:24 & Large 1991:212).

2.4.2.4 **Speech**

Speech as an interactive device in the CD-ROM industry has probably never been used. This method of communication is, surely, one of the simplest since users will not be expected to master keyboards or even the commands of the various systems. Research with regard to use of speech as a communication mode between the user and the computer is continuing and a number of areas where speech can be used have been identified. Kirakowski (1988:29) mentions instances where speech can be used to deliver help and error messages. Shortcomings of speech as a communication mode include the fact that most speech recognition devices can only function on one isolated word at a time and, as a result, if many words are said at a time, recognition will fail (Kirakowski 1988:28).

2.4.3 **Ease of use of the CD-ROM interfaces**

Ease of use, also referred to as user friendliness, is a difficult concept to define. Various definitions are provided in the literature to explain what it is and what it means but, until now, there is no universally agreed upon definition. Dehning (1981:67) defines user friendliness from the "technological point of view, if the individual user feels the subjective operating complexity to be very low. This further means that our main computer interface must be adaptable to different users and their needs". This definition does not help in that no one system could accommodate all users. Another definition by Nesdore (1983:6) maintains "a system is user friendly if it permits execution of the function for which it was designed in a minimum of training time by a user who has little knowledge of the process and in a moderate amount of time in its most sophisticated form with options and extensions by a user with a sound knowledge of the intricacies of the system". This definition

establishes some important elements that deal with an interface. For instance, as it distinguishes between users with little knowledge and those with sound knowledge it establishes the element of levels of interaction as important for an interface. Other authors, instead of providing definitions of user friendliness, identify elements that are related to this concept. Li (1991:273-274) identifies the following elements:

- Is there an introductory screen that identifies the database and time span covered?
- Is an on-screen tutorial included?
- Is the user told where to look for prompts and menus?
- Is the meaning of commands and menu items explained on screen?
- Is the user told how to back up through the menu screen and exit individual functions?
- Is the user instructed in exiting the database and leaving the system ready for the next person?
- Is function specific online help provided?
- Is context specific online help provided?
- Are useful error messages provided?
- Are examples of commands displayed?
- Are examples of logical search operations displayed?
- Can the index be browsed for the selection of search terms?
- Can users select an item from the index without re-typing?
- Can users select several items from the index without re-typing?
- Does the system provide suggestions on improving searching vocabulary?
- Are explanations of display options thorough and clear?
- Are explanations of print options thorough and clear?
- Does the system offer shortcuts for experienced searchers?
- Can explanations not available on screen be summarized on a one-page printed crib sheet?
- Is the documentation (user's manual) easy to understand?
- Is the documentation arranged in a logical manner?
- Is the documentation well indexed?
- Does the documentation include samples of searches?

- Does the search language use mnemonics and few keystrokes?
- Is there efficient use of function keys?

Jacso (1992:20) maintains that a well-designed interface must exhibit the following characteristics:

- Consistently used function keys
- unambiguous prompts
- informative labelling of options
- directional clues
- context indicators that remind you where you are, where you came from, and where you may go.

An analysis of these characteristics reveals that they span through the entire list of elements that have been identified as forming an interface. Not only do they cover how communication is entered into, whether for experts or novices, but also how the interaction must take place in order to be regarded as efficient. Documentation and ergonomic elements are covered.

Owing to the lack of unanimity on what ease of use means, it is, for the purpose of this research, regarded as the ability of the interface to encourage use by both novices and experts, utilizing appropriate interactive devices that support searching and, finally, provide end-users with enough support features during their searches. This definition is important since it identifies those areas of the interface that may cause problems to end-users.

2.4.4 **Ergonomic characteristics**

Coats and Vlaeminke (1989:3) distinguish between physical ergonomics and psychological ergonomics. By physical ergonomics they refer to the way in which the equipment, both computer hardware and ancillary equipment, is designed and arranged into a workstation. Psychological ergonomics, on the other hand, refers to the effect that the user experiences when reading a message which is phrased in a language that he does not understand because

it is laid out in some eccentric fashion. It is the psychological ergonomics that are of interest for this research because it deals with an important aspect of the interface, namely, how communication is entered into and how end-users perceive their interaction with the machine. Screen layout, colour, sound and response time are further identified as elements that are related to the ergonomics of a system.

2.4.4.1 **Screen layout**

Screen layout represents one of the most important aspects of the interface since it affects the ease with which the user can absorb displayed information. Information displayed on the screen must not be cluttered, that is, there must not be information overload on the screen (overload in the sense that users do not know which field identifies what aspect of the reference). There must also be adequate spacing when the interface employs windows. This must also be done with care to avoid overload, which will increase the chances of the user losing interest. Schneiderman (1992:315) maintains that dense or cluttered displays can provoke anger and inconsistent formats can inhibit performance. Figures 6 and 7 represent examples of screen layouts that can either encourage or discourage use.

1 of 8 Complete Record EJ425488 CS741657

The Electronic Eugenean : A Multimedia Yearbook Project.

Layton, Tom

Writing Notebook : Creative Word Processing in the Classroom, v8 n4 p14 Apr-May 1991

Language : English

Document Type : JOURNAL ARTICLE (080); TEACHING GUIDE (052) ; PROJECT DESCRIPTION (141)

Journal Announcement : CIJSEP91

Describes a multimedia CD-ROM yearbook project which combines words, sounds, and images to interpret meaning. (MG)

Descriptors: *Computer Uses in Education; Educational Technology; *Multimedia Instruction; Program Description; Secondary Education; Student Publications; *Yearbooks.

Identifiers : *CD-ROM

FIGURE 6: CLUTTERED SCREEN LAYOUT

Current display format :SHORT Browse record with Cursor keys, Pg Up/Dn, Home/End.

Item 4 of 6

Title Online and CD-ROM database in school libraries, reading, Lathrop, A : Book review

Author	Olsen, S.I.
Periodical	South African Journal of Library and Information Science
Year	1990

FIGURE 7: ECONOMIC SCREEN LAYOUT

For instance, Figure 6 appears to be cluttered whereas Figure 7 uses the screen economically.

2.4.4.2 **Colour**

Colour displays are attractive to users and can often improve task performance. There are no hard and fast rules with regard to the use of colour with interfaces but principles developed by graphic artists for using colour in books, magazines, highway signs, and television are being adapted for computer displays. CD-ROM interfaces may use colour to illustrate various tasks, for example, to express hierarchies within menus, fields or sub-fields within records and to distinguish between several pull-down menus (Large 1991:213). The use of colour to represent tasks must be done in a consistent manner so that users are not confused. Users must, for instance, regard yellow as the colour which always represents the author field. Schneiderman (1992:325) identifies the following effects of colour on users:

- Soothe or strike the eye
- add accents to an uninteresting display
- facilitate subtle discriminations in complex displays
- emphasize the logical organization of information
- draw attention to warnings
- evoke strong emotional reactions of joy, excitement, fear or anger.

The use of colour must therefore be appropriately determined since colour, which can be seen as the clothing of the interface, can affect use. Jacso (1992:19) maintains that clothing is important in that it can emphasize strengths and soften weaknesses.

2.4.4.3 **Sound**

Sound is beginning to establish itself in the CD-ROM industry as an ergonomics device. Research with regard to sound is continuing and an example of such research is in Kirakowski (1988:29) who advocates the use of sound to deliver help and error messages. Among the disadvantages associated with this ergonomic device are that recognition may not

be clear as only one word can be interpreted at a time, a large amount of computer space is taken up and reproduction is dependent on hi-fi equipment which, as yet, is not part of CD-ROM workstations (Kirakowski 1988:29; Large 1991:124).

2.4.4.4 **Response time**

Schneiderman (1992:279) defines the computer system's response time as "the number of seconds it takes from the moment users initiate an activity (usually by pressing an enter key or mouse button) until the computer begins to present results on the display or printer". Response time, as such, can either make or break the effectiveness of an interface. It is agreed within the CD-ROM industry that a response time of more than 15 seconds is detrimental to effectiveness of an interface (Large 1991:219). Rubinstein and Hersh (1984:148) maintain that when an interface takes longer than four seconds to respond, some message should be provided to the user, such as "wait busy with your transaction".

2.4.5 **Help and tutorial facilities**

Help facilities refer to devices that interfaces use to inform the users where they are, which tasks can be performed and how these tasks can be performed. There are online and printed guidelines that users can utilize when performing searches. For instance, facilities such as F1, which is regarded by many interfaces as a help function, is an example of an online tutorial. Most tutorials are geared towards equipping users with the necessary skills to perform their tasks. Tutorials must be context sensitive in order to give appropriate directions (Jacso 1992:16). As explained, there are two types of tutorials, namely, written and interactive or online tutorials.

2.4.5.1 **Written tutorials**

Written tutorials refer to user assistance devices such as flipcharts, manuals, handouts, posters and charts which can be placed at the workstation or given to users before they use a particular interface. These written tutorials can be designed by either database vendors or individual libraries. When clearly written they can serve as quick reference tools after a user

has received training. Because most of them consist of only a few pages they can be carried with ease and used whenever needed. Small notes and comments can be added (Powell 1990:288). A drawback with regard to written tutorials is that users have to constantly move their attention between the interface and the tutorial and, as a result, the user may miss some reactions from the system. Reactions with regard to the effectiveness of written tutorials in the CD-ROM industry are still mixed. Criticisms on written tutorials centre upon crucial content shortcomings, such as inaccuracies, omissions and lack of an index, and physical shortcomings like poor binding or paper quality. Another drawback of written tutorials is that the interface may change and for some time the tutorial may still reflect the old situation (Large 1991:215). Some manuals are lengthy and, as such, discourage use.

2.4.5.2 **Interactive tutorials**

Interactive tutorials refer to those help facilities which come with the interface and can therefore be viewed on the screen. Compared to written tutorials, interactive tutorials are complicated and expensive to develop and maintain. Online tutorials can be used to verify actions that the user has performed. These tutorials also use graphics to add interest. Relationships between fields can also be clearly illustrated by means of online tutorials. For instance, by using graphics, emphasis can be put on actions that users should perform. Some interfaces highlight actions that can be performed on a particular screen and, as a result, the user is already advised of functions that he or she can use. Powell (1990:288) maintains that online tutorials also help users not to wander off, which is one of the shortcomings of written tutorials. Drawbacks associated with these tutorials include, among other things, that users need to concentrate consistently. For people with short concentration spans this can be a problem. Another problem is that users will have to become familiar with the various tutorials since, in most cases, different aspects are used as help features and also they are not used consistently among the various CD-ROM interfaces. Many CD-ROM interfaces utilize interactive tutorials. In some instances these tutorials are replicas of the printed manual, however, they always have the advantage of providing users with help which is related to the problem at hand. Some standardization has taken place with regard to some elements of interactive devices, for example, the use of function key F1 to ask for help. This is an important development because users will not have to learn different functions for help when

using CD-ROMs. Tutorials are therefore an important element in making users utilize CD-ROM interfaces.

2.5 SUMMARY

This chapter set out to identify elements which constitute user interfaces and which elements may cause problems to users. In an endeavour to identify these elements, definitions of interfaces were analysed and the history of the interface was discussed. This was done because, without understanding what interfaces are and how they have developed, it will be difficult to understand end-user problems. It was established that there was no consensus with regard to the various elements of the interface. For instance, various elements are advocated by various authors. Kahn (1988:170) identifies browsing, using menus, refining a search, accessing an online version, printing and saving results as elements of an interface. Some of these elements are not regarded as constituting an interface in this research and, hence, no attempt was made to discuss them. For instance, an issue such as accessing an online version of a database is not regarded as part of the interface since some end-users may not know that it exists at all and, as a result, this will not affect their search processes. Dialogue between the interface and user, various interactive devices, screen layouts and documentation provided have been identified as elements that affect users during their searches. Users have not only to deal with commands, language or menus, they must also be able to use devices such as a mouse. Their perception of how the system responds to their queries affects their use of the various interfaces. The challenge to information professionals and database vendors is how to address these elements in a way that will encourage use. This is the purpose of the discussion in the next chapter.

3. END-USER TRAINING FOR USING CD-ROM DATABASES

3.1 INTRODUCTION

The previous chapter dealt with the nature of CD-ROM interfaces. It was established that end-users may experience difficulties with regard to efficiently utilizing the multiple interfaces which are available for use. To address problems provided by multiple interfaces, database vendors designed more friendly interfaces, making room for novice as well as expert searchers. Research indicates that even if there were some success in this direction, it cannot be concluded that end-users can fully utilize CD-ROMs without some form of training.

In this chapter it is intended to look at the various training programmes which have been designed, either by database vendors or information professionals, in an attempt to address the issue of multiple interfaces of CD-ROMs. It is an attempt to analyse literature on the training of end-users of CD-ROMs with the purpose of identifying elements of the various programmes. An analysis of the various training programmes is deemed necessary as it will help those who want to develop new programmes to focus on the elements that are discussed. It is also necessary so that, in the designing of new programmes, the wheel is not reinvented.

The discussion on the nature of the various training programmes will include the following aspects. From the outset it must be mentioned that this research does not claim to include all aspects involved in training. Rather, it reflects a process of analysis and selection. Other important aspects may be identified by other studies. First a general discussion on end-user training with regard to CD-ROMs will be given. This section will be an introductory discussion on trends in general with regard to CD-ROM training worldwide. Another aspect to be discussed is the establishment of end-user needs and in this discussion it will be endeavoured to establish, from the literature, which needs should be addressed in order to help end-users solve some of the problems which they may experience with CD-ROM databases.

Related to the identification of end-user needs is the issue of establishing the cornerstones of

the various training programmes. One of the most important elements of a training programme is its objectives and this discussion is an endeavour to establish what the various training programs, as found in the literature, aim to achieve. After establishing the objectives of the various training programmes, the next discussion will be on how the objectives are achieved. This section will discuss the various training elements, which are identified in the literature, to make end-users competent searchers. In essence it is a discussion on the learning content of the various programs. The next part of the discussion will be on the various methods employed to address end-user needs. Related to methods are the different media utilized by the various methods to achieve their objectives. Media used to teach end-users will form the next phase of the discussion.

Various approaches utilized in training end-users, as established in the literature, constitute the next part of the discussion. The concluding part of this chapter will be on obstacles or problems which are identified in the literature and which may impact on the training of end-users of CD-ROMs.

3.2 GENERAL BACKGROUND ON CD-ROM TRAINING

The subject of training end-users for using CD-ROM databases has been well covered in the literature. Countries such as the United Kingdom, Canada, Australia, Hawaii, Sweden and South Africa have produced literature with regard to training end-users to utilize CD-ROMs. However, the extensive coverage of this subject is not without its problems. For instance, within the available literature there is no consensus on a number of important elements which are to be discussed within this chapter. There is, for example, no agreement on the elements that must be taught to end-users in order to make them competent searchers. In a survey conducted by Allen (1990:92), it was established that end-users do not regard training on a selection of databases as important. In another study the same issue, database selection, is regarded as one of the most important elements of training needed by end-users (Whitaker 1990:31).

Basically two approaches are identified in the literature with regard to training of CD-ROM users. Maxymuk (1991:47) refers to these approaches as the two levels of training. In this

research the first approach is that which is regarded as the conceptual approach. This approach emphasizes the importance of the end-user understanding the various concepts involved in CD-ROMs. The following are regarded as examples of conceptual training: "Define and select the best database, select appropriate choice of natural language or controlled vocabulary and examine Boolean operators and other available connectors" (Sylvia & Kilman, 1991:44).

Opposed to this view is the second approach, namely, the skills approach. It maintains that end-users have no desire to be expert users of CD-ROMs and, as a result, they do not need to know concepts such as Boolean or command languages of the various databases on CD-ROMs. This approach is similar to that referred to by Maxymuk as the first level of training. Other authors refer to this approach as the minimalist approach, meaning: teach the end-user the minimum possible and his or her desire to know more will let him or her follow a further training course individually. Courtois (1991:109) maintains that there is strong evidence in the literature which points out that CD-ROM users have little or no interest in becoming sophisticated searchers.

Throughout this research both these two approaches will be discussed. The reason in discussing both is to present a picture of the nature of training as a whole. Each approach has its own methods, contents and implementation strategy.

3.3 IDENTIFICATION OF END-USER NEEDS

This step forms the beginning of any training programme designed for end-user instruction. It helps to focus the training programme on those people for whom it is intended. Malley (1984:40) maintains that the needs of the user override all other aspects in designing training programmes. Knowing the needs assists in developing successful programs since they would reflect the interests of the end-users. Van Brakel (1985:53) regards needs as being synonymous to requirements and demands. Based on this explanation user needs, with regard to utilizing CD-ROMs, are those elements of CD-ROM databases which users are required to master in order to use the various CD-ROM databases. It was explained earlier that literature on this subject is found in abundance and almost every article identifies its own

user needs. For the purpose of this research some case studies will be discussed in order to identify end-user needs.

Whitaker (1990:31-32) identifies three end-users needs. Effective use of the source is regarded as the first need of end-users. The concern is that even if end-users are eager to use CD-ROM databases they do not utilize them effectively. They take longer to get results which are not necessarily relevant. As a result, end-users need to be taught the correct use of databases. The second element that users need to be taught is the appropriate selection of CD-ROM sources. In most instances it is argued that users are lured to choose CD-ROM formats over other sources, such as print, for the wrong reasons or they select the wrong databases. Users need to be taught that CD-ROM databases do not have answers to all their problems and that they are divided into subjects. Therefore, users should not expect all databases to yield results to their requests, irrespective of their relevance. Finally, users need to be taught that CD-ROM databases are developed in different formats. For instance, each database has its own interface, especially if the databases are not from the same vendor. Users need to be taught that format may affect the ease of use of a particular database and therefore they must not expect all CD-ROM databases to function in the same way.

Johnson (1990:36) identifies six end-user needs. The first need is that of subject. End-users need to know the subject which is covered by a particular database. Closely looked at, this need is similar to what Whitaker identified as CD-ROM selection. It is an awareness need that CD-ROM databases do not just cover all subjects on one disc but are designed according to specific subjects.

The second need is identified as that of comprehensiveness and precision. It is a need that is based on the fact that all end-users do not always have the same information needs. Some may have dissertations to write, in which case they will need as much information as possible, while others may have class assignments to complete, in which case one article may suffice. This need is also linked to choosing the appropriate CD-ROM database and is seen to be similar to what Whitaker regards as CD-ROM selection.

The third need identified is that of timeliness. Users need to know the currency of the

databases which they are using. Some may have the wrong perception that CD-ROM databases are as current as their online versions and hence conduct searches that they incorrectly think cover the latest information.

Cost is another end-user need identified. Users need to be taught that huge costs are involved in providing a CD-ROM service although, unlike online databases, CD-ROM databases could be provided for free. Speed is another need identified. Unlike online databases, where users have to wait for their search results, CD-ROM databases offer end-users the advantage that results can be printed immediately and hence users would be able to commence with their projects immediately. Furthermore, CD-ROM databases offer users an advantage over print sources in that the process of searching abstracts manually. Covering, for instance, a ten-year period can take days, whereas on CD-ROM databases it is a matter of hours or minutes for experienced searchers.

The last need identified is that of the learning process. Users not only want to get results of a query they have at the moment but they also need to be taught the process of searching in future. They need to learn skills that they can apply to other databases in future.

3.4 OBJECTIVES OF TRAINING PROGRAMMES

The purpose of training programmes, generally, is to familiarize end-users with new sources and services in libraries. For instance, when online databases came into being there was a need to train information professionals on their use. The same can be said of CD-ROMs. When the phenomenon of end-user searching became a reality there was a need from both database vendors and information professionals to teach end-users how the new sources operated. This is a basic and general objective of most training initiatives even beyond the information science profession. End-user training for CD-ROM databases is no exception. What is difficult and more controversial is how training should be provided. This is largely determined by the objectives of the program which, in turn, depend on end-user needs (Malley 1984:40).

An analysis of the literature reveals that in most cases programmes are based on training for

a particular database or certain groups of end-users. Training is also geared towards familiarizing end-users with searching CD-ROM databases in general. The objectives of most programmes seem to be either teaching a particular concept, such as Boolean logic, or generally teaching the skills which are needed for CD-ROM searching.

In some of the literature, training programmes which are geared towards providing end-users with skills are regarded as the "generic approach" (Broughton 1991:16). This approach is not only supported by Broughton but by other authors as well. For instance, Nickerson (1991:45) discusses a programme of which the objective is to introduce students to the concept of information retrieval. This broad objective can be interpreted as obtaining skills for information retrieval.

Lowe (1990:17) discusses a programme with an "integrated approach" which is geared towards effective and efficient information retrieval. This programme is geared towards end-users distinguishing and evaluating information tools, of which CD-ROM is only a component. Kenny and Schroeder (1992:42) write of developing "independent users of the impact of disc databases". On the other hand, Nipp (1991:42-43) establishes a set of goals which are specific to CD-ROM and which, in the view of this research, illustrate a skills approach.

Although more cost effective, an integrated approach in cause training can cause problems. For instance, because it is broad, it cannot cover all aspects of CD-ROM searching in detail. Trainers therefore cannot treat one aspect extensively. Having said this, it is important to add that in conditions where economy does not allow for individualized training, this may be the likely option to take.

As against a general approach, in the literature an approach is found whereby users are trained in the use of a certain database or databases from the same vendor. Without a doubt the advantage offered by this approach is that more specifics can be dealt with by the trainer. Whitaker (1990:31) maintains that having a specialized audience means that information professionals can concentrate heavily on familiarizing patrons with a limited number of sources. Critics of this approach argue that it is not cost effective. The researcher also has

some misgivings with this approach because, eventually, the aim is to produce end-users who are information literate, not literate in using one database. If, for example, training is provided on the use of ERIC by DIALOG, it will mean further training is needed when the same user has to use another database, such as Library Literature by HW Wilson.

Support for this approach is also found in the literature. Steel and Tseng (1992:55) discuss an end-user training programme where the objective is to familiarize medical students in the United Kingdom with searching on MEDLINE. Hoover (1989:1), Courtois (1991:105) and Harrington (1990:12) advocate the same views. Hoover and Clayton write of a programme for prospective masters education students; Courtois discusses a programme whose objective is the use of EBSCO's products, whereas Harrington's programme is geared to users of SilverPlatter. While two approaches have been discussed, the impression must not be gained that other approaches are not viable. There are, for instance, those who advocate both approaches used together, that is, first teaching end-users generally about CD-ROM databases and later concentrating on specific concepts.

3.5 CONTENTS OF TRAINING PROGRAMMES

Contents of programmes refer to what needs to be taught to end-users in order to help them use CD-ROM databases. There is no unanimity in the literature with regard to the elements that training programmes must concentrate on to make end-users competent searchers. Various authors advocate various elements. For the purposes of this research a process of synthesis and analysis was engaged in to come up with a list of elements which are discussed by most authors. This approach provides for a more scientific discussion rather than discussing elements as deliberated by various authors. In some instances the same contents are advocated. For this research the following are discussed as contents of training programmes:

- Database content
- database structure
- Boolean logic
- vocabulary control

- hardware and software issues
- evaluation of search results
- CD-ROM technology.

3.5.1 **Database content**

End-users need to be taught that there are various titles of CD-ROM sources and they need to choose the correct database in order to fulfil their needs. The training programme must be able to inform users of the contents of the databases that they are using. Instances have been recorded in the literature of students of business economics using a psychology database to find out the standing of a certain business house as compared to other business organizations. This clearly indicates the end-users' lack of knowledge on which database to use for which tasks.

3.5.2 **Database structure**

When end-users know which database to use, the next stage the programme must address is the structure of the database. End-users must be able to identify the title of an article or book, the author, the language used in that article, descriptions and, finally, the abstract. Not all databases are structured in the same way. For instance, some databases have the author as their first entry whereas others start with the title. Furthermore, some databases do not provide abstracts or descriptors. Users must be taught that the use of one of these elements will be enough to help them retrieve relevant information. Only when a user is, for instance, aware of the language will he or she be able to evaluate the relevance of that reference.

3.5.3 **Boolean logic**

Boolean logic refers to the use of Boolean operators such as AND, OR and NOT. Users must be taught when to use these operators during their searches. Results obtained in using these operators must also be explained. For instance, it must be explained that the use of OR may increase recall but affect precision or relevance. Nicholls (1990:39) maintains that

the best method of teaching Boolean operators is through the use of Venn diagrams.

3.5.4 **Vocabulary control**

End-users also need to be taught that a certain database will yield better results if the vocabulary of that database is utilized. Although this has to some extent been solved by the use of free language among some databases, it is still important to teach users how to control their searching.

3.5.5 **Hardware and software issues**

Hardware and software issues refer to elements such as keyboard and printers. In instances where users can change the discs, they must be taught how. Function keys also form part of the hardware and software issue. Users must be taught, for instance, how to search and eventually how to display print and download their results. Users also need to be familiarized with the interface of a particular database. Some elements of interface, like structure, have already been discussed and it is only necessary to mention here that software will include interfaces.

3.5.6 **Evaluation of search results**

Users need to be taught that not all results retrieved necessarily are relevant. This is especially the case in instances where interfaces do not allow users to limit their searches. For instance, if a user cannot limit by language, the database will retrieve everything related to the subject entered, irrespective of language. For people who can only understand a particular language some results will not be relevant to their needs. Therefore, users must be able to evaluate relevance. This is also the case in instances where a user has been given a project covering a certain period and in his/her eagerness to use a CD-ROM database he/she just keys in his/her terms without limiting the search to the relevant period. Results can also be evaluated by looking at the descriptors used or reading the abstract. Users can only evaluate their results if they know that provision is made for these elements.

3.5.7 **CD-ROM technology**

Users need to be taught most aspects related to CD-ROMs that were not covered in other program contents. For instance, they can be taught that CD-ROMs have disadvantages when compared to other sources. Users always have the wrong perception that if they have searched on a CD-ROM database and have found nothing or only a few references, that no other information is available. They should be taught that CD-ROM databases have a limitation of time and there may be new references available that have not yet been indexed on the CD-ROMs.

These are just some of the advocated contents that training programmes must include. Table 1 identifies some additional content matter of training programmes as advocated by Maxymuk. There are no hard and fast rules on the content matter. As MacDonald (1990:95) rightly maintains, the content matter represents a "jungle".

Elements of an Instruction Programme for Novice Users	**Teaching Objectives for Experienced CD-ROM Searchers**
* What is a database?	* What thesauri and search manuals are available?
* How does a database compare to a print index?	* What are basic commands of searching?
* What constitutes a search strategy?	* Are all Boolean connectors available?
* Why should you devise one?	* How does this system use them?
* How is one devised?	* How are proximity operators used in this system?
* Summarizing your topic	* How do you re-use a search set?
* Identifying the main concepts	* What is the truncation symbol?
* Choosing your search terms	* How do you perform a field-specific search?
* What is truncation and when to use it?	* What are the basic commands to view items from a search set?
* How a thesaurus can help?	* Can you mark items to print or download?
* What are connectors?	* What is the command sequence to print/download items?
* Boolean logic	* How do you change disks?
* Proximity operators	* How do you quit the system?
* How do you use connectors with search terms?	* How do you get help?
* How do you fine-tune a search?	* Are there any special features available?
* How do you get help?	

3.6 METHODS OF TRAINING

Training is one of the most important preconditions towards providing access to CD-ROM databases. It is a precondition which stands between the end-user and information. Without training most end-users will experience problems, irrespective of attempts by database producers to design easy-to-use interfaces. Hence, the bulk of the literature deals with the subject of training end-users.

Literature pertaining to training methods for the use of CD-ROM databases is found in abundance. However, there is confusion within the literature with regard to what Malley (1984:59) calls the methods and media of training. Malley (1984:59) defines methods of training as a form or procedure which teaching programmes follow, whereas modes refer to the manner in which the method is taught. There is a tendency by some authors to mix these two, but this is not the approach of this research. Even if Malley (1984:59) does not consider this distinction to be vital, it offers advantages in that it brings order to the many possible ways of teaching. A further distinction of teaching methods is made by Van Brakel (1975:218-242), who discusses group and individual training methods. The approach in this research is therefore going to be that of discussing group instruction methods followed by individual instruction methods. This approach will also be utilized when media of training are discussed.

3.6.1 **Group instruction methods**

3.6.1.1 **Lectures**

Lectures may be provided to a group of new students in general or to a specific user group, for instance, psychology students in Course One. If well prepared, they can be used to explain to end-users most of the aspects involved in searching on databases. The lecture may include aspects such as how to analyse a topic, select an appropriate database, use Boolean operators and display or print results. Lectures offer the opportunity for trainers to explain the difference between the various formats of information sources such as CD-ROM, online databases and print information sources.

(a) Advantages of lectures

MacDonald (1990:107) maintains that lectures may be a good medium for generating enthusiasm. Users who are enthusiastic of the technology can be reassured by explanations provided in the lecture. Lectures can be given in the same area that houses the CD-ROM workstation. This will serve as an advantage since it offers an opportunity of hands-on experience while the lecture is given. Lectures may also reduce the number of raining sessions needed because many users can be addressed at the same time.

(b) Disadvantages of lectures

One of the identifiable disadvantages of this approach is that attendance at the lectures is not always satisfactory (Whitaker 1990:33; Lynn & Bacsanyi 1989:19). Lectures are also not the best medium to teach specifics such as operator's aid function keys, especially in instances where the lecture takes place in a different setting to where the CD-ROM workstations are located. Depending on the size of the class, instruction may not always be effective since individual attention will be almost impossible to provide. Some lectures may be lengthy which would prove a disadvantage to end-users with short attention spans.

3.6.1.2 **Group sessions or seminars**

Group sessions can be utilized to address some of the problems experienced with lectures. Compared to lectures, group sessions address small groups of users and they can also be used to concentrate on an aspect of interest to a group. Group sessions also encourage dialogue between the instructor and students. Van Brakel (1979:221) maintains that group sessions have proved to be one of the most effective methods of training.

(a) Advantages of group sessions

Because of the numbers involved, instructors would have time to address various

aspects of user training. Group sessions also offer the advantage that they can be used to train users at all levels (Van Brakel 1979:221). End-users' concentration is almost certainly assured, especially in instances where the session has to do with specific aspects related to studies undertaken by end-users.

(b) Disadvantages of group sessions

The fact that a small number of end-users can be addressed at any one time serves as a disadvantage to instructors because they may have to repeat the same aspect of training for many group sessions. For successful application the trainees' responses are important and a dull class will mean less dialogue which may discourage the instructor. The sessions may also be time consuming in that one aspect of training may be addressed instead of introducing all aspects at the same time. Another disadvantage is that the co-operation of teaching staff is necessary for successful group sessions and in most cases this relationship is not prevalent.

3.6.1.3 **Computer Assisted Instruction (CAI)**

This method, as part of computer-based training (CBT), is one of the least used methods but highly successful if utilized. One of the most notable disadvantages of this method is that it is time-consuming to create lessons. Reese (1993:151) refers to these methods as tutorials, the difference being that they are online. They can be produced by either database vendors or individual libraries. Vendor-produced tutorials will have the same limits as other vendor aids, such as being biased towards the company.

(a) Advantages of computer-based training programs

This training method offers a number of advantages over other training methods in that they can save staff time, especially in circumstances where a large number of end-users need to be trained. Instead of the information professional being completely involved, the end-user can sit at the terminal and go through the program on his own. Staff are only needed when there are problems. This method offers staff

the opportunity of concentrating on other duties in the library. It also offers users the advantage of self-paced learning. This method is more appropriate at times when other methods of training are not available to end-users, for instance, in the evening when there are less or no staff members at all. Successful computer-based training provides a feeling of self-accomplishment to users. It is also interactive; unlike other methods which instruct, it allows end-users to respond. Once completed, these programs can be used over and over again and as a result save costs in terms of time and staff. Locally produced programs can be more successful since the trainer is assured of having researchers and post-graduate students as potential user groups. Nowadays these programs are also available on discs which can be used on private workstations. Most of these computer-based training programs use graphics and this can serve to enhance the commands on the program.

(b) Disadvantages of computer-based training programs

Most of these programs try to cover all aspects related to CD-ROM searching within one short sitting or session. The time it takes end-users to go through the program may be long and therefore discourage use, which is a disadvantage. The constraints of time is also felt by designers in respect of staff time and effort in designing a program. Programs may take between 200 and 400 man hours to produce. Most of the programs are expensive because they take such a long time to be designed. Computer-based programs are also difficult to revise. Considering the long hours taken to design them, it will also take some effort to revise or update them. In instances where revisors have to use public workstations this can serve as a disadvantage since the workstations will be tied up. Retief (1989:15) also identifies a problem of language, especially in the South African context. Most programs are in English and their Afrikaans versions are not readily available.

3.6.1.4 **Video programmes**

Video programmes can also either be produced by database vendors or individual libraries. They are a flexible method of providing training either to groups or individuals. Locally

produced video programmes should also be of a good quality to attract users.

(a) Advantages of video programmes

Video programmes are flexible in that they can be stopped and discussed or rewound to review certain aspects. Reese (1993:152) maintains that their self-paced nature allows a non-threatening environment for the learner. Video programmes can also be viewed more than once.

(b) Disadvantages of video programmes

Video programmes designed by vendors may mainly be marketing tools. On the other hand, for libraries who design their own programmes, cost is one of the most detrimental elements. Since most video programmes need to be updated from time to time this may prove too expensive for an organization, both in terms of time and money.

3.6.1.5 **Written materials**

Vendors, in an attempt to address the problems presented by user interfaces, supplement their databases with written materials. These written materials may take the form of posters, templates, search forms, user guides, manuals, etc. Keyboard templates are useful for explaining function keys. Posters may explain the process of searching in a concise manner. Libraries should use posters discriminately because some of them are cluttered and could confuse instead of help the end-user. In most cases written materials are detailed aids on how to conduct a search.

(a) Advantages of written materials

One of the most important advantages of written materials supplied by vendors, especially in times when most libraries are experiencing budget cutbacks, is that they are free. On acquiring a certain database, these materials will also be provided and

can be used instantly. The advantage here is in terms of staff since they will not have to spend time designing a training tool and hence will have time to perform other duties in the library. Another advantage may be that vendors who have been in the business for some time may have the necessary experience to understand and address the problems experienced by end-users. This seems to be the trend in manuals nowadays. Instead of giving too much detail, vendors are providing simple command cards.

(b) Disadvantages of written materials

Most of the early written material tend to be long and detailed and may take time to go through. This discourages use. Long and detailed manuals may not be effective material for quick reference guides. Most of this material also tend to be marketing tools for vendors. Instead of concentrating on problems experienced by end-users, they tend to concentrate on promoting vendor products. In most cases they do not explain any shortcomings of the database. There is also the problem of updating the material when new software becomes available.

3.6.2 **Individualized instruction methods**

3.6.2.1 **Point-of-use instruction**

Point-of-use instruction, which also goes by names such as one-on-one, personal assistance or individualized instruction (Reese 1993:136), is regarded as one of the most widely known self-instructional methods but it is seldom used (Malley 1994:65). It refers to instruction being available to the user at the point of need or when the user is about to commence a search. Unlike most instructional methods, emphasis is shifted from the instructor to the user teaching himself or herself how a search can be conducted. Point-of-use instruction can utilize various media including handouts, posters and charts. As a method it can be used to teach end-users various aspects of CD-ROM searching. In utilizing this method a number of issues should be considered, for instance, where workstations are situated and whether there are enough staff to help end-users whenever they experience problems. Even if users

teach themselves, there should always be someone available to help puzzled users.

(a) Advantages of point-of-use instruction

As a method, point-use instruction is always available. For instance, the user can consult a poster on how to operate the system and thereafter conduct the search on his/her own. End-users have the advantage of being able to use the method at their own convenience and thus can pace their own learning experience. It is also available when the user has a specific need. In such a case the user is more likely to persevere than just give up, even if there are problems. It also offers uniformity in terms of instruction and end-users have the opportunity to re-read difficult points.

(b) Disadvantages of point-of-use instruction

A certain degree of motivation is needed to utilize the method. End-users are always reluctant to use paper prints (Whitaker 1990:32; Lynn 1989:18). Also, users always expect some sort of help, especially novice users and therefore the method may be somewhat expensive and not cost effective (Reese 1993:137). It is also difficult to evaluate the effectiveness of the method, especially if reluctant end-users who are not prepared to ask are dealt with. The possibility of a user not having obtained proper help, is high. Point-of-use instruction tends to use product specific materials and cannot be used to search other databases.

3.6.3 **Summary of methods**

Finally, to conclude this section on methods, it is important to mention that the methods discussed are not the only ones available. These are just some of them and the fact that, here too, various authors are confusing methods and media is an issue to be considered since those media which are regarded by some authors to be methods are, in this research, regarded as media. It is also important to mention that, in practice, these methods are used together, that is, a mixture of the various categories is employed for maximum results.

3.7 MEDIA OF INSTRUCTION

Training media are employed by the various methods for successful instruction. As with methods, group applications are discussed first and then individual applications.

3.7.1 GROUP INSTRUCTIONAL MEDIA

3.7.1.1 **Demonstrations**

Demonstrations can be used to support the lecture method. After end-users have been lectured on what a CD-ROM looks like, they can be shown what it is and how it works. Demonstrations offer end-users practical experience on what they have been lectured on. Smaller groups offer more chance of success for this medium since individualized attention can be given by the instructor. Demonstrations can either be given per appointment or on an ad hoc basis.

(a) Advantages of demonstrations

This medium offers an opportunity of involving the searchers in the learning process. It offers users hands-on experience not offered by other media of training. Another advantage is that training can be standardized.

(b) Disadvantages of demonstrations

Not all end-users who have to attend, turn up for the demonstrations. For libraries with limited resources this medium may be costly to employ. Equipment needed and the area of instruction may present a problem, especially when large groups of end-users need to be trained. Demonstrations are also not the best media for explaining conceptual information (Reese 1993:141). Furthermore, staff may need to test the equipment before it can be used and this could be a disadvantage in terms of time. If big classes are involved more than one group will have to be scheduled.

3.7.1.2 **Workshops**

This medium allows for more skills to be taught than in a demonstration. In its application demonstrations can also be utilized and therefore it is a more intensive media as compared to demonstrations alone. Workshops can be used to teach all aspects related to CD-ROM searching. For instance, users can be taught what a database is, what a record looks like, how to structure a search and eventually they can be given the opportunity of performing their own searches on the workstations as a follow-up to what they had been taught.

(a) Advantages of workshops

It is an effective medium since users have the opportunity of combining theory and practice. End-users also have the benefit of having the instructor at hand.

(b) Disadvantages of workshops

Attendances are not always satisfactory. Workshops are not cost effective because of their duration. Staff time is devoted to one aspect only, thus affecting other duties in the library.

3.7.2 **Individualized instruction media**

3.7.2.1 **Workbooks**

Workbooks refer to written guides which explain the process of searching on databases. They include written exercises that end-users can work through to learn various aspects of CD-ROM searching. Care should be taken to identify the problems experienced by end-users when they use these media. End-users sometimes continue with the next exercise without having completed the previous one. This should also be checked since, in most cases, the exercises are dependent on the successful completion of the previous ones. Workbooks can either be made available at workstations for the use of end-users before they use the system or the books can be given to end-users who attend training programmes.

(a) Advantages of workbooks

Workbooks can be studied by end-users at their own convenience, even if some deadlines need to be stipulated. For those end-users who do not wish to sit in the library for hours completing a workbook, this medium offers an opportunity of doing so at a place of their choice. They offer users some involvement because end-users have to provide answers to questions. Workbooks are relatively inexpensive.

(b) Disadvantages of workbooks

Workbooks can be very difficult to revise, especially if they were ordered in bulk. They can be boring since they do not utilize the source they aim to teach, namely, computers (MacDonald 1990:141).

3.7.2.2 **User guides**

User guides are also referred to as point-of-use guides or cheat sheets. User guides can be produced locally or by database vendors. User guides can be brief, one-page resources, pamphlets or brochures (Reese 1993:146). Most user guides are used to get people started but not to teach the whole process of CD-ROM searching.

(a) Advantages of user guides

They are always at hand to end-users when the need to use a particular database arises. One-page guides are easy to compile and cheap to update.

(b) Disadvantages of user guides

Like most training methods and media produced by database vendors, they seem to be biased towards a particular producer. Another disadvantage of user guides is that they do not cover all aspects of searching that may help end-users and therefore some additional help is required from an instructor.

3.7.2.3 **Templates**

These are guides which assist users in getting to know how the keyboard functions. Templates are important in instances where end-users are not yet computer literate and, therefore, not familiar with the different functions of the keyboard.

(a) Advantages of templates

This is a good starting point for the training of computer searching, especially to end-users who have no prior experience of using computers.

(b) Disadvantages of templates

If more than one database is used, various templates are needed. End-users may be confused and not know which one to pick to start a search.

3.7.2.4 **Search forms**

Search forms are, in most cases, one-page instructional media which users fill in before beginning a search. They are produced locally and, as such, can best serve local needs.

(a) Advantages of search forms

A search form is a good medium to help end-users organize their ideas before a search is conducted. They help the user visualize relationships between concepts. Instead of during the search, the user utilizes thesauri while completing the form. In this way time is saved. End-users simply type what has already been filled in on the form. Forms also make the combination of terms easier for end-users.

(b) Disadvantages of search forms

Although time spent at the computer is reduced by filing in the form, it may take too

long to complete the form. Some end-users may dislike the idea of having to complete some forms before starting the search.

3.7.2.5 **Flipcharts**

Flipcharts are guides which are placed at workstations for consultation by users. As the name suggests, users have to "flip" to the page in which they are interested. Flipcharts can be used to introduce all aspects of searching on CD-ROMs. They have headings for each aspect at the bottom of the chart. For instance, if a user wants information on how to print, he/she can look for this heading and go directly to the relevant page.

(a) Advantages of flipcharts

Flipcharts are unobtrusive and need only be consulted when a user wishes to do so. They contain enough information to help a user conduct a search without assistance from an information professional. They are handy in circumstances where information professionals are too busy with other functions or users to assist a user at that time.

(b) Disadvantages of flipcharts

As with most guides left at workstations to help end-users, flipcharts are not used extensively. The mere fact that they are available at the workstation does not assure their being used. Instances are known where users put their bags or books on top of this important guide, unaware of its importance (Reese 1993:15). Flipcharts may also be difficult to update and, as a result, may be expensive for some institutions.

3.7.3 **Summary on media**

Media are used together with the various methods discussed. By discussing them separately, it does not mean that each and every method or media works independently of the others. This approach was only followed to provide sequence to the discussion. As with methods,

other media may be identified but, for purposes of this research, those identified seem to be sufficient.

3.8 APPROACHES IN PROVIDING TRAINING FOR VARIOUS METHODS AND MEDIA

There are a number of approaches in the literature with regard to utilizing the various methods and media. In this discussion, however, one particular approach will receive attention. The approach of formal courses warrants mention since there is evidence from the literature that most institutions utilize this approach. Behrens (1993:126-127) categorizes formal courses into 'non-credit' and 'for-credit' courses. A 'for-credit' course implies that users are tested on the skills acquired and then given credit for having completed a particular course. Formal courses can be also be categorized according to their subject coverage. Behrens (1993:127) identifies general or subject-related courses within this category.

3.8.1 **Generic courses**

Generic courses are not designed for a specific database, nor are they geared towards a specific aspect of CD-ROMs searching. Broughton (1991:16) discusses a generic CD-ROM instruction course. This course is based on the premise that, since end-user needs are diverse and there are many databases available, end-users will be better served by this approach.

3.8.2 **Subject-related courses**

A subject-related course is meant for end-users in a particular subject field. Source content of this course will emphasize aspects of CD-ROM searching which are relevant to that subject. As opposed to a generic approach, emphasis will for instance be on teaching users only those databases which they will encounter during their period of study in a particular subject field. Lowe (1990:18) discusses a programme designed for education students. Nickerson (1991:46) discusses a programme called an accredited information science programme. Subject-related courses are also discussed by Le Poer (1989:39).

3.8.3 **Course-related instruction**

Course-integrated instruction is considered to be essential for the student's knowledge of the subject (Behrens 1993:127). As opposed to course-related instruction, course-integrated instruction forms part of a user's curriculum. The advantage offered by this approach is that users learn at the time of need. Lowe (1990:18) discusses a programme at Baruch College which is required of all Ph.D. students. Course-integrated instruction depends on lecturers and information professionals should work towards co-operation with them.

3.8.4 **Summary of approaches to instruction**

Finally, it is important to mention that all these approaches form part of a general trend as found in the literature. It is also important to mention that the approaches are linked to the methods and media discussed. Attendance of formal courses, that is both credit and non-credit courses, could be voluntary.

3.9 OBSTACLES TO PROVIDING CD-ROM TRAINING

In the discussion of various methods and media of training end-users, a number of disadvantages were identified and these disadvantages can, in a way, be regarded as obstacles to training. Apart from the problems inherent in the various methods, there are other obstacles recorded in the literature which makes training for the use of CD-ROMs difficult. One of the most discussed obstacles for providing training is that of lack of staff and time (Whitaker 1990:33). Most training methods and media require a considerable amount of staff time to implement. In instances where there is only one staff member this can be a major obstacle (Neame 1990:105). Whitaker (1990:34) identifies lack of equipment as another obstacle. Although it is a problem, improvements with regard to equipment have been noticed in most libraries. However, there are still libraries experiencing financial problems, which has an effect on the equipment available. Lack of standardized searching software is regarded as another obstacle towards providing an effective training programme. Broughton (1991:18) identifies the issue of convincing users that they need training as one of the obstacles of training. Users are sometimes deceived by the statement that CD-ROMs are

simple to use and are reluctant to attend the training programmes. Users need to be convinced that some form of training is needed for the effective use of CD-ROM databases. Financial problems also provide an obstacle since training methods depend on available resources. Because some methods are expensive, they may not be cost effective for certain institutions.

3.10 SUMMARY

The purpose of this chapter was to establish the corner stones and basics upon which various training programmes for CD-ROMs are based. The following were identified in the literature as some of the important elements which most training programmes already designed discuss:

- Establishing end-user needs
- objectives of the various training programmes
- learning content of the various training programmes
- methods and modes used to train end-users
- approaches towards providing training
- obstacles towards providing training.

It can be concluded that these elements form the basics of most training programmes. These elements will be used in the following chapters to provide a basis for a situation analysis. Establishing the needs of end-users will form part of the next chapter. Determining aims and objectives, content and methods will be the task in the next chapters in order to come up with suggestions for the design of a training programme for the environment under study.

4. CURRICULUM DEVELOPMENT

4.1 INTRODUCTION

The previous two chapters provided the theoretical basis upon which the problem of user interfaces regarding CD-ROMs has been addressed. The chapters endeavoured to introduce most of the theories, models and principles which underpin the topic under investigation. This chapter deals with the theoretical principles with regard to the curriculum process. It represents the last phase of the conceptualization stage of the research.

The two preceding chapters provided some case studies with regard to how problems relating to CD-ROM searching were addressed. A number of case studies was discussed. The purpose of discussing these case studies was to establish the basic principles underpinning the programmmes. The purpose of this chapter is to establish the basic fundamental principles upon which curricula could be based. Curriculum principles are important because they provide the only scientific basis for establishing curricula. Much has been written about curriculum processes in literature. A discussion of the relevant literature is necessary to identify the variables needed for this study. Curriculum processes are important for this project because they provide the theoretical basis upon which objectives, content and methods suitable for UNIN could be based. Various models of curriculum processes are advocated. For purposes of this research a number of models are discussed. A working model will be developed for this project.

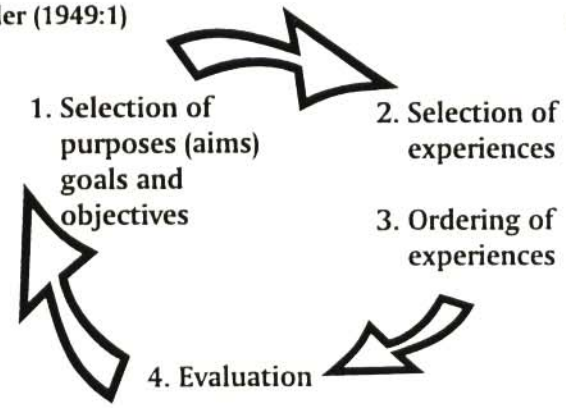
As a concept, curriculum design has been defined in a number of ways. Carl *et al.* (1988:23) explains curriculum design as not only dealing with the creation or design of a new curriculum, but also as dealing with the possible re-planning of an existing curriculum after a thorough assessment has been made. Zais (1976:16) on the other hand defines curriculum design as the organization of the components or elements of a curriculum. He further identifies the elements of a curriculum as being aims, goals and objectives, subject matter or content, learning activities and evaluation. Closely analysed, the definitions complement each other. While the definition of Carl *et al.* does not mention elements that need arrangement, Zais identifies such elements. To formulate one definition from these two:

Curriculum development is the organization of the elements of a curriculum after an assessment has been made; qualified further it is the organization of aims, goals, subject matter and learning activities after an assessment has been made. What is still not clear from these definitions is what needs to be assessed. Various design models with regard to curriculum design have been advocated. The following section of the discussion focuses on those models.

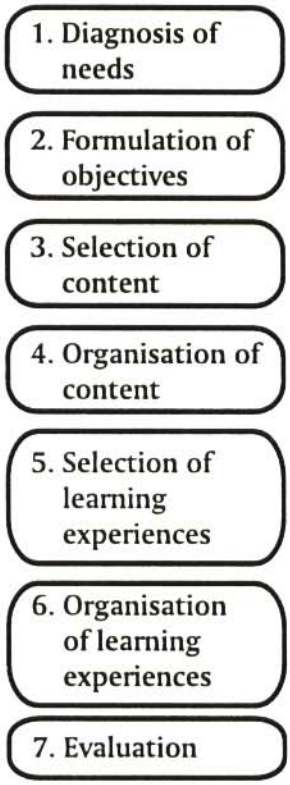
4.2 MODELS OF CURRICULUM DESIGN

Zais (1976:445-469) discusses a number of models which have been utilized in curriculum design. Among others, the following models are discussed in the literature: the administrative model, grass-roots model, demonstration model, Beauchamp's system, Taba's inverted model, Roger's interpersonal relations model, systematic action-research model and, finally, what Zais regards as emerging technical models. It is not the intention of this chapter to enter into the merits and demerits of each model. What is important is that a picture of diversity of the models emerges. This picture indicates the lack of consensus among educationists with regard to which models are adequate for designing curricula. Three clearly defined models of curriculum design are apparent: the traditional models, the more recent models of which Taba's model is an example and, finally, the models which Zais (1976:76) refers to as emerging technical models. For purposes of this research a number of models will be discussed and, eventually, elements which are relevant for this study will be identified. The models by Zais (1976:97), Tyler (1949:1), Taba (1962:342-379), Wheeler (1979:30-31) and Nichols and Nichols (1978:21) are chosen because they address and identify most of the elements discussed in the literature of curriculum development. Figure 8 depicts the basic outline for each of the mentioned models.

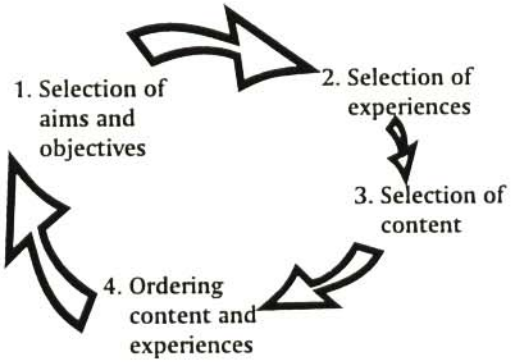
Tyler (1949:1)



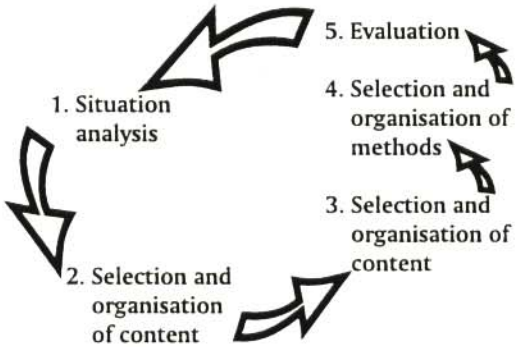
Taba (1962:342 - 379)



Wheeler (1979: 30-31)



Nichols & Nichols (1972: 21)



ZAIS (1976: 97)

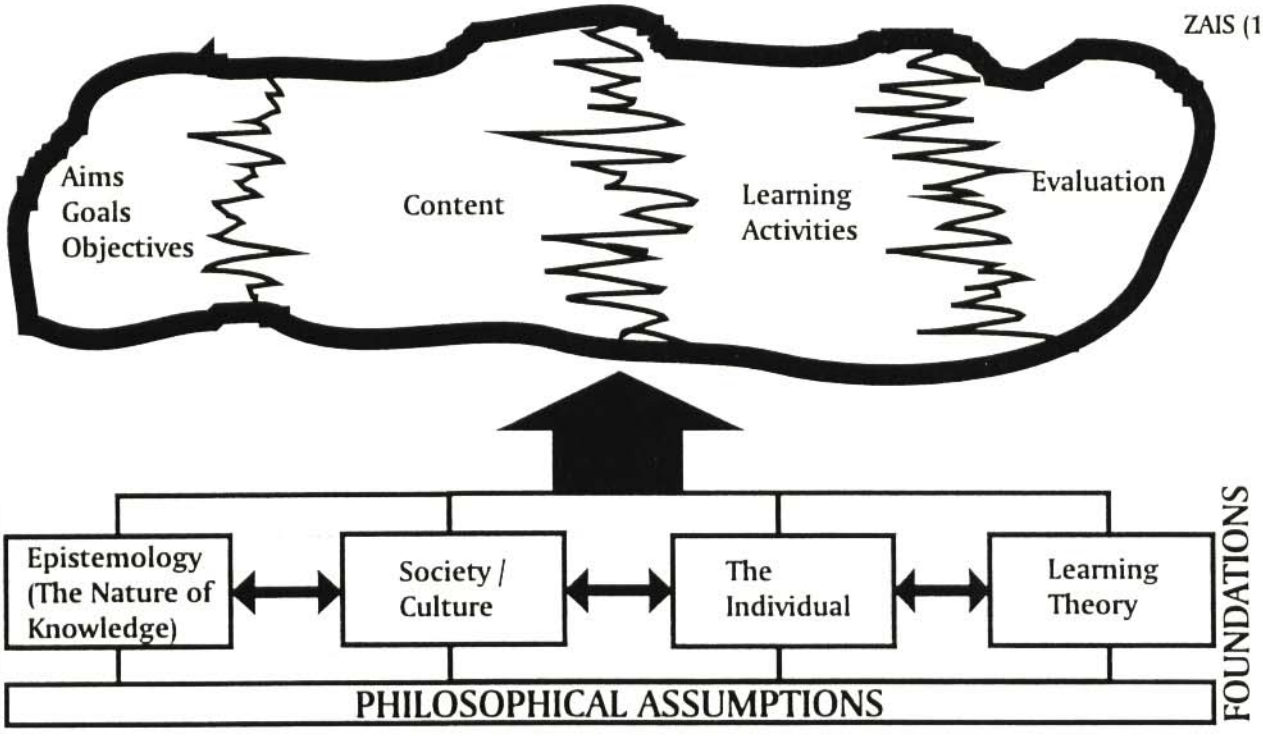


FIGURE 8: CURRICULUM MODELS

An analysis of the models reveals some interesting similarities and differences with regard to the phases advocated by each model. For instance, the selection of aims and objectives is advocated by both Tyler and Wheeler. The same can be said of selection and ordering of content. Wheeler, Tyler, Taba and Nichols also include these stages, but at different positions in the model or under different names. Zais's model identifies aims, objectives, contents, learning activities and evaluation as important steps in curricula design. What is different though is the emphasis that is placed on the philosophical foundation. According to this model, philosophical foundations influence the aim and content and as a result, for successful curriculum design, one should first understand the philosophical assumptions of the situation under study. Another important difference is observed when an analysis of the models of Taba and Nichols and Nichols is made. Taba (1962:342) identifies needs analysis as the first stage of any curriculum design. This means that before one decides on aims, content and methods one should first identify the needs of the user. Nichols and Nichols on the other hand identify situation analysis which includes needs as the first step towards curriculum design. It is the view of this researcher that the model of Nichols and Nichols regarding this aspect is similar to Zais's emphasis of the philosophical foundation. In the process of analysing the situation one would, for instance, determine the nature of knowledge and the culture of a society. It is the contention of the researcher that situation analysis among other things entails the diagnosis of needs. Based on the similarities and differences amongst the various models, the approach in this research will be on selecting from various models stages that are regarded as important. The stages advocated in this research are thus identified as: situation analysis; formulation of objectives; content selection; organization of learning experiences; organization and integration of experiences and content; and finally evaluation. The following section will concentrate on the stages of curriculum design.

4.3 SITUATION ANALYSIS

In explaining situation analysis Carl *et al.* (1988:28) describe this process as including the accumulation and interpretation of all information that can contribute or greatly influence the successful design dissemination, implementation and evaluation of the curriculum.

Calitz (1982:11) on the other hand regards situation analysis as an analysis of the data or

variables that can play a role in the movement towards achieving a goal. Mokgalabone (1992:172) maintains that this process is a systematic isolation of variables which have and may have a bearing on the existing and envisaged curriculum. Walters (in Carl *et al.* 1988:28) refers to this concept as being a form of contextual evaluation which will not only expose present physical facilities, but which will at the same time indicate limitations, gaps and needs.

Based on the literature, a working definition for this research can now be formulated. The situation analysis will be regarded as an organized process of isolating, exposing, accumulating and assessing variables which influence the design of curriculum in a particular situation. This process forms the basis upon which all elements identified in various curriculum design models are based.

Situation analysis, as explained, refers to a process of assessing variables. It becomes important to identify the variables which need to be assessed. Various types of variables are identified by a number of authors as elements which need to be assessed. The following section will endeavour to identify variables that have been advocated by some of the authors. It must be mentioned that not all identified variables apply to this research and consequently only those elements that are relevant will be discussed. The process curriculum design occurs at various levels. In an academic environment the rector and senate are responsible for overall planning and as a result elements like the flow of resources would be their responsibility, whereas at the microlevel lecturers identify elements like students' aptitudes. This research will therefore also look at relevant variables operating on microlevels.

4.3.1 **Variables**

Skilbeck (in Bishop 1985:132-133) lists a number of elements which are important to obtain a true picture of the situation under investigation. He divides these variables into two groups, namely, external and internal factors.

For the purpose of this research some factors as advocated by authors such as Nichols and Nichols (1972:22-31) and Cartl *et al.* (1988:29-31) will be identified. Factors applicable in

this research are illustrated by asterisks. These variables are relevant at university level as at other levels. Variables identified are as follows:

- Pupils - their aptitudes, abilities, attitudes, values, and defined educational needs *
- teachers - their values, attitudes, skills, knowledge, experience, special strengths and weaknesses, and their roles *
- organizational ethos and structure - common assumptions and expectations including traditions, and authority relationships *
- material resources including buildings, equipment, learning materials and possibilities for improving these *
- perceived problems and shortcomings in an existing curriculum. *

Nichols and Nichols (1972:22-31) also identify a number of variables which, when analysed, are not completely different from those advocated by Skilbeck. The following are relevant:

- Teacher
- pupils *
- environment *
- building. *

The variables in Skilbeck and Nichols and Nichols would reveal that elements advocated by Skilbeck can also fit into the model of Nichols and Nichols. Skilbeck's model endeavours to establish the necessary elements of each category.

Carl *et al.* (1988:29-31) on the other hand identify an extensive list which incorporates all levels of curriculum design. According to their approach a situation analysis of three areas, namely learner, learning content, and school and classroom, is of the outmost importance to allow for the successful design of a curriculum. Relevant variables are the following:

4.3.1.1 **Situation-analysis of the learner**

- Standard of pupil
- sex

- language medium
- age
- attitude towards subject and school
- potential of pupil *
- achievement in subject
- attention span
- leadership
- level of development *
- skills (e.g. the ability to work in a group)
- independence *
- initiative
- field of interest.

4.3.1.2 **Situation analysis of the learning content**

- Link with formulation of goals
- extent/comprehensiveness
- standard for which it is presented
- degree of difficulty
- sources needed and those available *
- availability of supplementary media and visual education
- requirements of the syllabus *
- depth of study
- ordering
- time scheduling
- enrichment possibilities
- textbooks available
- other learning contents, for example, availability of magazine articles
- suitability for particular pupils (connection with aptitude and development of the learner)
- relevance
- structure of subject contents.

4.3.1.3 Situation analysis of the school and classroom

- Situation analysis of the school and classroom
- nature of school curriculum (subject choice, school policy)
- types and number of classrooms *
- number of pupils in the school *
- number of boys and girls
- medium of instruction
- number of men and women
- community in which the school is situated
- attitudes of teacher towards innovation and change
- level of curriculum knowledge and curriculum skills
- quality of subject team systems
- staff development in the school
- leadership of education leader
- availability of sources in the library/media centre
- the existence of a positive climate for the promotion of curriculum development
- physical space available *
- number of desks *
- lighting *
- ventilation *
- creation of subject atmosphere
- temporary pre-fabricated classroom or permanent structure
- whether pupils or teachers change classrooms
- media in classroom
- availability of reference works in the classroom.

All these variables will be involved under the heading of creation of objectives, content, and methods. Bishop (1985:133) comments that a situation analysis is not only an accumulation and assessment of variables, but rather a solution-seeking exercise geared towards planning the resources and the organizational changes that are needed. After assessment the information which becomes available could be used. The relevance of this process to

curricular design is that it allows for correct approaches to be employed with regard to aim and objective formulation, content matter, methods of training and evaluation. For instance, based upon knowledge of classroom issues appropriate methods can be chosen for instructing students. The results of situation analysis thus become guidelines for the formulation and selection of objectives.

The next phase of curriculum design, namely, selection and formulation of objectives, will now be discussed.

4.4 SELECTION AND FORMULATION OF OBJECTIVES

The history of selection and formulation of objectives is traced to 1860 by Van Brakel (1979:63). He divides this history into a number of stages starting with early pioneers like Johann Herbart and Herbert Spencer. The next phase in the development process is credited to Franklin Bobbitt and Werrett Charters. Ralph Tyler is regarded as the person who revived the movement of establishing aims and objectives in curriculum development, because of a change in emphasis regarding curriculum development after Bobbitt and Charters's contribution. A stage was identified where the learner instead of aim and objective formulation became the emphasis of curriculum design.

Bloom and his colleagues, with their publication on taxonomy of objectives in 1956, followed on Tyler's work. It is this development which is regarded as being important in the re-establishment of this concept since the situation that is prevalent today originated from Bloom's work. Another phase to the growth of the movement was brought about by Hilda Taba and Robert Mager who finally established the principle of aims, goals and objectives as important elements of curriculum development.

Establishing aims, goals and objectives is not without problems, such as that setting goals and objectives leads to an emphasis of trivial outcomes and those who set aims, goals and objectives cannot always take advantage of unexpected possibilities. The view propagated by some curriculum writers is understandable only if curriculum purposes are established from a behaviouristic point of view. The view held in this research is that aims and

objectives are important because without them it will be difficult to establish the failure or success of the learning results. As Nichols and Nichols (1972:33) rightly comment, by setting objectives we are in a position to assess the importance of what we are trying to teach. Setting curriculum purposes is therefore not questioned in this research.

The discussion on the selection and formulation of objectives will take the form of explaining the nature, criteria and classification of various objectives.

4.4.1 **Nature of aims and objectives**

There is no uniformity in the literature with regard to the use of terms such as objectives. The same uniformity is also lacking with regard to the provision of a definition. Zais (1976:305) comments that no universal agreement on the precise meaning of this term exists among curriculum writers. Part of the problem is brought about by the fact that curriculum purposes (as they are referred to in this research) are realized at various levels. It is therefore important to explain the view held in this research. The existence of various levels is one of the factors contributing towards confusion. To illustrate this lack of uniformity: Zais (1976:307) discusses three purposes of a curriculum; Taba (1962:194), on the other hand, writes of educational outcomes and only two such outcomes, namely, aims and objectives, are identified. This research therefore supports three curriculum or educational purposes because these purposes can be identified at different stages of the learner. Aims reflect the general expected behaviour after a learner has completed his schooling days, whereas in the interim goals will help to establish if the desired results are being achieved. Objectives will finally reflect the method in which this interim behaviour will be achieved. Curriculum purposes as advocated by Zais (1976:307) are:

- Aims
- goals
- objectives.

(a) Aims

Aims are defined by Zais (1976:306) as statements that describe expected life outcomes based on some value schema either consciously or unconsciously borrowed from philosophy. As a result they reflect a philosophy of life. What differentiates them from other curriculum purposes is that they do not relate directly to classroom outcomes. Their realization can be determined (if they can be determined at all) only after a learner has completed his schooling days. They refer to long-range targets and are therefore difficult to measure. Matthews (1989:5) characterizes aims as:

- General rather than specific
- remote rather than immediate
- reflecting a particular view of society
- having a cultural base
- reflecting judgement of value.

Aims are thus concerned with the total development of the learner. Various kinds of aims are identified, among which are aims concerned with manpower, knowledge and personal development. What is difficult for curriculum planners is to translate these broad purposes into observable outcomes linked to the school. Attempts to achieve this have resulted in criteria such as realizability and feasibility being used in an attempt to narrow down these broad purposes.

(b) Goals

Goals represent the next level of curriculum purposes. They refer to learning outcomes which in most cases reflect the education system rather than classroom purposes. They are also long range and do not reflect classroom activities. Wheeler (1967:32) defines them as patterns of expected behaviour at given stages over the educational period. As such they are intermediate purposes, because they reflect what is learned at various stages of the child's development. Goals specify clearly what behaviour should be achieved at a certain stage. Unlike aims, they represent

recognizable stages in the progress towards ultimate goals (Wheeler 1967:111).

(c) Objectives

Objectives represent possible outcomes of activities within classroom situations. As Zais (1976:306) maintains, they refer to the everyday business of the operative curriculum and the degree to which they have been achieved. They are thus immediate and specific. Their importance is that they assist in evaluation after certain purposes have been achieved.

4.4.1.1 Summary on levels of curriculum purposes

The various levels of curriculum purposes discussed may not reflect a complete picture and hence some levels may be identified. The use of terminology may also not reflect a true picture as indicated by levels advocated by Wheeler (1967:31), who identifies ultimate, mediate and proximate goals. For purposes of this research the terminology and levels discussed are deemed sufficient.

4.4.2 Criteria for selection and formulation of objectives

Various criteria are used to select and formulate objectives. Taba's principles on formulation of objectives are adopted for the purposes of this research, because she is one of the few who has described them and who's criteria are extensive enough. Taba (1962:199-205) identifies the following criteria for the selection of objectives. Objectives should:

- describe both the kind of behaviour expected and the content
- be stated analytically and specifically
- be formulated to clearly distinguish among learning experiences required to attain different behaviour
- be developmental, representing roads to travel rather than terminal points
- be realistic
- be broad.

(a) Describe expected behaviour and the content

Objectives should explicitly state the behaviour expected after a certain content element has been taught. They should not only state behaviour but also the content that would make the achievement of a particular behaviour possible. Taba (1962:200) refers to this relationship as the two-fold nature of objectives. She regards this relationship as being important as it helps to serve as a platform for curriculum development and evaluation. The relationship points attention to the fact that the process of education consists of mastering content and developmental powers. The relationship thus eliminates the over-emphasis of either element.

(b) Analytic and specific

Objectives should be specific about what must be achieved. This helps in the evaluation process; if an objective is not clear, it is difficult to evaluate whether it has been achieved. Objectives should communicate in clear terms what the instructional intent is. Mager (1962:10) maintains that specifically stated objectives convey to others a picture of what a successful learner is like. Specific objectives reduces the number of vague alternatives to a curriculum purpose. They should exclude broad and vague statements.

(c) Clear distinction among learning experiences required

To ensure success distinction with regard to what behaviour is expected from a certain experience should be clearly made. Attaining a different behaviour should not be the by-product of the same objective. For instance, experiences designed to create interest in something may not necessarily change the attitude of a person. Hence objectives should clearly outline which behaviour should be achieved by a certain experience.

(d) Represents roads to travel not terminal points

Objectives should represent a developmental process which must be achieved over a period of time and through different contexts. This also means that the achievement of educational objectives should be planned to assure for continuity with appreciation of the developmental steps within that environment (Taba 1962:203).

(e) Realistic

The tendency among curriculum writers is that in an attempt to explain their purposes they over-elaborate and as a result design unrealistic objectives. Objectives should be designed in such a way that they are attainable and achievable. They should not represent hopes which may not be achieved.

(f) Broad

Objectives should be broad and must include all learning experiences that are expected of a child. They should address what is regarded in the literature as school-wide and behavioural objectives. If they are not broad they may possibly concentrate on one aspect of the child and as a result not produce a total individual. The other reason for setting broad objectives is that if they emphasize, for instance, behavioural objectives it may imply that other objectives are not important.

4.4.2.1 **Summary on educational purposes**

An attempt was made to define educational purposes, to establish the various levels of educational purposes and, finally, to establish criteria for the formulation of objectives. These criteria will again be looked at in the formulation of objectives in the next chapter.

4.5 SELECTION OF CONTENT

During the establishment of criteria for objectives it has been mentioned that classification has an important role in selecting attainable objectives. The need for definition and classification of criteria also applies to effective content selection. It is therefore important

to establish criteria for the choice of learning content. Van Brakel (1979: 84) maintains that the selection of learning content raises two important issues, namely,

- selection of content
- establishment of criteria to evaluate the content.

These issues reinforce the approach that content should be selected according to certain criteria.

There is no unanimity among curriculum writers with regard to criteria for content selection. Factors responsible for this confusion include among other things that requirements for what constitutes literacy have changed and, also, that the world has experienced an explosion in information dissemination. Information technology also demands from curriculum planners a shift in emphasis towards a curriculum which prepares the student for current practices. These problems, namely requirements for literacy and the information explosion, contributed towards the confusion reigning among curriculum writers. Hence the question of how to prioritize curriculum content has become all important. Some writers (e.g. Taba 1962:265) criticize prioritizing because, as it has been illustrated in some instances it unbalances the curriculum. Such problems emphasize the importance of establishing criteria for the evaluation of content.

Various curriculum writers discuss similar criteria for the selection of elements to include in the curriculum. Recent contributions to criteria for the selection of curriculum content come from Valencia (1991:590-591) and Bacchus (1990:289). Significant contributions by these writers with regard to criteria include these elements:

- Material should reflect important themes, and
- help pupils to eventually emancipate themselves.

(a) Reflect important themes

Materials which reflect important themes are relevant because they help in the integration of facts, concepts, generalizations and theories (Valencia 1991:590). An example related to this criterion may be history for the 21st century. This implies that all content will be geared towards achieving this ideal.

(b) Help students to emancipate themselves

This criterion is often discussed in terms of political connotations. Not only must students emancipate themselves from poverty as advocated by Bacchus (1990:289), but content should also enable them to become important members of society. Emancipation from parents, teachers and other influences is necessary. This criterion focuses on independent individuals.

(c) Significance

The criterion of significance became prominent in content selection with the advent of discipline-centred curricula in the 1960s (Zais 1976:343). Significance of content is judged in terms of how essential it is to the discipline under study. This criterion presents problems where a number of elements are regarded as being of the same importance. As a result, criteria to further establish which elements are the most basic to the behaviour of an individual and which are logically basic to a given field of study are desirable. This criterion is most relevant to content perceived as a logical structure. Among the shortcomings levelled against this criterion are that it tends to foster specialized competence and ignores the needs and problems of both learner and society.

(d) Utility

The criterion of content selection gained popularity in the early decades of the twentieth century in an attempt to break the stranglehold of the classics on

curriculum. The criterion rested on the basis of establishing what people needed to know to function effectively in society and was therefore useful in the performance of adult behaviour, such as courtship and marriage. The criterion of utility is important as it helps to ensure a connection between curriculum content and practice. Criticism levelled against the use of utility as criterion includes that it is centred on adult activities and as such does not give enough consideration to students, implies uncritical acceptance of adult activities. This criterion focuses on reflecting society and can thus inhibit social change.

(e) Interest

This criterion is based on the principle that curriculum content should reflect the interests of students. The problem with this criterion is that the learner has to experience something before it can be of interest to him. Interest is an individual attribute and therefore it will encourage individualistic elements within the curriculum. Criticism levelled against this criterion includes, among other things, that since students are immature their interest will hardly constitute a sound basis on which to select content.

(f) Human development

The criterion of human development (also termed "democratic value orientation", "social worth" or "social development") is based on the premise that, since the school is the gatekeeper of knowledge and intelligence, its curriculum should be able to direct social change. The criterion is based on inquiry into moral values and ideas, social problems, human emotions, effective thinking processes, and controversial issues (Zais 1976:347). Among some of the criticism levelled against this criterion is that it is excessively social-studies oriented, that is, it mainly selects its content from history, sociology, political science, and other socially based subjects. Because it is social-studies oriented, subjects like biology which is socially neutral tend to be neglected.

(g) Validity

Wheeler (1967:218-219) maintains that the term validity can be applied in more than one sense, namely,

- technical sense
- authentic sense.

In a technical sense it means that there is a close connection between content and the goals which it is intended to serve. In this sense content will be valid if it promotes the curriculum outcomes that it is intended to promote. In the sense of authenticity, content will be regarded as authentic if it is true. Being true implies that it should reflect what is significant in a society at a particular time. The fact that truth changes implies that authenticity should always be checked. Validity as a criterion requires continual scrutiny by curriculum writers. Another element related to validity is that more often than not curriculum writers omit valid material from what they regard as less important subjects like anthropology. This criterion emphasizes the importance of all relevant connotations.

(h) Significance

Significance as a criterion refers to the material which needs to be chosen and presented as content. This criterion strives to answer questions such as whether the content is central enough to apply to a wide range of problems (Wheeler 1967:221). It attempts to evaluate if an element is widely applied in subjects covered by the curriculum.

(i) Learnability

This criterion has to do with the learnability of levels of abstraction as required of students during various stages. As a criterion it functions almost in the same manner as difficulty; the only difference being that difficulty can be expressed in statistical terms whereas learnability cannot. According to this criterion students should be

taught only up to their levels of understanding.

(j) Consistency with social realities

According to this criterion the chosen content should provide the most useful orientation to the world around us. Content should reflect social and cultural realities of the time (Taba 1962:272).

It was mentioned earlier that the above-mentioned criteria reflect only a sample of those advocated in the literature by various curriculum writers. Wheeler (1967:222) makes an interesting distinction with regard to criteria for selecting content, namely, between major and so-called minor criteria. This illustrates that, even within the criteria discussed, there are major and minor criteria and hence criteria are not of equal importance. Major criteria will therefore be incorporated into almost all learning content that aims to achieve goals.

As was the case in selecting objectives, an attempt was made to present some standards which all curricula should meet. These standards are not only relevant in designing curricula for the school situation but also in designing training programmes for specific areas such as training programmes for CD-ROM databases. All training programmes should fulfil the various criteria discussed. The next phase of the discussion will concentrate on establishing the learning experiences needed to achieve certain behaviours. As in the discussion of objectives and learning content, the emphasis will fall on establishing criteria needed to evaluate the learning experiences.

4.6. SELECTION OF LEARNING EXPERIENCES

After a curriculum aim has been determined, and content to achieve these purposes established, it becomes necessary to implement that which has been established. Learning experiences provides the practical way in which to change behaviour. Wheeler (1967:129) maintains that learning experiences imply a conscious plan to instil some behaviour patterns and inhibit others. Learning occurs through students' experiences. This implies that the situation in which a student finds himself and observes play important roles in the learning

process. Learning experiences, according to Johnson (in Van Brakel 1979:93), consist of two elements, namely, activity and content. Through learning the student enters into a relationship with the learning content. Learning experiences also imply an interaction between the learner and external factors within which the learner operates. Learning occurs through the participation of the learner and therefore two people might experience learning differently. The fact that learning experiences can be realized differently raises two important problems of selecting learning experience, namely, that experiences chosen must be able to achieve the curriculum purposes envisaged and that an environment is created within which effective learning can take place.

4.6.1 **Principles for selecting learning experience**

Principles for selecting learning experiences are discussed by a number of curriculum planners, including Calitz (1982:59-60), Wheeler (1967:130), and Tyler (1971:65-68). Principles advocated by these authors show some similarities. Among the most often used and comprehensive principles are those of Wheeler (1967:130). Calitz (1982:60) adds one principle to those of Wheeler. Tyler (1971:65-67) also adds to Wheeler's list. This study maintains that all the principles are important in the selection of learning experiences.

Wheeler (1967:130) identifies the following as being important in the selection of learning experiences:

- Learning is an active process in which the learner must be involved
- learning proceeds more effectively if the learner understands what he/she is learning
- learning is considerably affected by individual goals, values, and motives
- frequent repetition of responses to types of situations is important in learning skills
- immediate reinforcement promotes learning (cognitive feedback is most effective when time-lapse is minimal)
- the wider the range of experiences presented to the learner, the more likely generalization and discrimination are to occur
- behaviour is a function of the learner's perceptions
- similar situations may elicit different reactions from different learners

- while transfer does occur, it is usually much less than people think
- group atmosphere affects learning experience and accrued satisfaction
- individual differences affect learning
- all learning is multiple.

To this list Wheeler (1967:131-145) adds other principles which warrant some discussion because they are not discussed by other writers. These principles are:

4.6.1.1 Integrative nature of learning experiences

The selected learning experiences should be purposeful, continuous, integrative and integrating. To be integrative, learning experiences should depict some of the following characteristics:

- Be appropriate to several courses rather than a single course
- require the relating of specific facts to broad principles and generalizations
- require the relating of knowledge and theory to problem and life experiences
- involve feelings, beliefs and values as well as intellect.

Wheeler (1967:131-132) also identifies other integrative implications of learning experiences which he regards as being parallels to the ones already discussed. The following parallels are identified:

- Types of learning experiences which are common to more than one unit, course, or subject level have more integrative implications that those which are confined to only one
- Learning experiences that require the relating of specific facts to broad principles and generalizations have more integrative implications than mere knowledge of facts
- Learning experiences which can be related to problems and life situations have more integrative implications than those which can be recalled but which cannot be linked to the learner's experience
- Learning experiences concerned with intellectual information, understanding and skills

have more integrative implications if they are supported by positive and pleasurable feelings and if they conform with a developing schema of attitudes, beliefs and values.

To these principles Calitz (1982:60) adds the principle of cumulative nature of learning. By cumulative nature of learning reference is made to the element of learning being more meaningful if it moves from the known to the unknown.

Considering these principles it is important to note that they are only one of many considerations to be taken into account when selecting learning experiences and, as a result, they should serve as guidelines only and not as final elements.

4.6.2 **Criteria for selection of learning experiences**

Miller and Seller (1985:196), who regard learning experiences as teaching strategies, maintain that the choice of learning experiences are based on various models of teaching. Their approach is that learning experiences will only have meaning for students if they reflect a particular model of instruction. Therefore criteria for choosing a model of instruction will also be relevant for selecting learning experiences. The following criteria for selecting models are identified by Miller and Seller (1985:196):

Models should

- be congruent with developmental aims and goals
- be congruent with the general environment of the institution
- achieve multiple goals
- relate to the student's framework or level of development.

Linked to these criteria are what Miller and Seller (1985:196) regard as three major curriculum positions (models). They identify three curriculum positions and under each position more criteria:

(a) Transmission criteria (criteria designed to pass on information)

- contain clear, concise objectives
- are structured to facilitate a specific direction in learning
- allow for straightforward evaluation of instructional models
- facilitate retention of content in traditional subjects areas
- reinforce traditional values through instructional and nurturant effects.

(b) Transaction criteria (criteria that allows individual decision making rather than external forces)

- allow students to examine their own reasoning processes
- stimulate inquiry and investigating
- are based on a particular scheme of intellectual development
- encourage a process of mutual inquiry between student and teacher.

(c) Transformation criteria (criteria designed to change or transform individuals)

- models should involve students in social awareness aid, that is, social change
- make connections between students' inner and outer worlds
- stimulate integration of subject areas
- focus on strategies that let students become aware of their own consciousness
- stress divergent thinking processes
- relate left-brain and right-brain thinking processes.

Contrary to Miller and Seller (1985:196), Wheeler (1967:147-178) identifies the following as being useful in selecting learning experiences:

- Validity
- comprehensiveness
- variety
- suitability

- relevance
- pupil participation.

These criteria of Wheeler are discussed in the following passages because they represent views endorsed by most writers.

(a) Validity

In establishing validity, it must be remembered that learning experiences should be closely connected with educational goals. The most important question to ask regarding this criterion is whether learning experiences result in changed behaviour with respect to the set objectives. Two aspects are involved in this question, namely, the nature, amount and direction of the change, and the concomitant changes additional to those which are desired (Wheeler 1967:147). Only experiences which contribute towards an outcome should be presented. Many types of behaviour which are regarded as being essential in education do not automatically result from studying conventional school subjects. This implies that provision must be made for specific outcomes by the conscious selection of particular kinds of experience. If, for instance, the objective is to cultivate initiatives, exercises that will support this objective should to be provided.

Validity of learning experiences also has to deal with evaluation. An experience is valid in so far as it actually does in some degree bring about the behavioural change specified in an objective. If it does not bring about such change, no matter how valuable it may be in other instances, it is not valid. Evaluation on the other hand does not only imply evaluating experience at the end of a certain period, but it is an integral part of the whole process of learning.

(b) Comprehensiveness

This criterion means that objectives which are selected for the curriculum should have corresponding experiences. Educational aims should be designed in compliance with the expected behaviour. Appropriate experiences should therefore also be considered when formulating educational aims. The problem with objectives that do not correspond with learning experiences is that there is a tendency to over-emphasize one area of development, for instance, the cognitive field over the others. As a result no provision is made for experiences which pertain to a higher level process.

(c) Variety

Learning experiences should be able to develop the total being of the learner and as a result contribute towards a balanced individual. Wheeler (1967:152), borrowing from development studies, maintains that not only do children need learning of many kinds, they also learn at different rates and through different methods and modalities. This results in an emphasis on the use of variety in selecting learning experiences. The more variety in selecting learning experiences, the more the student will find satisfying activities which will enable him to proceed towards the required learning. The fact that an individual brings different abilities, capacities and background into the learning situation also emphasizes the role that variety has to play in selecting learning activities. Variety is useful because it accommodates the various individual attributes of children, such as being under-privileged.

(d) Suitability

Learning experiences should be appropriate both to the general level of development of the group and to the general and particular levels of development of the individuals within the group (Wheeler 1967:154). General levels of behaviour should be well known so that curriculum planners are not obliged to suggest them. Through research it can be established that children at a particular level should show a particular behaviour with regard to their intellect, emotion, moral and social development.

Learning experiences should be arranged in a sequence that will enable children to understand, for instance, from the simple to the more complex experiences. Learning experiences should be suited to the level of development of the child concerned.

This criterion demands that curriculum planners only recommend certain experiences when learners are ready for them. Another aspect related to readiness is pacing. While readiness has to do with individual development, pacing refers to the provision of experiences of an appropriate kind and difficulty. Also related to suitability is the gradient of difficulty, that is, the levels of knowledge acquisition.

(e) Patterns

By patterns is meant that each experience and opportunity must form part of the total educational pattern developed for a specific group (Visser & Van Brakel, 1987:131). Patterns help in differentiating between the formal and informal. Learning experience must make certain behaviour patterns habitual. In providing learning experiences, care should be taken that there is a demonstrable relevance to the overall plan and contribution towards desirable aims. Patterns are also relevant for the selection, balance and continuity of learning experiences.

(i) Balance

Human beings do not only learn from the formal education system. Experiences outside the school also contribute towards the total development of individuals. Learning experiences should thus be able to reflect what is happening within both the formal and informal learning context. Failure to make provision for this will result in imbalances within learning experiences. Balance is required because two sources are involved, namely, the developmental needs of the child and the demands of society. If for instance attention is given to only one of these sources, failure may result in the other sources. It should be mentioned that this criterion does not represent a mechanical process but rather a well-considered manner of making decisions about what should be taught in schools and how much time should be provided for each of these experiences.

(ii) Continuity

This criterion refers to the fact that learning is a continuous process which results from chosen experiences. In the progression from one idea to another there is continuity so that the learning experiences reflect a process of what has happened before and what is occurring at that particular moment. Continuity should also be maintained between what happens in schools and what is happening outside the school.

(f) Relevance to life

By relevance to life reference is made to learning experiences that have maximal relation to life and the living of it. Relevance should not only reflect life in the future, but also what learners are experiencing at that particular time. Because transfer is greatest while learning is taking place, contexts must be chosen which enable the learner to make life applications (Wheeler 1967:169). Only in this way can learning experiences be made relevant. Learning experiences must be able to relate what is happening inside schools to what is happening outside it because no school can operate successfully in isolation from its socio-cultural surroundings.

(g) Learner participation in planning

Criteria discussed thus far seem to relate to educational authorities such as teachers and curriculum planners. What this criterion emphasizes is that learners should also be part of the planning process. The selection process refers not only to the selection of subjects such as English or Afrikaans, but also to the selection of common experiences offered by the learning institutions. The fact that learning does not always take place indicates how much power the learner has in selecting or rejecting experiences that would concentrate on curriculum outcomes as formulated by the learners. Student objectives thus determine how they learn. Furthermore, the content of the curriculum should clearly reflect student objectives. This criterion ensures student participation in curriculum planning.

With regard to criteria for learning activities, it is important to mention that the relationship between objectives and learning activities is an important one. Even if there is not much evidence in the literature about this relationship, the criteria discussed should serve to emphasize the importance of this relationship.

4.7 ORGANIZATION AND INTEGRATION OF EXPERIENCES AND CONTENT

After content and integration of experiences have been selected it becomes important to organize them in a manner which will allow successful learning. In this stage of curriculum design, attempts are made to organize subject matter and learning activities to the extend that they make sense, provide continuity and are available for use (Wheeler 1967:230). It is an important phase of curriculum design, because chaotic arrangement of content or isolated learning experiences usually do not achieve the desired curriculum aims.

Organizing curricula is a difficult task. The task is exacerbated by many factors among which is the fact that planners need to apply all they know about the nature of knowledge, student development and learning. Stratemeyer *et al.* (in Miller & Seller 1985:197) identify a number of questions that the curriculum planner will have to address during the stage of curriculum development. Among other things the planner will have to assure

- balanced development, that is, he should guarantee that important areas of life will not be neglected
- continuous growth
- desirable depth of knowledge
- depth of command of special subjects areas which are important to individual learners
- broad cultural resources which are part of the heritage of all students
- basic concerns rather than trivial transitory interests
- genuine group experiences.

These are not the only issues to be considered. Herrick (in Wheeler 1967:230) identifies four other approaches regarding curriculum organization, namely, the

- subject
- broad fields
- problems of living
- needs approaches.

Burton (in Wheeler 1967:232) advocates a different approach to organizing curricula. According to him two criteria for organizing curricula are used in American schools, namely, the

- assign-study-recite-test procedure
- unit.

Because of the many varied approaches curriculum planners are faced with difficulties, not knowing which approach or consideration will produce desired outcomes. The various approaches do not help the curriculum planners in their tasks. Based on this lack of uniformity, the need to establish criteria becomes a pertinent issue of this research. The next section will concentrate on establishing these criteria. Taba (1962:290-300) identifies the following criteria:

- Establishing sequences
- providing cumulative learning
- providing integration.

Zais (1976:366) makes an important remark concerning these criteria to the effect that, in the absence of substantive research into the criteria, Taba's criteria have come to be widely accepted as a standard for the organization of learning activities. These criteria are regarded as standards for purposes of this research and are adopted as such.

(a) Establishing sequence

This criterion attempts to arrange learning experiences in such a manner that they make sense to the student. It endeavours to establish the order in which experiences

should be exposed to students. In an attempt to accomplish this a number of principles are used. For instance, there are principles which prescribe that content should move from simple to complex, be based upon prerequisite learnings, proceed from whole to part, and reflect a chronology of experiences. In establishing sequence care should be taken of whether the purpose is to understand a concept or to ascertain the meaning of the concept because the sequences are not the same for the two. Posner and Strike (in Miller and Seller 1985:200) have developed a scheme for sequencing curricula. Their scheme groups learning experiences into five categories:

- Content-related sequence
- concept sequence
- inquiring-related sequence
- utilization-related sequence.

During sequencing it is important to establish accurately the purpose of the sequence.

The planning of learning sequences requires a way of organizing content as well as a sequence of reactions and behaviours. Both the learning content and learning experiences need to be divided into appropriate steps to provide for active understanding. A method of translating the essence of particular ideas, processes or concepts into thought forms and perception patterns should therefore be established because simple principles, like moving from simple to complex, may not be sufficient.

(b) Cumulative learning (continuity)

The problem associated with this criterion is one of making provision for a progressively more demanding performance, more complex materials to deal with, more exacting analysis, a greater depth and breadth of ideas to understand, relate and apply, and a greater sophistication and subtlety of attitudes and sensitivities (Taba 1962:296). For a curriculum to facilitate cumulative learning, it must be planned in such a manner that there is an increasing complexity of material to deal with, accompanied by mature mental reactions. This criterion does not depend exclusively

on content but also on maturity of thought. Learning activities should be planned in such a way that they develop from one level of activity to another.

(c) Integration

The problem of specialization and integration of knowledge is a burning question within education circles. It is recognized that for learning to be effective facts and principles from one field need to be related to another field. Integration can be experienced in different ways. Integration, as some authors maintain, can occur at a horizontal level wherein horizontal relationships are advocated, whereas others maintain that integration takes place within an individual. Integration must therefore develop mechanisms for helping individuals in this process of creating a unity of knowledge. The interpretation of integration shifts the emphasis away from integrating subjects to locating integrative threads. Integrative threads are important because within the process of learning they can be altered. Organization of learning experience is as important as organizing content.

4.8 EVALUATION

Evaluation is the final stage of curriculum design (Taba 1962:342-379; Nichols and Nichols 1978:21). It is based on measurement and assessment of the changes that are expected from students after having gone through certain learning experiences. It allows for the comparison of actual outcomes to expected outcomes. Evaluation is an important stage because without it it will not be known whether objectives have been realized and to what extent. This stage is often wrongly referred to as an assessment or measurement. Evaluation is much broader because it does not only deal with the of determining what the actual educational outcomes are, or with the process of comparing them with the expected outcomes, but it also involves judgement based on certain criteria, such as continuity, consistency, and comprehensiveness.

Evaluation is an important step in the curriculum because without it it will be difficult to validate the hypotheses upon which the curriculum is based and it will also be difficult to

determine the strengths and weaknesses of what is being offered to students.

Finally, with regard to curriculum stages, it is important to mention the fact that all stages are interrelated. For instance, after evaluation weaknesses are identified and the process returns to the selection of other objectives, content and learning experiences. Curriculum design is thus a cycle. The rationale for discussing these stages is that they should serve as guidelines in the construction of a user education programme regarding CD-ROMs. The discussion of stages of curriculum design serves to provide the theoretical basis upon which curricula or training programmes can be evaluated.

4.9 SUMMARY

Six curriculum phases were discussed in this chapter. This was despite the fact that other authors like Taba (1962:342-379) advocate more phases for curriculum development. A case was made for discussing only six phases. The phases discussed will be used in the following chapters to act as a guide for designing a curriculum for training end-users of CD-ROM databases at UNIN.

In the next chapter it will be endeavoured to identify and select relevant aspects of the curriculum process as advocated by various authors with the view of utilizing them for designing a curriculum for CD-ROM instruction.

5. SITUATION ANALYSIS

5.1 INTRODUCTION

In Chapter 4, six stages were advocated for the process of curriculum design. Situation analysis was also identified as the cornerstone upon which all other stages of curriculum design are based. Among other things, it was mentioned that this stage involves analysing user needs. Analysing user needs was identified in Chapter 3 as the first stage in designing a training programme. This chapter is the start of the operationalization stage where situation needs will be analysed. The model propagated in Chapter 4 with regard to curriculum design will be used in this chapter.

The first part of this chapter deals with a description of the methodology which was used to provide a profile of the UNIN Library. Data collection which utilizes the methods discussed will form the next phase of the discussion followed by a description of data gathered. This discussion, since it will reflect a profile of the University, will also include a short discussion on the history of the University. Based on the description of the situation, the next stages of the model of curriculum design as formulated in Chapter 4 will be discussed. This discussion will include recommendations with regard to aims, objectives, content and methods which can be employed at the UNIN Library to improve end-user results.

5.2 RESEARCH METHODOLOGY

In research, two stages can be identified, that is, the conceptualization and the operationalization stages (Dalton 1991:118). The choice of methodology forms the operationalisation phase. Leedy (1985:133) maintains that the choice of methodology is based on the nature of data for which the researcher is looking. Babbie (1979:315) advises that in instances where individual people form part of the units for analysis, survey methods should be employed. Based on these two assertions, survey methods were used as one of the methods of research. Survey methods utilize, among other things, two techniques for gathering data, namely, questionnaires and interviews. Interviews are characterized as either formal and structured, using pre-prepared or standardized questions or informal and

unstructured formats which use an interview guide to probe in-depth answers (Dalton 1991:121). Personal and unstructured interviews were utilized in this research. This technique was utilized because respondents were readily available and as a result it proved a cost-effective technique of gathering data.

To supplement interviews another method of gathering data, namely, the syllabus study, was used. This method, which gathers data through the study of written records, was used because it was felt by the researcher that it would provide more data with regard to issues such as the organizational mission and what was expected from students in terms of academic performance. The researcher's general understanding of the situation was also applied.

5.2.1 **Data collection**

Data collection deals with the actual process of interviewing and studying the syllabi. This section will explain how the interviews were conducted and syllabi analysed.

5.2.1.1 **Conducting the interviews**

Two sets of interviews were conducted. The first set was conducted with the head of the subject reference division because the CD-ROM unit came under her control. Emphasis in this interview was put on the following major aspects of the CD-ROM unit as illustrated by the interview guide questions in Appendix 1:

- Establishment of the CD-ROM unit
- regulations/policies governing the use of the unit
- clientele using the unit
- present training being offered to students
- future plans for the unit
- physical space and facilities available
- situation with technological devices.

A discussion of each element follows.

(a) Establishment of the unit

The researcher wanted to discover the reasons behind the establishment of this unit. Many institutions implement projects for the wrong reasons and it was important to find out whether this unit was established because CD-ROM units were fashionable or whether it was a strategic decision. The interviewer also wanted to establish the accomplishments of the unit since its inception, as well as problems that have been encountered since inception.

(b) Policies governing the use of the unit

Institutions have different policies governing the use of their CD-ROM units. These policies are based on the unique variables that each institution faces. The interviewer wanted to establish whether there were policies governing the use of the unit. If there were any such policies, the interview was used to establish the variables which underpinned these policies.

(c) Clientele using the unit

First of all the interview was used to establish whether there were more than one group of users utilizing the unit. After establishing the various user groups the interviewer wanted to have a general picture of these users, that is in terms of their ability to use the unit whether they were novices or expert searchers. The level of literacy of users with regard to the computer, information and, finally, CD-ROM databases was established.

(d) Present training offered to students

This aspect is related to the previous one, clientele using the unit, because training programmes are designed specifically for certain user groups. The interviewer wanted to establish whether there were any training programmes and, if any, which methods were used. It was also important to establish if the head of the section

thought that the training provided was adequate or whether she had any future plans to change or improve methods which were being used at that time.

(e) Future plans for the unit

This question was asked to establish the overall plans for the CD-ROM unit. It was meant to establish, for instance, things like whether there were plans to change practices with regard to access, buying of databases, moving the unit to another building, networking and, finally, the training being provided.

(f) Physical space and facilities available

In the interview it was also sought to establish whether the space available for the CD-ROM unit was thought to be sufficient and, if not, whether there were plans to move the unit to a bigger place. Facilities such as desks and chairs were of particular interest for this research, because without proper information on these items it would be difficult to plan a training programme.

(g) Presence of technological devices

Although these devices may be included in facilities, it was important to discuss them separately because they form the core of this research. Devices such as computers, CD-ROM drives, printers and overhead projectors were of importance for this research.

The interview was intended to solicit information with regard to the variables which were identified in Chapter 4 as being of importance. Information was established with regard to variables relating to the learning institution and the learner. The head of the section was identified as the key informant because she was in charge of the unit and was in a position to provide invaluable information with regard to these variables.

The second set of interviews was conducted with all subject reference librarians. In total six

interviews were conducted with this group. The CD-ROM unit is part of this section and because these librarians are involved in the day-to-day running of the unit, it was felt that their views with regard to a number of issues would be important. The interviews concentrated on the following issues:

- Experiences regarding students using the CD-ROM unit
- training provided.

(a) Experience with students

This element is not different to the one asked to the head of the section, but it was felt that because the subject reference librarians are involved daily with students, more information could be obtained.

(b) Training provided

Subject reference librarians are responsible for designing training programmes. They decide what should be included during training (content); the approaches to use; methods to use; and media to employ during training. The interviewer sought to establish their views with regard to these elements of training and whether they had any suggestions that could improve present training. Interviews with this group were intended to solicit information with regard to students and learning content.

5.2.1.2 **Syllabus study**

A syllabus study of all courses offered in the Faculty of Arts was conducted. During the study a decision was made to exclude courses which were also offered in other faculties. Three reasons determined this choice of Faculty of Arts. Firstly, since the researcher is the Subject Reference Librarian for Arts, it would be easy to have access to other important documents in the Faculty should the need arise. Secondly, the researcher's experience within this Faculty was also important. Finally, the fact that the Faculty is the biggest at the university, and as such would offer more courses to evaluate, contributed to the decision.

Appendix 2 is a list of all courses offered in the Faculty of Arts and those indicated by asterisks were analysed. Only honours courses were analysed because as from Master's and Doctoral levels students write theses or dissertations. The fact that only postgraduate students could utilize the unit also contributed towards this decision. In analysing the syllabi course requirements was of interest.

Course requirements involve a number of issues. The analysis tried to establish whether students were expected to write research papers, conduct literature reviews, make oral presentations or undertake projects. The analysis also tried to establish whether there were sources available to support the various requirements of the syllabi. Statements such as "the examination comprises four 3-hour papers and a research paper suitable for publication" *(University of the North Calendar 1994:28)* were of particular interest. These statements were considered because the researcher felt they would provide information with regard to the situation analysis of the learning content as advocated in the previous chapter (4.3.1.2). It was also felt that knowing what was expected from students would provide some information on students' behaviour. For instance, students who had to present a research paper would be more inclined to use recent information as provided by CD-ROM databases.

Data collected, using the approaches discussed above, related specifically to three groups of variables:

- Situation
- learner
- course content.

When variables were identified in Chapter 4, it was mentioned that different variables were advocated by a number of authors. A close analysis of the variables revealed that irrespective of the number of variables advocated all of them could be grouped together into three categories as advocated by Carl *et al.* in 4.3.1., the broad categories being the learner, learning content and school and classroom (learning institution). Based on this argument, these three variables were selected for attention during the data collection process. At the outset it must be mentioned though that within these three broad variables, different elements

can be identified as evidenced by the discussions in 5.2.1.1 and 5.2.1.2. The next discussion focuses on analysing the data.

5.2.2 **Data analysis**

Data analysis will result in a profile of UNIN and its Library. In analysing the data an approach will be followed in which the situation and the learner are looked at simultaneously because they are related. The sequence will be an analyses of data pertaining to the situation, the learner and finally the content. In providing a profile of this institution, it is deemed necessary to first engage in a short historical background of UNIN.

5.2.2.1 **University of the North**

UNIN was established in 1960 and is located at Turfloop, 30 km east of Pietersburg in the Northern Transvaal (Tsebe 1994:113). By 1994 it had a student population of 13 572 (Library Committee Report 1994:1). UNIN offers degrees in the faculties of Agriculture, Arts, Management Sciences, Education, Health Sciences, Law, Mathematics and Natural Sciences, and Theology. UNIN is regarded as being historically black and it serves the tertiary education needs of an underprivileged, developing community (Tsebe 1993:113).

UNIN Library was established in 1960, starting as a one-room operation and expanding to its present capacity of accommodating approximately 14 000 students. The library has a staff complement of 68; 35 professionals and 33 administrative staff. A total collection of 151422 books and 2 671 periodical titles was recorded in December 1994 (Library Committee Report 1994:13). It is described as being a relatively small library, considering the large student population. In a report to Council (Library Committee Report 1994:1) physical resources were identified as a major problem facing the university library. The report indicated that there was a 25% seating space deficit for students in the library.

This introductory discussion is deemed necessary before a discussion of the various elements because it provides a historical perspective which may not be covered under the identified elements. As indicated earlier (5.2.1.1), under each variable there are many elements to

discuss, but for purposes of this discussion the following were chosen as being relevant for this research:

- Establishment of the CD-ROM unit
- policies regarding CD-ROM usage
- clientele using the unit
- present training provided
- future plans for the unit
- presence of physical space and facilities
- presence of technological devices.

5.2.2.2 **Data pertaining to the situation and the learner**

In the preceding paragraph the profile of UNIN and the Library was introduced. This discussion was based on official documents of the university and articles written by senior staff members of the library (Library Committee Report 1994; Tsebe 1993). What follows is a discussion of the situation based on results obtained from the interviews. Two variables, namely, the situation and the learner, will be addressed simultaneously since they are related - the learner finds himself within a particular situation.

(a) Establishment of the CD-ROM unit

The CD-ROM unit was initially established to serve departments which were largely involved in research, such as Biochemistry. The first database acquired was Books in Print (BIP). It is important to mention that initially the service was rendered to researchers who were members of staff rather than to students. Staff members later started to send their post-graduate students to conduct some searches for them and in this way post-graduate students were given permission to use the unit. The decision to establish this unit was purely strategic. An investigation into the state of the library established that the library was understocked with regard to printed bibliographic databases. An analysis had revealed that, rather than trying to acquire these databases retrospectively, the library should acquire CD-ROM versions. This

decision was based on costs and other advantages offered by the CD-ROM format. A special effort was made to acquire as many titles as possible, initially on the recommendations of departments but later subject reference librarians were also permitted to make recommendations.

Accomplishments included the fact that, even though the university is remotely situated, researchers were provided with relatively more recent tools than when print sources were used. The unit also witnessed a tremendous increase in users.

Various problems were encountered. Even if the number of users had increased it was felt that still more users could utilize the unit. The main reason for the reluctance among some students resulted from the relationship between faculties and the Library. Some departments prescribed reading material and as such students were not encouraged to use the Library for further learning.

Another problem experienced was that of space. When the unit was started, it had two computers with stand-alone CD-ROM drives. The situation has changed and presently seven computers, one with a tower, three with double drives and three still with single stand-alone drives are available. In the meantime the number of students has grown and there is no further space of the unit to develop. The unit has, in other words, reached its full capacity.

The unit also experienced problems with equipment. Most of the computers are old and thus are not compatible with CD-ROM databases. Owing to malfunctioning computers, the unit is sometimes not operational. This situation is exacerbated by lack of professional support staff to service the computers and drives. The library is dependent on technicians from the university who are not always available.

(b) Policies regarding use of the unit

The most significant policy is the one with regard to access. Only lecturers and post-graduate students, that is from honours level upwards, are given permission to use

the unit. This decision is based on the limited resources available. Not only is there a shortage of equipment, but also of staff needed to train the users. Available space also cannot accommodate the great number of undergraduates. During the interviews it was indicated that if circumstances with regard to equipment, staff and space improved, this policy would be changed so that senior undergraduate students could also use the unit. There is presently no time limit on use. As long as there is no other user waiting the incumbent may continue using the service. Also appointments are made to avoid users accumulating in the unit.

(c) Clientele using the unit

Tsebe (1994:113) earlier characterized users of the Library as being underprivileged and developing. Most of the users use libraries for the first time when they arrive at the university. They are neither library nor information literate and the culture of reading is minimal. The situation is made worse by lecturers who are not encouraging students to use the library, the reason being that they are themselves for the first time exposed to the library. Besides not being information literate, users are also not computer literate. Most, if not all, have never had access to a computer. In the words of one respondent: "They have no idea of what CD-ROM databases are all about". There was consensus during the interviews that most users lacked the basic skills to use information and computers. It was also revealed that even if these users lacked the basic skills, most were eager and prepared to learn.

(d) Present training provided

Of all the interviewees one indicated that users were given more training than they needed. All other interviewees were of the opinion that present training was inadequate since it did not allow for follow-up. Students were trained for approximately 30 minutes and were expected, within this period, to grasp all the techniques involved. Another shortcoming was that since most of the databases acquired were from SilverPlatter the training tended to concentrate on products of this company. Users were thus not exposed to other databases and would need further

training if they wanted to use products of a different company. Demonstrations were mainly used during training. The limited time spent on training made it impossible for information professionals to teach users most of the aspects involved in CD-ROM searching. Most of the information professionals taught users only how to key in keywords. Things like Boolean operators were not taught since it was thought that they will confuse users. There was also a lack of co-ordinated training and each information professional decided independently what to teach users.

(e) Future plans for the unit

Three observations in this regard can be made, the first being that there are plans to extend the library and a bigger area will be allocated to the unit. Furthermore, there are also plans to include senior undergraduate students, that is, those in their third year of study in the case of three-year degrees or fourth year of study in the case of four-year degrees. There is, finally, talk of networking which will make the service available to people in their offices. This will to some extent resolve the problem of space. The library is conducting a survey among users to determine actual and potential needs. The survey will determine whether or not to network (Tsebe 1994:117)

(f) Physical space and facilities available

There is consensus that the present room housing the unit is too small for the student population of the university. Facilities such as desks, chairs, and air conditioners are also not adequate.

(g) Technological devices

At the moment there are seven computers and drives in the CD-ROM unit. There are two overhead projectors which are not only utilized in the unit but are also used by other sections of the Library. All these devices are at the disposal of 590 post-graduates students in all faculties (1994 student statistics). There is, as a result, a

shortage of technological devices.

The previous paragraphs provided a picture with regard to two variables, namely, situation and learner. The following paragraphs will concentrate on the content.

5.2.2.3 Data pertaining to course content

Data with regard to content concentrated specifically on course requirements. Of all the 30 courses analysed two, namely French and German, were offered only at undergraduate level. That left 28 courses offered at postgraduate level. Of the 28 only 13 required students to present a research paper. The majority, that is 15, did not stipulate this requirement. Students were expected, in all 28 courses, to write papers (assignments). This did not compel students to use CD-ROMs since it could be achieved by using a few and old prescribed books. The Library had acquired sufficient CD-ROM titles to support the needs of most of the departments. As of December 1994 there were 36 CD-ROM titles available (Appendix 3). It could be concluded that even if the Library had sufficient titles to support the research function, the CD-ROMs were not adequately utilized. Some of the courses stipulated that students were expected to make oral presentations.

Paragraphs 5.2.2.2 to 5.2.2.3 provided information which was gathered during interviews and syllabus studies. They portray a situation analysis of UNIN and its Library. Situation analysis, it was established, forms the cornerstone of the process of curriculum design. From this analysis, further stages in the process of designing curricula will be discussed. Chapters 3 and 4 established the fact that after thorough knowledge of a situation has been acquired, the next stages of curriculum design can be engaged in. The next part of this discussion will therefore focus on the next stage of curriculum design, namely, formulation of aims and objectives. This discussion will be based on the data which were obtained from the situation analysis. After aims and objectives with regard to CD-ROM training have been developed, content and methods will also be suggested. It must, from the outset, be mentioned that the discussion, aims and objectives will only be suggestions designed to solve the problems of end-users with regard to CD-ROM databases.

Finally, regarding the results of the situation analysis, the following can be identified as aspects which will have a bearing on the next stage of curriculum design, namely, formulation of educational outcomes:

- Space available
- equipment available
- staff available
- users of the unit
- training currently provided
- future plans for the unit.

These aspects will have a bearing on the next stages of curriculum design, because planning and designing of programmes can only be done when they are based on resources available and users of a particular service. In a nutshell these aspects refers to environmental issues.

5.3 FORMULATION OF EDUCATIONAL OUTCOMES

In Chapter 4, three educational outcomes were advocated, namely, aims, goals and objectives. In the discussion, criteria for selecting these outcomes were also discussed. An analysis of literature pertaining to educational outcomes reveals a lack of consensus with regard to these outcomes. Fjallbrant (1977:201) and Taba (1962:194) discuss two levels of educational outcomes. Zais (1976:307), on the other hand, discusses three educational outcomes. Paragraph 4.4.1 put a case for three educational outcomes. For this research three outcomes will be discussed.

In the discussion, aims, goals, objectives, contents, methods and media will be suggested. These formulations are only suggestions and will not be evaluated according to the numerous criteria established in Chapter 4. This evaluation will be done in another study.

5.3.1 **Aims, goals and objectives**

Aims, according to Burrell (1983:240), refer to a generalized statement of intent. They

provide direction for the course of the didactic activities (Fraser, Loubser and Van Rooy 1993:120). Fjallbrant (1977:201) adds an important criterium for formulating aims, namely, that aims of user education programmes should support the library's mission statement. It is suggested that the mission statement of the Library is taken into account when formulating relevant aims for user education programs. From the analysis of the situation it was established that students were neither library, information nor computer literate. This should be considered in the formulation of aims and objectives. The fact that students are neither library information nor computer literate is important since aims emanate from what is and what should be (Dick and Carey 1990:13). The fact that aims stem from more than one source does not imply that a programme could have more than one aim. However, many objectives can be formulated. The following paragraph will concentrate on aims and objectives that are suitable for the UNIN Library.

5.3.1.1 **Aims**

The UNIN Library's mission states that "the purpose of the library is to provide a dynamic and efficient support service to facilitate academic excellence in teaching, learning, research and community development" (Library Strategic Planning Report 1994).

Based on this statement, the aim suggested at UNIN is the following:

> Post-graduate students will, based on their information needs, identify the library as the centre for information, be in a position to identify services and information sources which will fulfil their information needs, utilize these services and sources optimally for successful completion of their tasks.

5.3.1.2 **Goals**

Wheeler (1967:111) identifies goals as the next stage of educational outcomes. Unlike aims, goals represent what should be learned at various stages of the student's development. They specify what is expected of a student at a given time. The purpose of this research is to help end-users improve their search results by introducing them to various interfaces provided by

databases. The suggested goals for this research are the following:

- Post-graduate students will know the various services provided by the library.
- Post-graduate students will identify and differentiate the various phases of information gathering and identify the various information sources in the library relevant to their studies.
- Post-graduate students will develop a positive attitude towards the library and information professionals.

(i) Services of the library

This goal is based on the fact that most post-graduate students experience libraries for the first time upon arrival at the university. There is a need to orientate them with regard to the services provided by the Library and how to use the Library.

(ii) Phases of information gathering and various sources

Successful information data gathering depends on clear articulation of an information need. The student must be in a position to state clearly what he/she needs before he/she can engage in data gathering. Students should know all the stages of data gathering. The Library consists also of many sources, for example, reference, indexing and abstracting sources. Students should know how to utilize them.

(iii) Positive attitudes towards the Library and information professionals

Students should be in a position to identify the Library as an integral part of their studies. They should know that for the successful completion of tasks the Library should be used. Students should also appreciate the role that information professionals play, especially the support of their learning activities.

Suggestions made included issues which do not fall within the scope of this research. Goals (i) and (iii) reflect such issues. Goals (ii), which refers to the process of information

gathering, will be pursued further because it refers specifically to information sources which are the brief of this research.

5.3.1.3 **Objectives**

Objectives represent the final stage of formulating educational outcomes. Unlike aims and goals, they reflect possible outcomes on the level of a classroom encounter. Objectives formulated are based on the aim and goal (ii) (which was discussed in paragraph 5.3.1.2). Because the aim and goals formulated were broad, some objectives which do not relate to CD-ROM databases will be mentioned in passing. Two sets of objectives, namely, broad and specific objectives, are proposed for this research. This is due to the fact that the scope of this research falls on specific objectives. However, there is also a need to establish the foundation (origin) on which such objectives are based. The following section deals with broad objectives. Figure 9 diagrammatically represents the scheme followed in formulating educational outcomes.

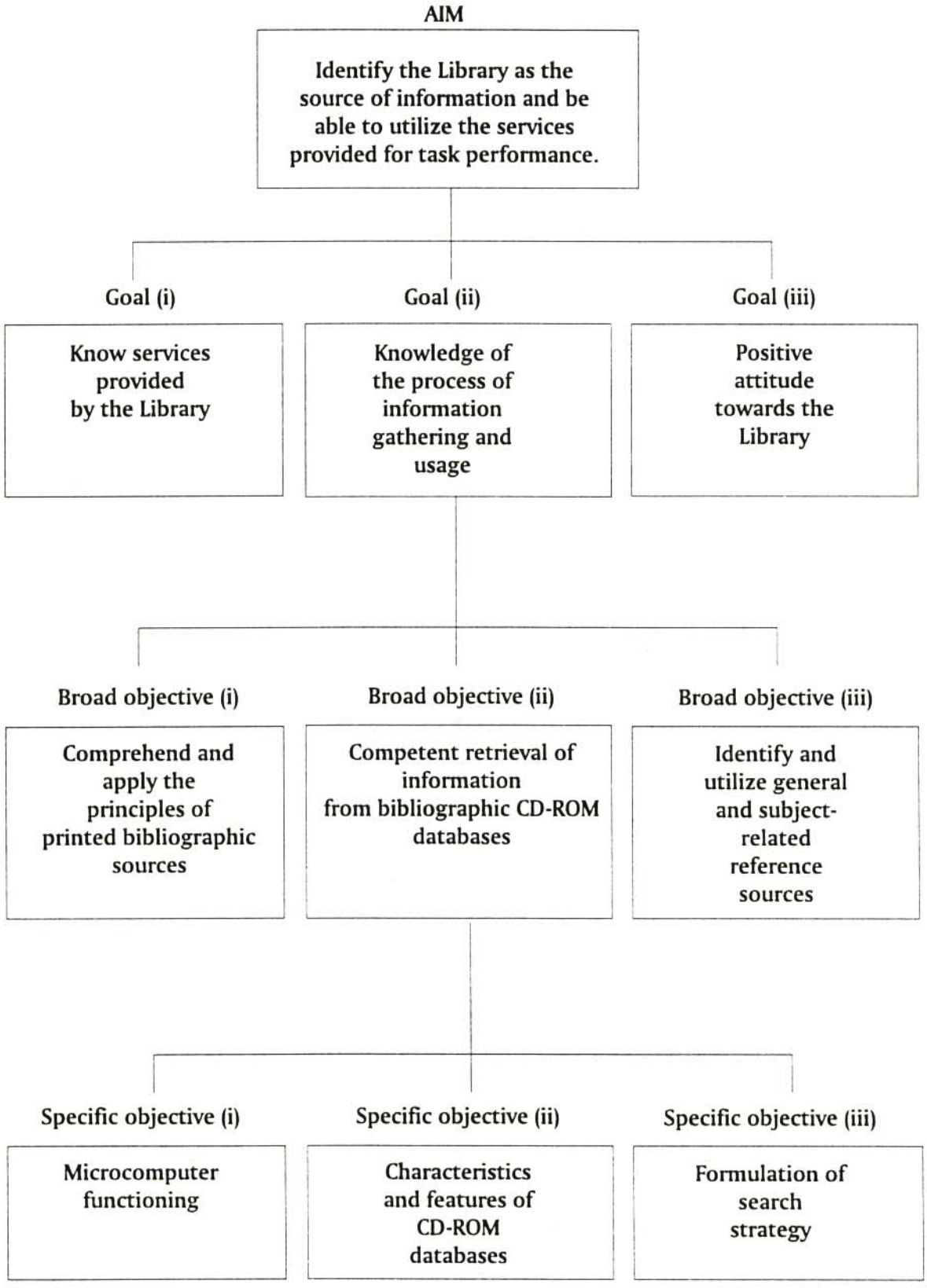


FIGURE 9: EDUCATIONAL OUTCOMES

(a) **Suggested broad objectives**

The following broad objectives are suggested, as derived from the situation:

- Post-graduate students will comprehend and apply the principles of using printed bibliographic sources.
- Post-graduate students will be confident and competent in retrieving information from bibliographic CD-ROM databases.
- Post-graduate students will identify and utilize various reference sources available in the library.

These are regarded as broad objectives, because some of them still do not relate to the brief of this research. They are also broad because it is still not clear what is meant by students who are competent in using CD-ROM databases. Objective (ii) relates directly to the scope of this research. It can be further divided into specific objectives which would illustrate clearly what post-graduate students must do to become competent users of CD-ROM databases. In discussing these specific, objectives content, method and media wil be included. Each specific objective will therefore be proposed together with its content, methods and media.

(b) **Proposed specific objectives**

Specific objectives proposed related entirely to various CD-ROM database issues. The objectives proposed should not be seen to be independent from but rather as supporting the broad aim of end-user training. The proposed objectives for this research are the following:

(i) Post-graduate students will be able to describe how the microcomputer functions and use it effectively as a CD-ROM workstation.

This proposal is made because results from the situation analysis indicated that many post-graduates did not have a background in personal computing. Based on this objective the

following learning elements are proposed:

- Starting and ending a search session
- CD-ROM handling
- keyboard knowledge and operation.

It is important to show post-graduate students how to switch the machines on and off because at the moment end-users who indicate that they can search independently switch the computers on and off. They also need to be shown how to insert discs because currently the Library uses two types of players, namely, one which uses a caddy and one which does not. An attempt to use a disc cover on the wrong player is a common mistake. End-users also need to know how the keyboard functions. They need to know how keys such as for page-down function and how, in other instances, a plus sign (+) or minus (-) will perform the same function as in page-up or down. The following methods and media are proposed as relevant towards achieving the stated objectives:

- Lectures: They can teach more users simultaneously. They are suggested here because of staff shortages. Because the UNIN Library's CD-ROM unit is separately housed, a group of students can receive a lecture and hands-on experience at the same time. A lecture incorporating various elements of CD-ROMs will be appropriate.

- Demonstrations: After students have been lectured on various elements of CD-ROM databases there is a need to expose them to the practical use of databases. Demonstrations on how to insert a disc, input terms, display results and finally print results can be conducted.

- Written materials: These are used to introduce users to simple log-in instructions. At the moment, the library has a guide pasted on tables which instruct users on the various steps that they should follow when using various databases. (See Appendix 4 for list of instructions.)

- Videotapes: Videos by database vendors cover most aspects of CD-ROM searching.

(ii) Post-graduates will differentiate between CD-ROM bibliographic databases and print bibliographic databases and identify and describe the various characteristics of CD-ROMs.

This objective is proposed because of the misconceptions among end-users that CD-ROM databases have answers to all their problems. Results from the situation analysis also indicated that students did not understand what CD-ROM databases really contain. To achieve this objective the following learning content is proposed:

- Features of CD-ROM databases
- relationship between CD-ROM databases and print-based sources
- advantages of CD-ROM databases.

Post-graduates need to know that CD-ROM databases contain the same information as printed sources. They must, for instance, understand that LISA on disc is the same as LISA in print, the difference being, apart from format, that the CD-ROM version indexes more recent information. They must be able to understand that CD-ROM databases offer much more search and retrieval facilities than print sources. They must also appreciate the speed of retrieval from CD-ROM databases as compared to print sources. Post-graduates must also understand that CD-ROM databases only index what is available in periodical literature. This will help to remove the misconception of CD-ROM databases being the answer to all problems. To bring about these changes among students, the following methods and media are proposed:

- Lectures: A lecture explaining CD-ROM systems can be provided. This lecture can discuss characteristics of CD-ROM databases and printed bibliographic sources. Similarities and differences can be shown during this lecture.
- Demonstrations: A demonstration using print bibliographic sources can be held. This will be invaluable for showing students the various elements of print sources. The same can be done with CD-ROM databases.

(iii) Post-graduate students will formulate and design effective strategies for

searching bibliographic CD-ROM databases.

The proposal of this objective is based on the finding that students keyed in whole sentences or even themes as their search strategy. There is a need to make students aware of the process of searching databases. The following learning content which can bring about desired results among students is proposed:

- Disciplines involved in a particular database, that is, whether it deals with the relevant subject area or not
- range of years covered by a particular database
- scope covered by a particular database
- Boolean operators
- online index or thesauri
- free text or controlled vocabulary
- proximity operator
- inputting terms
- displaying results
- printing and/or downloading results
- locating retrieved material.

Post-graduates need to select appropriate databases for their queries. They need to know the years covered by a particular database so that when they retrieve insufficient references they do not conclude that the retrieved references are the only ones available. Some databases are bibliographic while others are not. There is also a need to know the languages covered by a particular database. This is because some users print references that are written in a language that they do not understand. Most databases explain their scope on the first screen, after inserting the disc. Post-graduates need to know what is covered by the database they have selected. At an advanced stage, post-graduates will have to be introduced to concepts like Boolean operators and proximity operators. They will have to understand that for maximum utilization of a partial database they may have to use an online index or thesauri. They will have to realize that certain databases use free-text searching while others use controlled vocabulary. End-users will then effectively input terms instead of keying in

paragraphs or sentences. After searching they will have to be able to display their results and print them. At the moment the Library does not provide for downloading and hence they need only to know how to print results. Finally, there is a need to teach students how to locate retrieved results, because during the investigation questions like "from here, where do I go?" were common. The following methods and media are proposed for this objective:

- Lectures: A lecture on how Boolean operators, proximity operators and online indexes function is suggested.
- Experiments: After being lectured on issues like Boolean operators students must be given an opportunity to experiment with them practically.
- Search forms: Search forms help students understand the basics of Boolean searching so that they know exactly how to do this.
- Videos: Videotapes by various database vendors address various issues suggested in the objectives. A selection of videos of a good standard will have to made.

These objectives are proposed because they contain what is regarded in the literature as the skills and conceptual approach. An analysis of these methods reveals that not all methods are suggested for all options, the reason being that some methods and media are more suitable for achieving certain objectives than others. It will also be realized that the whole spectrum of methods and media available in the literature is not suggested in this research because the situation does not call for their utilization.

5.4 SUMMARY

This chapter set out to make suggestion and proposals that could be utilized at the UNIN Library. These suggestions and proposals were supposed to refer specifically to CD-ROM databases. However, some of the suggestions made were general and as such did not fall within the scope of this research. The reason for this state of affairs was that the information gathered from the situation analysis included broad elements of end-user instruction. Because of these broad suggestions, there is a need for further research that would address the issue of a general end-user training programme at UNIN Library.

In this chapter, by means of utilizing guidelines provided in previous chapters and results obtained from the situation analysis, proposals were made for a training programme for end-users of CD-ROM databases at UNIN Library. These proposals included the objectives of such a programme, learning content, methods and media which can be used. In Table 2 the results of the findings are summarized.

OBJECTIVES	LEARNING CONTENT	METHODS AND MEDIA
Microcomputer knowledge	- Starting and ending a search session - CD-ROM disc handling - Keyboard knowledge	- Lectures - Demonstrations - Written materials - Videos
Features and characteristics of CD-ROMs	- Features of CD-ROM databases - Relationships between CD-ROM databases and print-based sources - Advantages of CD-ROM databases	- Lectures - Demonstrations
Search strategy formulation	- Disciplines covered by a particular database - Range of years covered - Scope covered - Boolean operators - Index or thesauri - Free-text or controlled vocabulary - Proximity operators - Inputting terms - Displaying results - Printing/downloading - Locating retrieved material	- Lectures - Demonstrations - Search forms - Videos

TABLE 2: PROPOSED TRAINING PROGRAMME AT UNIN

6. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 SUMMARY

This research was designed to investigate end-user training programmes with regard to bibliographic CD-ROM databases. Of particular importance to this research was the effective use of the multiple interfaces employed by various databases. These interfaces, preliminary studies and literature reviews had revealed, provided end-users with problems. Related to the problem of multiple interfaces was the training programmes which had been devised by other institutions. The aim of this research was to establish the various elements which were incorporated in these training programmes. The next issue which was addressed in this research was the establishment of a scientific basis upon which to base a training programme. The investigation revealed that training programmes were based on the process of curriculum development. Curriculum development as a process was studied to address the issues of multiple interfaces and training programmes.

To address the problems of multiple user interfaces and training programmes, two sets of literature surveys were conducted. The first literature survey set out to identify elements comprising CD-ROM interfaces. This was reported in Chapter 2. Definitions were first investigated. This decision was taken because there seemed to be confusion among writers with regard to a single, universally accepted definition of interfaces. In the process of establishing a definition for this study, elements which constituted interfaces were identified. Based on the elements identified and views from other writers, a definition applicable to this study was formulated. This survey underlined the fact that, despite "user-friendly" interfaces, end-users still experienced problems when using bibliographic CD-ROM databases: they had to struggle with various components of interfaces, they not only had to deal with command languages or menus, but they also had to be able to use keyboards and all the other components which were identified as comprising an interface.

The next literature survey set out to establish the cornerstones and basics of training programmes which where designed at other institutions as an attempt to address problems encountered by users. The second survey was reported in the next chapter. This survey was

meant to provide the researcher with an overall view of elements involved in bibliographic CD-ROM databases. It was designed to establish the core elements of the various training programmes. The literature study revealed that most institutions designed programmes unique to and for their institutions. This was the practice because end-user needs varied and also because various institutions concentrated on different elements in their training. Irrespective of the uniqueness of most of the programmes an attempt was made to identify basic elements underpinning these programmes. The basics were then identified as establishing end-user needs, formulating educational outcomes, formulating content and methods, and media used to train end-users.

Chapter 4 dealt with identifying alternatives upon which basic elements, established in Chapter 3, could be based. Curriculum design was then identified as the scientifically appropriate process on which to base aims, objectives, content and methods of user education programmes. It was established that there were nevertheless different approaches to the process of curriculum design. Different models were advocated by different authors. An analysis of the various models was done and eventually a model for this research was suggested. This model was used to design a programme for the UNIN Library. Chapters 2, 3 and 4 thus related to the conceptualization part of this research.

Chapter 5 heralded the first part of the operationalization phase of this research. It dealt with a situation analysis of the UNIN and its Library. This part was engaged in because it would identify end-user needs. Identifying end-user needs, as was established in the models of curriculum design, is an important step in designing training programmes. A situation analysis was then made to identify these needs. Post-graduate students in the Faculty of Arts were identified as the target group for this research. The process of identifying needs was performed by conducting informal interviews with senior members of staff in the Library and subject reference librarians who were in close contact with the post-graduate students. Syllabi studies were also conducted as another method of identifying end-user needs. After this information had been gathered an analysis was done to provide a profile of the situation under investigation. This profile was then used to engage in the other stages of curriculum design as suggested in the model. Based on the results of the situation, suggestions were made with regard to the aims and objectives of a training programme at the UNIN Library.

During the discussion of the formulation of objectives, broad and general objectives were identified. Because this research had as its emphasis CD-ROM instruction, which was specific, it was decided to concentrate on specific objectives. In the discussion of the specific objectives, learning contents, methods and media were included.

6.2 CONCLUSIONS

The study indicated that it was difficult for end-users to conduct effective searches on some of the manifold CD-ROM interfaces. The fact that most of the programmes to help end-users search were designed by database vendors was an indication of the difficulties of some of these databases. The results of the study also illustrated that end-users needed training to utilize these databases successfully. This conclusion was made despite contrary views from database vendors that their interfaces were "user friendly". The conclusion was then reached that training was an integral part of CD-ROM databases if they were to be used successfully. Despite improvements that had been made within the interface industry, end-users still experienced problems. It can be concluded that user-friendly databases, which can be used without training, has not yet been developed and that user-friendly searching interfaces does not yet exist.

Most of the students encountered the concept "information use" for the first time at the university. However, they were willing and eager to learn after being informed of the importance of information use during their studies. It can be concluded that students at UNIN show the potential of developing into information literate users.

UNIN was characterized as being in a phase of development. This characterization provided challenges to staff at the institution. Despite the fact that it was under-resourced, invaluable contributions were being made by staff with regard to training end-users. The conclusion can be made that information professionals, like their counterparts in other countries, are paying attention to the problems end-users encounter with regard to utilizing various resources provided in the Library. This statement is borne out by the amount of literature which is available concerning end-user training in the country.

At the time of investigation, training was not sufficient. Each subject reference librarian decided individually what to teach students. This practice resulted in some issues not being addressed. The fact that emphasis was put on products of one database company meant that end-users were not exposed to databases of other companies.

To design proper training programmes, a scientific method needs to be followed. From the education literature, curriculum design was identified as a method for scientifically designing training courses and programmes. It can be concluded that curriculum design as a process should be followed for the successful design of programs in libraries.

Finally, the curriculum devised for the UNIN Library was designed according to the results of a situation analysis. This curriculum would, as a result, be relevant to this institution. A conclusion from this argument can be made that individual institutions which are involved in curriculum design pertaining to CD-ROM training could use this curriculum only as a guideline.

6.3 RECOMMENDATIONS

The recommendations flowing from this research concentrate on four issues, namely,

- situation
- learner
- training
- studies for the future.

6.3.1 **Recommendations with regard to the situation**

During the analysis of the situation it was established that some of the methods which lecturers employed were not supportive of the university's research mission. Therefore the following recommendations are made:

- The teaching methods employed should be evaluated to establish whether they support

the university's research mission. At the time of the investigation emphasis was not placed on independent studying by the student. This practice, then, negatively affected student behaviour with regard to using libraries. If students knew that they could complete their degrees without using material additional to the recommended ones, they would have no reason to use the library. The curriculum should clearly require students to perform independent studies.

- Relationships between the lecturing staff and the Library should be improved. Lecturers should see the Library as supporting their activities of teaching and research. Libraries should reach out as much as possible to attract users who are not yet library conscious. Lecturers are better placed to encourage students to utilize the Library. This would depend on the relationship between lecturers and information professionals. Only when lecturers are aware of library services, and when they value the Library as an invaluable aid for their tasks, will they be able to encourage students to use it.

- Current resources in the Library need to be upgraded to bring them in line with the phenomenal growth in student population (facilities like computers, projectors and printers come to mind). The situation analysis revealed that the resources available were not sufficient, when taking the student growth into consideration. Information professionals can only provide a service based on resources available. An attempt should be made to acquire more resources so as to enable information professionals to provide a more efficient service.

- Networking of the CD-ROM drives should be looked into thoroughly since it could provide an underdeveloped, under-resourced university with numerous advantages. At other institutions networking has proved to be a solution to most of the problems produced by insufficient resources. Problems such as insufficient space in the Library are alleviated because access is not limited to the library. One source/database can be accessible to many end-users and as a result costs involved in acquiring a database will be reduced. Maximum use of resources is made possible by networking.

- Individual initiatives from subject reference librarians should not be stifled by a suggestion of co-ordinated training. An initiative should be practised within the broad spectrum provided by the curriculum.

6.3.2 **Recommendations with regard to the learner**

Post-graduate students were characterized as not being library, information or computer literate. They were also said to be underdeveloped. These statements necessitate the following recommendations:

- A concerted effort should be made to introduce students to the library. (The library offers a bibliographic instruction programme to post-graduates, but this is not sufficient since most of the post-graduates lack the basic skills of library use.)

- The alternative, namely, starting a library course which will be incorporated in students' curricula, should be examined. In the literature it is illustrated that students learn more when they know that they are going to be tested on a particular aspect. It has been illustrated that problems of non-attendance are solved when a course is incorporated into the curriculum. At the time of this investigation the library offered a course which was incorporated in the curriculum of Honours students in Physiology. The response of students was excellent in terms of attendance and participation during classes.

- Projects should be undertaken to equip students with computer skills, so that when they come into the library they already know what computers are. (This project does not have to be provided by the library; units such as a Computer Science Department or Computer Centre can be approached for such a project.)

- Staff and student relations should be strengthened so that students are in a position to approach information professionals freely. A more amiable ambience will make it easier for students to use the library and thereby succeed in their task performance.

6.3.3 **Recommendations with regard to training**

At the time of the survey each subject reference librarian decided on what to teach and which methods to employ. This practice necessitates the following recommendations:

- The curriculum should be designed in such a way that broad outlines are given on how training should be provided (this will encourage uniformity). It must be emphasized that this recommendation does not prevent individual interpretation of the curriculum by various subject reference librarians. What is advocated here is that it should be clear to each subject reference librarian that the teaching of some elements should correspond to the abilities of students at a particular time.

- Two levels of training are suggested. The first level introduces users to the library and teaches the basic skills to operate computers. The second level addresses the complex functions offered by various databases, functions such as using an online index or thesaurus and downloading.

- More time which allow for follow-up training should be provided since students have to learn many aspects. It should be clear to all involved that a programme which makes provision for follow-up training will benefit both students and staff. When provided with training over a short period of time, students continually return for information on some forgotten aspect of the training. As a result staff are always occupied with such requests, which interrupt their other duties. A programme which makes provision follow-up training develops students into independent researchers.

- The training programme should go beyond the utilization of CD-ROM databases. It should also aim at creating an information literate end-user. During the research it became clear that students did not only have problems with CD-ROM databases, but they also lacked other skills. A programme which incorporates the various services of the library will benefit students more.

- Adequate training should be provided to subject reference librarians to enable them

to utilize all the functions offered by various databases. This was not the case at the time of the survey.

- The UNIN Library should explore the option of establishing its own technical section or training some staff in the maintenance of information technology devices so that it need not depend on other departments.

- Manuals provided to students should be revised to represent the latest developments. At the time of the survey they were inadequate.

- Continuous evaluation should be conducted to determine if user needs have remained the same. This recommendation is made because needs are not static and, after some time, end-users might have developed to a stage where teaching them keyboard usage will no longer be necessary. The process of curriculum design also encourages constant evaluation.

6.3.4 **Recommendation with regard to future studies**

Further studies should be undertaken to evaluate the validity of suggestions made in this research. This is important because in this research the findings are limited to recommendations and not the actual design of a complete programme.

The effect of the designed curricula on end-users should be evaluated to establish if provision is made for desired changes in students. A study which concentrates on the validity of suggested material will be necessary. Without such a study, the validity of learning material will never be tested.

A study investigating the implications of staff training is necessary. As in the case with students, there is a need for a structured training programme for staff.

The implications of networking need to be well understood by all interested parties. A study to research the various configurations of networking should be conducted to establish the

relevant options for the situation.

Similarly, a study investigating the viability of most of these recommendations is necessary to establish costs involved in terms of financial and human resources.

The implications of course integration need to be analysed. Such a study must consider who would provide such a course and how approaches identified from the literature could be utilized. Approaches which could be adopted at UNIN should be utilized.

Finally, when the situation permits, a survey utilizing questionnaires should be undertaken to investigate the question of a complete, general end-user training programme at the UNIN Library.

7 BIBLIOGRAPHY

1. Allen, G. 1989. Patron response to bibliographic databases on CD-ROM. *RQ*, 29(1):103-110.
2. Allen, G. 1990. CD-ROM training: what do the patrons want? *RQ*, 30(1):88-93.
3. Babbie, E.R. 1979. *The practice of social research*. Belmont, California: Wadsworth.
4. Bacchus, K. 1990. Curriculum development in the developing countries. *Educational review*, 42(3):287-301.
5. Beheshti, J. 1991. Retrieval interfaces for CD-ROM bibliographic databases. *CD-ROM professional*, 4(1):50-53.
6. Behrens, S.J. 1993. User education at tertiary level: a review of recent literature. *South African journal of library and information science*, 61(3):124-130.
7. Bills, L.G. & Helgerson, L.W. 1988. User interfaces for CD-ROM pacs. *Library hi-tech*, 6(2):73-115.
8. Bishop, G. 1985. *Curriculum development: a textbook for students*. Hong Kong: Macmillan.
9. Blumenthal, C., Howard, M.J. & Kinyon, W.R. 1993. The impact of CD-ROM technology on a bibliographic instruction program. *College and research libraries*, 54(1):11-16.
10. Bostian, R. & Robbins, A. 1990. Effective instruction for searching CD-ROM indexes. *Laserdisk professional*, 3(1):14-17.
11. Bristow, A. 1988. Reference sources on CD-ROM at Indiana University. *Electronic library*, 6(1):24-29.
12. Brondy, H. 1961. *Building a philosophy of education*. Englewood Cliffs, N.J.: Prentice Hall.
13. Broughton, N., Herrling, P. & McClements, N. 1991. CD-ROM instruction: a generic approach. *CD-ROM librarian*, 6(10):16-19.
14. Bunnage, R. 1989. Computer-aided instruction in a law library. *Education for information*, 7:107-132.
15. Burrell, T.W. 1983. Curriculum design and development in education for librarianship and information service. *Education for information*, 1: 229-261.

16. Calitz, L.P., Du Plessis, S.J. & Pandsteyn, I.N. 1982. *Die Kurrikulum: 'n handleiding vir dosente en onderwysers*. Durban: Butterworth.

17. Calitz, L.P., Marais, De la Rey & Van Wyk, C.F.M. 1985. *Die intergrering van onderwysmedia in lesaanbieding*. Johannesburg: McGraw-Hill.

18. Carl, A. *et al.* 1988. *Curriculum development in the primary school: a modular approach*. Cape Town: Maskew Miller Longman.

19. Clow, D. & Cochrane, C. 1986. User education and staff training in a continuing education programme. *Education for information*, 4: 17-25.

20. Coats, R.B. & Vlaeminke, I. 1987. *Man computer interfaces: an introduction to software design and implementation*. London: Blackwell Scientific Publications.

21. Condic, K.S. 1992. Reference assistance for CD-ROM users: a little goes a long way. *CD-ROM professional*, 5(1):56-57.

22. Courtis, M.P. 1991. Tutorial for CD-ROM instruction: a review of EBSCO-CD's core Medline. *CD-ROM professional*, 4(6):105-109.

23. Crellin, J. 1992. Implications of CD-ROMs for reference services in university libraries. *Library management*, 13(3):20-28.

24. Dalton, G.M.E. 1991. User satisfaction as a measure of subject reference performance in an academic library. (MLS thesis). Pretoria: University of South Africa (unpublished).

25. Dehning, W. 1981. *The adaption of virtual man-machine interfaces for user requirements in dialogs*. Berlin: Verlag.

26. Dick, W. & Carey, L. 1990. *The systematic design of instruction*. New York: Harper Collins.

27. Doll, R.C. 1986. *Curriculum improvement: decision making and process*. Boston: Allyn & Bacon.

28. Dubbeld, C.E. 1991. CD-ROM - a viable alternative to online searching for academic libraries? *Electronic library*, 9(4/5):245-250.

29. Dyer, H. & Morris, A. 1990. *Human aspects of library automation*. Great Britain: Gower Publishing Company.

30. Edmonds, E. 1992. *The separable user interface*. London: Academic Press.

31. Faries, C. 1992. User's reactions to CD-ROM. The Penn State Experience. *College & research libraries*, 53(2):139-149.

32. Fjallbrant, N. 1977. Planning a programme of library user education. *Journal of librarianship*, 4(3):200-211.

33. Foss, C.L. 1989. Tools for reading and browsing hypertext. *Information processing and management*, 25(4):407-418.

34. Fraser, W.J., Loubser, C.P. & Van Rooy, M.P. 1990. *Didactics for the undergraduate student*. Durban: Butterworth.

35. Fraser, W.J., Loubser, C.P. & Van Rooy, M.P. 1993. *Didactics for the undergraduate student*. London: Butterworths.

36. Gagne, R.M. & Briggs, L.J. 1979. *Principles of instructional design*. New York: Holt, Rinehart & Winston.

37. Geyser, E.P. 1991. *A model for evaluating user friendliness of an interface to an information retrieval system*. (M.Bibl. thesis). Pretoria: University of Pretoria (unpublished)

38. Harrington, J. 1990. Searching Silverplatter: a computer-based CD-ROM instruction tool. *CD-ROM professional*, 3(6):12-13.

39. Harrington, J. 1989. Computer-assisted instruction for end-users: our pandora's box. *Library software review*, 8(3):152-154.

40. Helgerson, L.W. 1992. *CD-ROM facilitating electronic publishing*. New York: Van Nostrand Reinhold.

41. Herther, N. 1988. Microcomputer technology: helping users cope. *Online*, 12(5):120-122.

42. Hoover, D.G. & Clayton, V. 1989. Graduate bibliographic instruction in ERIC on CD-ROM. *Behavioral & social sciences librarian*, 8(1/2):1-12.

43. Hostetler, J.C. & Harwood, J.A. 1989. Computer-assisted bibliographic instruction: a pilot study. *Journal of educational media & library sciences*, 26(2):123-132.

44. Jacso, P. 1992. *CD-ROM software, dataware and hardware evaluation, selection and installation*. Englewood (Colo): Libraries Unlimited.

45. Johnson, M.E. & Rosen, B.S. 1990. CD-ROM end-user instruction: a planning model. *Laserdisk professional*, 3(2):35-40.

46. Kahn, P. 1988. Making a difference: a review of the user interface features in six CD-ROM database products. *Optical information systems*, 8(4):169-183.

47. Kehoe, C.A. 1985. Interfaces and expert systems for on-line retrieval. *Online*

review, 9(6):489-505.

48. Kenny, R.F. & Schroeder, E. 1992. An evaluation of a training and assistance program for the CD-ROM databases: reflections on the process. *Reference services review*, 20(2):41-48.

49. Kirakowski, J. 1988. *Human computer interaction form voltage to knowledge.* Sweden: Chartwell-Brett.

50. Large, A. 1991. The user interface to CD-ROM databases. *Journal of librarianship and information science*, 23(4):203-217.

51. Le Poer, P.M. & Mularski, C.A. 1989. CD-ROM's impact on libraries and users. *Laserdisk professional*, 2(4):39-45.

52. Leach, B. 1993. Computer based CD-ROM tutorials providing effective on-demand instruction. *CD-ROM professional*, 6(4):113-117.

53. Leedy, P.D. 1985. *Practical research: planning and design*. New York: Macmillan.

54. Li, T.Z. 1991. Generic approach to CD-ROM systems: a formal analysis of search capabilities and ease of use. In: *Interfaces for information retrieval and on-line systems: the state of the art*, edited by Martin Dillon, New York: Greenwood Press.

55. Lindeman, M.J. 1991. Interface styles. In: *Interfaces for information retrieval and on-line systems: the state of the art*, edited by Martin Dillon, New York: Greenwood Press.

56. Lindeman, M.J. 1989. Interface styles from an interface designer's perspective. *Bulletin of the American society for information science*, 15(4):16-20.

57. Lowe, I.B. 1990. Integrating CD-ROMs into your bibliographic instruction program. *CD-ROM professional*, 3(6):16-19.

58. Lynn, P. & Bacsanyi, K. 1989. CD-ROMs: instructional methods and user reactions. *Reference services review*, 17(2):17-25.

59. MacDonald, L.B. 1990. *Teaching technologies in libraries: a practical guide.* Boston: G.K. Hall.

60. Mager, R.F. 1962. *Preparing instructional objectives*. Palo Alto, California: Fearon Publishers.

61. Malley, I. 1984. *The basics of information skills teaching*. London: Clive Bingley.

62. Matthews, J. 1989. *Curriculum exposed*. London: David Fulton.

63. Maxymuk, J. 1991. Considerations for CD-ROM instruction. *CD-ROM*

professional, 4(3):47-49.

64. McClamroch, J., Stein, L.L. & Williamson, E. 1991. MLA on CD-ROM: end-users respond. *Reference services review*, 19(1):81-86.

65. McFaul, E.J. 1992. CD-ROM consistent interface guidelines: a final report. *CD-ROM librarian*, 7(2): 18-29.

66. Miller, D.C. 1987. Evaluating CD-ROMs: to buy or what to buy. *Database*, 10(3):36-42.

67. Miller, J.P. & Seller, W. 1985. *Curriculum, perspectives and practice*. New York: Longman.

68. Mokgalabone, M.B.E. 1992. The teaching of history in black secondary schools with special reference to concept teaching. (D.Ed. thesis). Mamelodi: Vista University (unpublished).

69. Myers, G.A. 1990. The gatekeeper as intermediary among database end-users in an academic environment, with special reference to the Department of Chemistry, University of Witwatersrand (M.Bibl. dissertation). Pretoria: University of South Africa (unpublished).

70. Nash, S. & Wilson, M.C. 1991. Value-added bibliographic instruction teaching students to find the right citations. *Reference service review*, 19(1):87-92.

71. Neame, L. 1990. View from Canada. *CD-ROM professional*, 3(4):105-107.

72. Nesdore, P.E. 1983. User friendly to all or none? *Computerworld*, October 31:2-6.

73. Newble, D. & Cannon, R. 1989. *A handbook for teachers in universities and colleges: a guide to improving teaching methods*. New York: St. Martin's Press.

74. Nicholls, P.T. 1990. CD-ROM in the library: implications, issues and sources. *Laserdisk professional*, 3(2):100-103.

75. Nichols, A. & Nichols, S.H. 1972. *Developing a curriculum: a practical guide*. Worcester: Billing & Sons.

76. Nicholls, P. *et al.* 1990. A framework for evaluating CD-ROM retrieval software. *Laserdisk professional*, 3(2):41-46.

77. Nicholls, P. 1992. CD-ROM databases: a survey of commercial publishing activity. *Database*, 15(1):36-41.

78. Nickerson, G. 1991. Bibliographic instruction for CD-ROM: developing in-house tutorials. *CD-ROM professional*, 4(5):45-47.

79. Nipp, D. 1991. Back to basics: integrating CD-ROM instruction with standard user education. *Research strategies*, 9(1):41-47.

80. Norlin, A. *et al.* 1992. Interface design and development: the human factor. *Library hi-tech*, 10(3):7-24.

81. Paxton, A.L. & Turner, E.J. 1984. The application of human factors to the needs of the novice computer user. *International journal of man-machine studies*, 20:137-156.

82. Pierce, S.J. 1990. *Weeding and maintenance of reference collections*. New York: Haworth Press.

83. Pope, C. 1989. An evaluation of ERIC on CD-ROM in a college library. *The electronic library*, 7(2):94-97.

84. Powell, J.E. 1990. *Designing user interfaces*. San Martos: Microtend Books.

85. Pritchard-Schoch, J. 1993. Natural language comes of age. *Online*, 17(3):33-43.

86. Reese, J. 1993. CD-ROM end-user instruction: issue and challenge. *Microcomputers for information management*, 10(2):131-154.

87. Reese, J. 1990. CD-ROM technology in libraries: implications and considerations. Electronic library, 8(1):26-35.

88. Reese, J. & Steffey, R.J. 1988. The seven deadly sins of CD-ROM. *Laserdisk professional*, 1(2):19-24.

89. Reifsnyder, B. 1990. CD-ROM and online searching. *Database*, 13(1):95-97.

90. Retief, I.D. 1989. Computer-aided instruction and its implementation. *South African journal of education*, 9(1):148-157.

91. Rice, J. 1981. *Teaching library use a guide for library instruction*. Connecticut: Greenwood.

92. Rosen, L. 1990. CD-ROM user interfaces: consistency or confusion? *Database*, 13(2):101-103.

93. Rubinstein, R. & Hersh, H. 1984. *The human factor designing computer systems for people*. Burlington, Mass.: Digital Press.

94. Schneiderman, B. 1982. *Designing the user interface: strategies for effective human-computer interaction*. Reading (Mass): Addison-Wesley

95. Schneiderman, B. 1987. *Designing the user interface: strategies for effective human-computer interaction*. Reading (Mass): Addison-Wesley.

96. Schubert, W.H. 1978. *Curriculum perspective, paradigm and possibility*. New York: Macmillan.

97. Spragg, E.B. 1992. CD-ROM software evaluation: comparison of searching ERIC on IBM and McIntosh. *College and research libraries*, 53(4):342-350.

98. Steele, I. & Tseng, G. 1992. End user training for CD-ROM medline: a survey of U.K. medical school libraries. *Program*, 26(1):55-61.

99. Sutcliffe, C. 1988. *Human-computer interface design*. Hampshire: Macmillan Education.

100. Sylvia, M. & Kilman, L. 1991. Searching on CD-ROM in an academic environment how to avoid CD-ROM information overload. *Computers in libraries*, 11(10):44-46.

101. Taba, H. 1962. *Curriculum development: theory and practice*. New York: Harcourt, Brace, World Inc.

102. Taylor, D.C. 1987. Reference ROMs: six implications for libraries building CD-ROM database services. *American libraries*, 20(5):452-454.

103. Tenopir, C. 1989. The user-system interface. *Library journal*, 114(13):80-81.

104. Teskey, N., Henry, M. & Christopher, S. 1987. A user interface for multiple retrieval systems. *Online review*, 11(5):283-284.

105. Tsebe, J.K. 1994. The University of the North Library innovations to improve service. In: *Survival strategies in African university libraries: new technology in the service of information*. Proceedings from a workshop at the University of Zimbabwe. Harare: Zimbabwe.

106. Tufte, E. 1992. The user interface: the point of competition. *Bulletin of the American Society for Information Science*, 18(5):15-17.

107. Tyler, R.W. 1949. *Basic principles of curriculum and instruction*. Chicago: University of Chicago Press.

108. University of the North. 1994. Library Committee Report. (unpublished).

109. University of the North. 1994. Library Strategic Planning Report. (unpublished).

110. University of the North. 1994. Faculty of Arts Calendar. (unpublished).

111. Unruh, G.G & Unruh, A. 1984. *Curriculum development: problems, processes and progress*. USA: McCutchan Publishing.

112. Valencia, S.W. 1991. You can't have authentic assessment without authentic content. *Reading teacher*, 44(8):590-591.

113. Van Brakel, P.A. & Boon, J.A. 1985. Strukturele veranderings aan die basiese graadkursusse in die Inligtingkunde en Biblioteekkunde. *South African journal of library and information science*, 54(1):16-25.

114. Van Brakel, P.A. 1989. End-user as a factor in online searching. *South African journal of library and information science*, 57(1):51-60.

115. Van Brakel, P.A. 1975. Biblioteekoriëntering en onderrig aan universiteitstudente: kritiese evaluering van die huidige situasie in enkele lande, met spesiale verwysing na die Republiek van Suid-Afrika. (M.Bibl.-verhandeling). Bloemfontein: Universiteit van die Oranje-Vrystaat (ongepubliseerd).

116. Van Brakel, P.A. 1979. Biblioteekgebruikersopleiding aan universiteitstudente. Ontwerp van 'n onderrigprogram. (D.Phil. verhandeling). Pretoria: Universiteit van Pretoria (ongepubliseerd).

117. Visser, M.S.P. & Van Brakel, P.A. 1987. Seleksie van leerervarings en leergeleenthede as kurrikuleringsfase. *South African journal of library and information science*, 55(2):126-131.

118. Walters, S.C. 1978. The design of a curriculum for physical science, with special reference to the teaching of physical science in the Cape Province. (Ph.D. thesis). Cape Town: University of Cape Town (unpublished).

119. Wheeler, D.K. 1979. *Curriculum process*. London: Hodder & Stoughton.

120. Wheeler, D.K. 1967. *Curriculum process*. London: University of London Press.

121. Whitaker, C.S. 1990. Pile-up at the reference desk: teaching users to use CD ROMs. *Laserdisk professional*, 3(2):30-34.

122. Widman, R. & Nourse, J.A. 1989. Delivering hi-tech library instruction: a hands-on approach. *Laserdisk professional*, 2(6):50-54.

123. Zais, R.S. 1976. *Curriculum principles and foundations*. New York: Harper & Row.

124. Zink, S.D. 1991. Toward more critical reviewing and analysis of CD-ROM user software interfaces. *CD-ROM professional*, 4(1):16-22.

APPENDIX 1

INTERVIEW GUIDE QUESTIONS

A. QUESTIONS TO THE HEAD OF DEPARTMENT

1. Can you tell me about the development of the CD-ROM unit in the library?
2. How would you characterize the clientele (students) using the unit?
3. How would you characterize the relationship between your department and faculties?
4. What future plans do you have for the unit?
5. What is your view of regulations governing the use of the unit, and are there plans to change them?
6. What is your comment concerning training provided to students at the moment?
7. Any other comments concerning the CD-ROM unit?
8. Would you say the space and physical facilities available are sufficient?

B. QUESTIONS TO THE SUBJECT REFERENCE LIBRARIAN

1. What is your experience regarding students using the CD-ROM unit?
2. Do you have any suggestions with regard to content which can improve students' performances (in cases where problems are encountered)?
3. What is your view concerning present training provided to students?
4. In your view, which additional aspects should be included in the training?
5. How would you regard databases that are being used?
6. What is your view concerning methods of training, can you make suggestions on this aspect?
7. Any other comments concerning the CD-ROM unit?

APPENDIX 2

UNIVERSITY OF THE NORTH

CALENDAR 1994

FACULTY OF ARTS

Accounting

African Law

Afrikaans *

Agriculture Economics

Anthropology *

Applied Sociology and Social Work *

Biblical Studies

Bibliocultural Studies *

Botany

Chemistry

Constitutional and Administrative Law

Criminology *

Development Studies

Economics

Education

English *

French

General Linguistics *

General Literary Studies *

Geography *

German *

History *

Information Analysis and Retrieval *

Information Science *

Information Studies *

International Politics *

Kinesiology and Physical Education

Latin

Library Management *

Library Science *

Mathematics

Northern Sotho *

Philosophy *

Physics

Political Development *

Political Science *

Private Law

Psychology *

Public Administration

Roman Law

Science of Religion

Semitic Languages

Sesotho *

Setswana *

Social Work *

Sociology *

Statistical Method

Tshivenda *

User Studies *

Xitsonga *

Zoology

APPENDIX 3

UNIVERSITY OF THE NORTH LIBRARY

CD-ROM TITLES

1. Academic abstracts
2. Agris
3. Aquatic sciences and fisheries abstracts
4. AV online
5. Biological abstracts
6. Bookfind
7. Books in print
8. Business periodicals index
9. CAB CD
10. Cross cultural
11. Educational resource information center report
12. Government public office
13. Social work abstracts
14. Humanities index
15. Index to foreign legal periodicals
16. Index to legal periodicals
17. MLA international bibliography
18. Library and information science abstracts
19. Library literature
20. Linguistics and language behaviour abstracts
22. MEDLINE
23. National technical information service
24. Nursing and allied health literature
25. International pharmaceutical abstracts
26. Index to South African periodicals
27. Public affairs information service international
28. Readers guide abstracts
29. Science citation index
30. Serial directory

31. Social sciences citation index
32. SOCIO-FILE
33. South African criminal law reports
34. South African statutes
35. South African tax
36. Waterlit

APPENDIX 4

CD-ROM DATABASES

INSTRUCTIONS ON HOW TO START

Type the instructions when the computer displays this C:\>
PLEASE FEEL FREE TO ASK HELP IF YOU ARE NOT SURE OF ANYTHING

1. Academic abstracts, 1984
   CD\ELITE then press Enter

   INSTRUCTIONS

   a) Type CD\ELITE then press Enter
   b) Type ELITE then press Enter

2. Cambridge scientific abstracts

   2.1 Aquatic sciences & fisheries abstracts, 1988
   2.2 Drug information source, 1991 only

   INSTRUCTIONS

   a) Type CD\CSA then press Enter
   b) Type CC then press Enter

3. BOWKER's books in print, 1990

   INSTRUCTIONS

   a) Type CD\BOWKER then press Enter
   b) Type BK then press Enter

4. MEDLINE, 1966

   INSTRUCTIONS

   a) Type CD\MEDLINE then press Enter
   b) Type MEDLINE then press Enter

5. ISI CD-ROM databases

   5.1 Science citation index, 1980
   5.2 Social science citation index, 1981

   INSTRUCTIONS

   a) Type CD\ISI-CD then press Enter
   b) Type CDE then press Enter