AN ABSTRACT OF THE THESIS OF

<u>Nattaya Keowmookdar</u> for the degree of <u>Doctor of</u>

<u>Philosophy</u> in <u>Education</u> presented on <u>July 8, 1993</u>.

Title: <u>A Comparison of the Effectiveness of Two CD-ROM</u>

<u>Database Training Methods</u>

Abstract approved: *Redacted for Privacy*

The primary question to be answered as a result of the

research was: Do native English-speaking undergraduate

students learn CD-ROM database search skills more

effectively through the use of conventional instruction

method or by training confined to a written manual self-

instructional method? Thirty-seven Oregon State

University students were randomly assigned to two groups

and partici-pated in the study. The study utilized an

experimental pretest-posttest control group design. The

length of the study was six weeks. All participants were

pre and post-measured using the CD-ROM Database Competency

Test which was validated using the Delphi method. The

subjects were trained using *Wilsondisc* and *SilverPlatter*

databases. ANCOVA and t-tests were the main statistics

utilized in the analysis. The results of the study were as

follows: 1) Subjects in both treatment groups experienced significant test score gains between pretest and posttest; 2) Those subjects which were assigned to the conventional instruction group had significantly higher scores than did subjects assigned to the self-instruction group; 3) Subject gender was determined not to be a factor when differences were considered from test results; 4) Interaction did not play a significant role in influencing the data results; 5) Students rated formal training as being very helpful in improving the effectiveness of their CD-ROM database searches.

The major conclusion drawn from the study was that the native English-speaking students at Oregon State University learned CD-ROM searching skills more effectively through the conventional instruction method than those students who were trained by self-instruction. The results of the study substantiated the need to undertake further efforts to improve the efficiency of learning CD-ROM access instructional methods in higher educational settings.

A COMPARISON OF THE EFFECTIVENESS OF TWO CD-ROM
DATABASE TRAINING METHODS

by

Nattaya Keowmookdar

A THESIS

submitted to

Oregon State University

in partial fulfillment of
the requirements for the
degree of

Doctor of Philosophy

Completed July 8, 1993
Commencement 1994

APPROVED:

Redacted for Privacy

Professor of Education in charge of major

Redacted for Privacy

Director of School of Education

Redacted for Privacy

Dean of Graduate School

Date thesis is presented July 8, 1993

Typed by Nattaya Keowmookdar for Nattaya Keowmookdar

ACKNOWLEDGEMENTS

Thanks to all my friends, Mary Verploegen, Somsri Tangmongkollert, Pattamaporn Vongleang, Methinin Pinyuchon, Suebsai Boonveerabut, SoonLen Lee, Young-Mi Kim, and Ruth Martin for their time, helpful advise and constant support.

Finally, thanks to all the students who participated in this research for their contribution.

TABLE OF CONTENTS

TABLE OF CONTENTS, Continued

LIST OF FIGURES

LIST OF TABLES

A Comparison of the Effectiveness of Two

CD-ROM Database Training Methods

CHAPTER 1

INTRODUCTION

The emerging of the modern technological tools
challenge education today and tomorrow. The use of
computer technology in modern life is widespread in both
academia and the workplace. Global competition and revolu-
tion at work cause the changes in the educational system.
As a result, the students must acquire fundamental skills
on the use of computer technology (Oregon Department of
Education, 1993). Computer keyboard familiarity, the use
of a software package, and computer literacy are the essen-
tial requirements for computer accessibility and usage.
Within both academic life and at the workplace, in order to
support and maintain acceptable levels of productivity, it
has become a necessity that everyone understand the capaci-
ties as well as the limitations of this technology (Smalley
& Brady, 1984).

CD-ROM database search is a research tool. A lifetime
skill of research strategy prepares students to meet with
the present and future information age (Mendrinos, 1989).
To search periodicals and literature through paper indexes

is a less than universally popular method when information
retrieval processes can be completed more quickly and with
greater ease of access using a personal computer. Optical
disk, or CD-ROM (compact disc read-only memory) information
storage databases provide digitally-based records that is
read by a laser beam controlled through a CD-ROM driver.
CD-ROM databases are used to maintain information records
that are not subject to change. In addition to which the
driver-controlled laser beam is limited in the ability to
read and retrieve information from the CD-ROM database.
These types of databases are increasingly used nationwide
to provide a source of comprehensive bibliographic infor-
mation.

In recent years, the number of users, including under-
graduate students, performing CD-ROM database searches in
college and university libraries has been growing rapidly
(Barbuto & Cevallos, 1991, Kamala, 1991, Rholes &
Caldwell-Wood, 1987). Recent statistics at Oregon State
University (Corvallis, Oregon) indicate that 50.70% of all
CD-ROM database usage in Kerr Library was by undergraduate
students (Oregon State University, Kerr Library, 1990). It
has been reported that students who perform their own
bibliographical searches experience frequent access
problems (Kenny & Schroeder, 1992). Allen (1990) found
that most patrons of CD-ROM information services supported
the need to provide training in CD-ROM information retrie-
val techniques, a position which has been supported either

fully or in part by numerous other recent studies (Bostian & Robbins, 1990; Culbertson, 1992; Johnson & Rosen, 1990; Schmidmaier, 1991; Stewart & Olsen, 1988; Stricker, 1990).

A number of the CD-ROM bibliographical instructional techniques provided with the service include information on basic search strategies and the use of Boolean logical operators. The potential effects of the development of complementary methods of instruction in the uses and applications of CD-ROM technology, are dependent upon end-user understanding of computer systems, in relation to gender as well as other related factors. This area of practical instruction has become a source of concern and a prominent and general focus of research interest (Bostian & Robbins, 1990; Charles & Clark, 1990; Culbertson, 1992; Johnson & Rosen, 1990; Kenny & Schroeder, 1992; Maxymuk, 1991; Whitaker, 1990). The impact of those factors that affect understanding of the basic requirements for the conduct of effective CD-ROM database searches constitutes a specific research area in need of further investigation.

Problem Statement

Do native English-speaking undergraduate students learn CD-ROM database search skills more effectively through the use of conventional instruction method or by training confined to a written manual self-instructional method?

Research Objectives

The purposes of the present study were as follows:

1) To determine pretest and posttest mean score differences on a CD-ROM database competency test between subjects placed in conventional instruction and self-instruction groups;

2) To determine adjusted mean score differences on a CD-ROM database competency test between subjects placed in conventional instruction and self-instruction groups;

3) To determine adjusted mean score differences on a CD-ROM database competency test between male and female subjects; and

4) To determine the presence or absence of interaction effects for levels of training methods and for gender among subjects on a CD-ROM database competency test.

Based upon these research purposes, the major focus of the present study was to enhance understanding of the learning techniques required to facilitate successful end-user CD-ROM database searches.

Theoretical Framework of the Study

The theoretical framework of the present study was based upon implications drawn from the following arguments and/or research findings:

1) Research studies have demonstrated that instruction in the techniques of CD-ROM database searches should be a high priority instructional requirement at the college and university level.

2) CD-ROM vendors state that their software is simple, self-explanatory, and easily understood, and that little to no further training should be required.

3) Among CD-ROM databases, virtually no standardization exists with respect to search protocols and terminology, data format, truncation symbols, or system interfaces.

4) Methods of instruction which provide skills and tools that can be carried over from system to system have been highly recommended.

5) Formal classroom presentation training methods in the uses of computers have been preferred by female end-users.

6) A review of the literature has demonstrated that there are no CD-ROM database competency tests that are appropriate for the specific purposes of the present study.

7) CD-ROM database searches constitute applications of a new technology, and thus a need to investigate the effectiveness of training methods in relation to various learning factors exists.

Individual CD-ROM database searches have gained in popularity at college and university research levels. Comparative studies have been conducted upon the uses of print indexes, on-line databases and CD-ROM databases, various user interfaces, and various CD-ROM conceptual models. Though it has been suggested that end-users could successfully search CD-ROM databases after receiving formal database instruction, no specific investigations have been focused upon the comparative effects of formal training methods in relation to end-user learning factors such as training methods used and transfer of skills. Therefore, it would be useful to test whether formal instruction, aimed at the development of effective search and basic skills that can be transferred from system to system, can be used to increase CD-ROM database competency test scores.

Significance of the Study

The present study was directed at the determination of the influence of two training methods, as well as collective differences in learning among male and female undergraduate students, upon the ability to provide instruction in the techniques required to conduct effective CD-ROM database searches at Oregon State University (OSU). The objective of the study was to increase awareness of effective training methods among undergraduate students as well as among instructors. Barbuto and Cevallos (1991) had con-

cluded previously that formal training programs based upon
the most efficient methods of instruction would be required
to attain this objective. End-users can developed compe-
tency in database searches by effective designed training
methods (Stern, 1991). The results of the present study
substantiated the need to undertake further efforts to im-
prove the efficiency and quality of learning of CD-ROM
access instructional methods in higher education settings.

Study Assumptions

1) It was assumed that the CD-ROM database competen-
    cy test would provide a valid measure of student
    knowledge.

2) It was assumed that the subjects selected to take
    part in the study would participate to the full
    extent of their individual potential.

3) It was assumed that materials presented in teach-
    ing sessions would be taught in identical manner
    during each session.

Limitations of the Study

1) The study was limited to native English-speaking
    undergraduate students enrolled at Oregon State
    University, Corvallis, Oregon, during the
    academic year 1992-1993.

2)   The study was limited to instruction in the
      Wilsondisc and *SilverPlatter* databases search
      program discs.

3)   The study data were limited to those test items
      included on the CD-ROM database competency test.

4)   The study was limited to those classrooms at
      Oregon State University equipped with accessible
      computer terminals.

5)   The sample population considered for the study
      was limited to a group of volunteer student
      subjects.

Definition of Terms

The following terms are defined as they were used in
the present study:

CD-ROM: Compact disk read-only memory consisting of a
      laser-mastered 120 mm (4.72") polycarbonate disk
      capable of storing approximately 750 megabytes of
      information. The information may consist of
      interspersed audio, visual, or alphanumeric
      (textual) files.

CD-ROM database: CD-ROM which stores bibliographical
      information that can be read by a laser beam con-
      trolled by the CD-ROM driver.

CD-ROM database competency test: A test designed to
      measure the amount of knowledge and/or skill an

individual has acquired as a result of formal database instruction.

Conventional instruction group: A randomly selected group of subjects taught to perform database searches.

Database: Information (data) contained in a machine-readable format that can be searched by a computer (Lathrop, 1989).

End-User: A person accessing information in a data-base; the term is frequently used to refer to an untrained or self-trained searcher, as differen-tiated from professional searchers, information specialists, or librarians (Lathrop, 1989).

Learning: "The process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 38).

Native English-speaker: An individual whose mother tongue language is English.

Search strategy: Outline of a computer search, usually including terms to be used and statements to indicate the Boolean (logical) relationships among the terms.

Self-instruction group: A randomly selected group of subjects asked to use instructional manuals, user's guides, online help, or other help guides to perform database searches.

SilverPlatter: An individual database vendor program disc.

Wilsondisc: An individual database vendor program disc.

Summary

Effective training methods to instruct end-users in the efficient uses of CD-ROM databases should be investigated and determined. Research objectives were discussed and a four-part problem statement was presented. The significance of the study was analyzed, and the study assumptions and limitations were indicated. Finally, the terms specific to this investigation were defined.

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

This chapter reviews the literature, related to the uses of CD-ROM, in six sections: CD-ROM databases, CD-ROM and online databases, database searches and training methods, suggestions for end-user training, gender differences, and Delphi method. The methodologies of conducting effective CD-ROM database searches constitutes a new field of study. In 1984, CD-ROM technology was introduced and by 1987 it had gained rapid acceptance in most academic libraries, including Kerr Library at Oregon State University (Corvallis, Oregon).

CD-ROM Databases

Many courses offered at the university instructional level require the performance of library exercises and research. Recently developed systems of information technology have included CD-ROM database systems, claimed by the vendors responsible for their development to be user-friendly and easily learned by self-instructional means (Kenny & Schroeder, 1992). CD-ROM discs are composed of

thin sheets of heat-sensitive plastic used to store digi-
tally-coded information, and are extremely durable. CD-ROM
discs thus provide an efficient media for the storage of
retrievable information.

At the minimum, each CD-ROM disc is capable of storing
the equivalent of 1,200 floppy disks, 250 large reference
books, 2,400 full screen photographs (Phillipo, 1989) or
680 MB of storage capacity. CD-ROM databases contain three
types of information, including full-text, bibliographic,
and directory or numeric information (Berger, 1989), and
require less time to search than print indexes (Ley, 1989).
This CD-ROM database system can thus provide time savings,
is generally less expensive to use than online databases,
and allow performances of searches with multiple keywords,
authors, or other qualifiers (Berger, 1989; Stewart &
Olsen, 1988). In contrast, searches of print indexes are
confined to single a concept or author searches, similar in
nature to the "browse" mode, one of the three modes offered
by the *Wilsondisc* databases (Kern, 1990). The Wilson
company, a large producer of CD-ROMs, has summarized the
advantages of CD-ROM searches as follows (Miller & Loeding,
1989, pp. 24-25):

   1)   Convenience of printing out citations on a
        printer, if available. Printing references
        eliminates the problem of incomplete or incorrect
        citations manually copied from sources. The
        ability to print out citations directly from the
        disc is significant . . . .

   2)   Cumulative data. Because of the tremendous
        storage capacity of the laser disc, it is possi-

ble to scan several years of data from the same or related databases, simultaneously.

3) Flexibility of access. Laser discs provide numerous access points and the ability to combine terms, unlike the linear mode of searching print materials.

4) Sorting of citations. The most recent citations are displayed first in most systems.

5) More data provided for many CD-ROM products. Early CD-ROM case studies indicate that users want more data to be included on discs. *WILSONDISC* supplies the unabbreviated source name and lists all subject headings assigned to each citation, providing other suggested topics for research . . . .

6) Currency of information. Some discs provide more recent citations than printed sources. Discs are generally issued monthly, quarterly, semi-annually, or annually.

7) Less storage space required. The shelf space required to store CD-ROM data is greatly diminished.

8). Disabled accessibility. Users with physical disabilities find information retrieval more user-friendly than with a microcomputer.

However, CD-ROM electronic databases have not been standardized, and databases produced by different vendors utilize different search software and operating command systems (Blumenthal, Howard, & Kinyon 1993; Nickerson, 1991). This lack of uniformity is one reason why instructional technology has failed to keep pace with other advantages of these systems (Gayeski, 1989).

Nonetheless, the conduct of research has been facilitated by the utilization of CD-ROM database searches of the literature of a given field (Berger, 1989). Increasing numbers of instructors assign students to CD-ROM database

searches. Electronic database searchers use abstract con-
ceptualization (Bodi, 1990), critical thinking (Blumenthal
et al., 1993; Nash & Wilson, 1991), and problem solving
(Huston, 1989) during the conduct of searches. Each of
these approaches is influenced by individual characteris-
tics (Kamala, 1991; Sein, 1988). To acquire search
strategies, students engage in abstract conceptualization
by thinking through their topics and choosing the most
appropriate resources and keywords (Bodi, 1990). Using
computer technology effectively requires the application of
critical thinking to process selectively the overwhelming
amount of information that exists in each database. As
software changes, and as it will hopefully continue to be
improved, it is necessary to choose appropriate informa-
tion.

Nash and Wilson (1991) determined that critical ana-
lyses of the results of database searches was a major pro-
blem for undergraduate students, demonstrating that
students need to be taught to apply critical thinking
skills to their information sources. CD-ROM indexes are
not only a graphical illustration of this point, they also
provide an excellent opportunity for teaching these skills.

Huston (1989), from more than 10 years of observation
of users' computer-based search techniques by librarian
researchers, reported consistent findings that most users
lacked the contextual understanding necessary to
effectively conduct online problem-solving. Further

research results have shown that college students at the
University of Wisconsin (Eau Claire) could be successfully
introduced to critical thinking processes for learning
methods of bibliographic instruction (Engeldinger, 1988).
Sein (1988), in a study of individual differences related
to learning computer systems among novice users, found that
high-visual subjects performed better than did low-visual
subjects.

Previous experience with microcomputers may not be a
necessary prerequisite for individual success with CD-ROM
searches. A study by Stewart and Olsen (1988) provided the
qualified evidence that end-users with at least some micro-
computer background could use CD-ROM databases to advantage
so long as the search software was comparable in user-
friendliness to that produced by *SilverPlatter*. However,
Siitonen (1985) had previously demonstrated that computer
experience could not be correlated with search results.
Thus, to meet their informational needs, students will be
required to make critical choices when using CD-ROM data-
bases and other electronic indices. Learning this tech-
nique will not only lead students to relevant information,
it will also raise their consciousness about the need to
select and evaluate during the process of critically
acquiring useful information on any given topic. (Nash &
Wilson, 1991).

CD-ROM and Online Databases

Online information retrieval has been available since the late 1960s (Johnson & Rosen, 1990; Miller & Loeding, 1989). Online database search techniques are not easily learned, and are frequently performed by such intermediaries as trained librarians. Staffing considerations alone provide justification of the need to train end-users to directly perform online searches with minimum assistance, training which must be specialized in view of the complexity of most of the software used for online searches (Paulk, 1986). At Drexel University, Wozny (1988) observed that freshman college students trained to complete online database searches had difficulty designing appropriate search strategies. Armstrong (1991) noted that though the basic commands were easily learned, training in database content and search structures would be required to obtain successful search results. For online database searches, end-users face time pressures since they must pay for connection to the system. Thus, by 1984, CD-ROM technology had been introduced to specifically facilitate economical end-user database searches.

One result of this transformation has been that online database traffic has decreased by more than two-thirds since the introduction of CD-ROM technology, and the most heavily searched databases have become available on CD-ROM (Barbuto & Cevallos, 1991). CD-ROM database search systems

were initiated at Oregon State University (OSU) starting in 1987, and the number of searches has since grown by at least 20% per year (Donel and Holbo, 1993). At OSU, *Wilsondisc* and *SilverPlatter* are the two principal CD-ROM resource, covering various subjects used by faculty, staff and students. Other CD-ROM databases in frequent use include *Agricola*, *Applied Science and Technology Index*, the *Biological and Agricultural Index*, the *Business Periodical Index*, ERIC, *General Science Index*, *Medline*, and the *Social Science Index* (OSU, Kerr Library, 1992).

Database Searches and Training Methods

The growth in the use of CD-ROM database search techniques is apparent, and the importance of effective training methods for the use of these techniques has been recognized (Huston, 1989; Jewell, 1989). For efficient use of these systems, database searchers must be familiar with the structure of CD-ROM systems since each database is different. (Ankeny, 1989; Armstrong, 1991; Blumenthal et al., 1993; Charles & Clark, 1990; Johnson & Rosen, 1990; Rholes & Caldwell-Wood, 1987). Culberton (1992) concluded that instruction in CD-ROM database search techniques should be given a high priority to enable end-users utilization of the full potential of CD-ROM technology.

Various training methods, including comparison of the differences among user interfaces (e.g., menu-driven or

command-driven) have been reported, as well as consider-ations of the use of computer-assisted instruction (CAI), traditional classroom set-ups (David, 1989; Puttapithak-porn, 1990; Reddy, 1988, and provided instruction at the point of use (Potter, 1992). Research reports have also been issued which cover training methods according to con-ceptual models (e.g., abstract or analogical models), as well as training specific to the use of print indexes, online, and CD-ROM database indexes and resources (Bostrom, Olfman, & Sein, 1988; Kern, 1990; Montgomery, 1987; Sein, 1988, 1989).

In a report by Reddy (1988), "Search strategy skills: A two-method comparison of teaching CD-ROM bibliographic searching techniques," the effects of CAI and traditional lecture training methods in CD-ROM online bibliographic search skills between two groups of ninth grade students was considered, utilizing *The Reader's Guide to Periodical Literature*. Reddy's methodology was based upon search strategies design in which the topics were narrowed and de-fined, following which the subjects were asked to identify key concepts, find synonyms and terms related to each con-cept, and then to group like concepts, form sets, apply logical connectors (Boolean), and to conduct the search.

The CAI group learned the *Online Retrieval I, II* and the *Reader's Guide Level II* using the *Combase* software package. The lecture group was instructed using transparencies and a transcript identical to the computer

screens and scripts viewed by the CAI group. Reddy (1988) found that the students were able to master the online technology and terminology regardless of the instructional method; however, all students required further instruction in Boolean logic and cross-references.

Stewart and Olsen (1988) compared training methods among four groups, including instruction versus non-instruction, for learning to use a CD-ROM database and a print index. The training contents included vocabulary control, logical operators (Boolean) and thesaurus descriptors. The CD-ROM instructed group received a 50-minute instructional session, while the print indexes instructed group was given a 30-minute instructional session. Both non-instructional groups were given an instruction sheet explaining the assignment and they were advised to consult the search manuals. Results indicated that the two instructed groups scored higher than the two non-instructed groups. Moreover, the CD-ROM instructed group had greater success finding relevant articles than the CD-ROM non-instructed group, and the print index instruction group did slightly better than the print index non-instruction group. It was speculated that the Hawthorne effect may have contributed to improvement of the instructed groups.

In contrast to other studies, Kern (1990), compared the browse mode between a CD-ROM database and a print index, and concluded that the *Readers' Guide* database was easy to use and required little training for high school

sophomore students. Kern employed two training methods using a print index and CD-ROM database version of *Readers' Guide* to train high school students. The software was set up to be used only in the "Browse" mode, corresponding to traditional subject searches in print indexes. It was found that the database search group retrieved more articles than did the print index group. It was noted that the evaluation was based on the number of relevant articles found and was further limited only to the browse mode. It was concluded that with a minimum of training and access to a monitor capable of providing help, high school students could confidently utilize a user-friendly database. However, Barlow, Karnes, and Marchionini (1987) found that though students with minimal training were successful in browse mode searching, they continued to experience difficulty with a free-text search mode and the use of Boolean logical operators.

A number of studies have reported a common set of problems end-users encounter with CD-ROM databases. These problems were associated with the database contents, search structure, the use of logical operators, vocabulary control, development of search strategies, the use of thesauri, truncation, the limiting of fields to search, and failure to differentiate between keywords and subject descriptors (Allen, 1990; Barbuto & Cevallos, 1991; Blumenthal et al., 1993; Culberton, 1992; Sichel, 1991; Silvia & Kilman, 1991). According to Johnson and Rosen

(1990), CD-ROM end-users need to be advised about database content and structure, as well as appropriate search strategies for specific databases. It has also been demonstrated that full knowledge of the contents of a database contributes to the success and credibility of a searcher (Weston & Lauderdale, 1988). Huston (1989) noted that in library experiments with various instructional approaches over a 10-year period, end-users required training in basic searching concepts.

Blumenthal et al. (1993) discussed the impact of CD-ROM technology on a bibliographic instruction program and concluded that to use a database fully, users needed to understand Boolean logic, the appropriate use of connectors, the importance of thesauri for accessing information, the value of truncation symbols, and the ability to break down topics into the most concise statements possible to identify the main search concepts. Charles and Clark (1990) observed 26 graduate, 16 undergraduate, and 3 university or community staff users at the Texas A & M Evans Library who used the *SilverPlatter Agricola* database with both CD-ROM and an online system. They determined that the majority of the participants did not understand basic search concepts, including selection of search terms, use of Boolean operators, truncation, and the limitation of fields. They commented that the end-users were impressed by the speed of the system and the large number of cita-

tions, but that little attention was given to the quality of the search results.

Salomon (1988) surveyed reference librarians to determine the impact of CD-ROM on their departments. Respondents indicated that, although users had some difficulty with search strategies and Boolean logic, CD-ROM systems were eagerly accepted by library patrons. Culbertson (1992) found that less than 20% of the participants of his study used special feature commands or segment searches and that only slightly more that half used Boolean connectors, the basic building blocks of database searches. CD-ROM end-users were usually able to obtain results and print records, but few used more sophisticated techniques to refine their searches. Culbertson stated that most of the searchers observed seemed to be unwilling or unable to progress beyond basic search levels. It was tentatively concluded that instruction should be a high priority for any library unit offering CD-ROM database searches, and that it cannot be assumed that patrons successfully use bibliographic CD-ROM databases after only a few minutes of introductory instruction. Culbertson recommended that further research was required to find effective instruction techniques that would enable end-users to utilize the full potential of CD-ROM searches.

Observations by Barbuto and Cevallos (1991), revealed that students did not understand the difference between keyword and descriptor concepts, and tended toward to use

the former more than the latter. Training sessions indicated that users were often totally unfamiliar with the purpose and content of print versions of indexes or abstracts searched through CD-ROM. These findings implied that heavy emphasis in training sessions on the use of the thesaurus may have been out of proportion to its importance to the end-users.

Maxymuk (1991) stated that CD-ROM database software is underutilized, that end-users needed instruction on the formation of search strategies, the limitation of searches, and in knowledge basic to database searches. Because CD-ROM databases are so simple to operate and the software is not fully utilized, professional observers often become frustrated when users do not employ the full capability of the software. Thus, at Temple University, researchers developed training programs oriented to the point of view of users, based upon two levels of instruction offered to either inexperienced or experienced users.

Silvia and Killman (1991) stated that the CD-ROM databases were popular at the St. Mary's Academic Library, but that end-users had difficulty structuring search strategies, understanding Boolean logical concepts, and employing the appropriate keywords or terminology. They stated that end-users were received a vast amount of how to retrieve information instead of given a conceptual strategy. One-on-one instruction, CD-ROM workshop instruction, and the use of print indexes as an instructional aid were the

methods of CD-ROM end-user training proposed as solutions to these problems.

Reese (1988) compared manual indices for the *Reader's Guide*) and a CD-ROM *InfoTrac II* database to determine which provided the most favorable information access. Results reflected a 83% success rate for manual index searches and a 63% success rate for *InfoTrac II* searches. It was concluded that information experiments should be conducted to determine how individuals used CD-ROM retrieval systems, who made the best use of them, and how these systems could be improved. Kenny and Schroeder (1992) noted that CD-ROM vendors promoted their CD-ROM database software as user-friendly, self-instructional systems that required little on-site assistance for use, conducting frequent surveys on the state of user satisfaction. However, whereas Nash and Wilson (1991) found that students indicated satisfaction with their searches, more than one-third of those considered in their study retrieved relatively useless or inappropriate citations.

Rholes and Caldwell-Wood (1987) studied the effectiveness of two types of training using the ERIC *SilverPlatter* system: one-hour training sessions and self-instruction sessions based upon the use of four pages of instruction. The results showed that the survey respondents (85%) successfully completed their searches. However, 56 % of the respondents reported experiencing problems, 30% had difficulty in the appropriate use of subject terms, and 22%

found difficulty in the operating steps (or what to do next). Other studies have indicated that the most popular training methods consisted of a short session or a day-long session (Armstrong, 1991; Gaul, 1986). Large amounts of information presented in only short periods of time is believed to create new problems for novice end-users. Several studies have shown that end-users search more effectively when given some degree of formal instruction (Culbertson, 1992; Haines, 1982; Stewart & Olsen, 1988). Lessons confined to an introduction to database search techniques has been found to be insufficient for both inexperienced and experienced end-users (Kenny & Schroeder, 1992).

Montgomery (1987) studied the training of end-user searchers, based upon the use and perceived benefits of online and non-online information resources. The purpose of the study was to investigate methods of training scientists and technologists to conduct their own online bibliographic searches. Nine months following either a one-day or a two-hour seminar, nonsearchers gave such reasons as forgetting what they had learned, too much time required to relearn search techniques, and a lack of practice opportunity for their failures to conduct their own searches.

Gayeski (1989) discussed the lack of uniformity among systems as well as the competing and mutually incompatible standards used by CD-ROM vendors. As systems were developed, it was common for a number of incompatible for-

mats to emerge, each produced by manufacturers who adver-
tised their products as being user-friendly. Lack of
standardization for CD-ROM systems means that a single
manual cannot be used by an institution for all databases
(Jaros, 1990). Jewell (1989) reported that at the Univer-
sity of Washington, the librarian experienced difficulty in
providing effective end-users training due to differences
in interface designs and various system. Charles and Clark
(1990) concluded that CD-ROM systems were not as easy to
use as they were proclaimed to be. End-users experienced
difficulty switching between two separate systems because
they lack the theoretical framework necessary to effect
necessary transitions. Silvia and Killman (1991) stated
that transferability of concepts is essential when libra-
ries own many different types of CD-ROM products.

The increased use of CD-ROM reference services has
meant that library staff have found it necessary to develop
a variety of teaching methods to train end-users to
initiate the different types of CD-ROM searches. The
components of poor searches that were noted several years
ago with the introduction of end-user searches using online
systems, were still present with the availability of disc-
based search techniques (Jaros, 1990). Litchfield (1990)
has observed that there is reason for vendors to promote
the user-friendly nature of their databases, since the
alternative is to provide basic level training to customers
at relatively high costs. The vendors provided training

only to trainers, and then left the responsibility to the
library staffs as well as to end-users. In addition,
Jewell (1989) stated that many end-users had difficulty in
using vendor support materials and brief manuals. Users of
the *Newsbank Electronic Index* have complained of the inade-
quacies of both user's manuals and help screens, factors
which can only lead to unsuccessful searches (Compton,
1991). These findings stand in contradistinction to those
of Keefe (1990), who has observed that the organization of
learning environments, the instructional methods in use,
and interactions between teachers and students all in-
fluence the course of human learning.

Suggestions for End-User Training

Instruction that facilitates end-user self-service
searching is an emerging trend, based upon the provision of
effective instruction by information professionals (Charles
& Clark, 1990). Whether end-users are able to structure
successful searches, or whether they are satisfied with the
search results, are questions frequently in many researches
since it has been determined that end-users need instruc-
tion in the formulation of search strategies and techniques
(Clever & Dillard, 1991).

Some of the training techniques suggested by previous-
ly completed studies include: Instruction in the selection
of a database, assistance in the determination of search

structures, and instruction in the use of Boolean logical operators, the use of keywords, truncation, and the limitation of fields (Barbuto & Cevellos, 1991; Eisenberg, Trombly, & Ruth, 1990; Jaros, 1990; Reddy, 1988; Silvia & Killman, 1991; Weston & Lauderdale, 1988); training conducted in classroom setting environments (Jaros, 1990; Gaul, 1986); hands-on training methods (Barbuto & Cevellos, 1991; Stern, 1991); and long-duration training (Gaul, 1986). Reddy (1988) recommended that the provision of hands-on experience with concept instruction would produce higher percentage success rates for the utilization of CD-ROM databases.

In the future, students should be taught how to retrieve information from multiple databases and how to transfer learned searching skills from one system to another (Blumenthal et al., 1991; Stewart & Olsen, 1988; Whitaker, 1990).

Gender Differences

That learning differences exist between genders has been established by a number of related studies (Allen, 1990; Belanger & Hoffman, 1990; Eastman, 1991). Kamala (1991) noted that such novice end-user characteristics as gender differences are taken into account in relation to CD-ROM database searches. According to Eastman, educational research has shown gender differences in atti-

tudes and time spent with computers; females were not ex-
pected to like computers and spent less time with them than
did their male counter parts.

According to Nye (1991), the existence of gender-
related learning differences with respect to computers
deserves increased recognition. Kinvig (1987) stated that
gender differences in learning styles included such factors
as female preference for concrete experience and male
preferences for abstract conceptualization. In addition,
Kinvig found that teacher-centered and individualistic were
the male primary learning characteristics, whereas personal
and interactive were the most favored female learning
characteristics among undergraduate students. Allen (1990)
subsequently found that females indicated a greater
preference for formal training in CD-ROM search procedures
than did males.

Nye (1991) reviewed the literature on gender differ-
ences in learning, and curriculum and classroom designs in
relation to computer software. He stated that many educa-
tors did not recognize the differences between males and
females in learning styles that affect how students respond
to computers. For example, Gilligan (Nye, 1991) had stated
that males perceive relationships from a hierarchic per-
spective, whereas females perceived the webbed nature of
relationships. Understanding the relationship between
learning styles and gender, as well as the reasons underly-
ing the perceived differences between genders, perhaps

helps to explain student behaviors when computers are approached for the first time. It would be preferable for educators to seek the means to redress or balance the perceived inequalities, rather than to perpetuate them. Belanger and Hoffman (1990) found there was a correlation between female levels of familiarity with computers and the frequency of use of the ERIC CD-ROM database by females.

In a study conducted by Reddy (1988), 68% of the female subjects were reluctant to use computers and required assistance to conduct database searches. It was stated that the reason for failing to find significant differences between the two training methods compared could have been related to the fact that more female than male subjects participated in the study. It was thus suggested that further research would be required to determine if male or female subjects were capable of mastering higher levels of search strategy skills when learning to search CD-ROM databases.

From the literature, it is obvious that few studies have focused on gender differences in relation to the use of computer systems, especially computer-based CD-ROM databases. This situation exists despite evidence of a more general nature which indicates that males and females do not learn best using the same methods. However, a number of factors have changed since these types of studies were first initiated, and more women are presently involved in the uses of computer technology. Therefore, the present

study is based upon the assumption that the ways in which females are trained to become familiar with new CD-ROM technologies is subject to improvement.

Delphi Method

Insofar as the literature demonstrates that there is no single CD-ROM database competency test which may be considered appropriate for the specific purposes of the present study, the Delphi technique was utilized to measure content-related evidence of the validity of the instrument developed for the study (Chapter 3). The Delphi technique can be described as a method for structuring group communication processes that effectively allows groups of individuals to deal with complex problems (Linstone & Turoff, 1975). It was originated at the Rand Corporation in the late 1940s as a systematic approach to the elicitation of expert opinions on various topics (Sackman, 1974), and was popularized for use in business, industry, and education by Helmer (1966) and others by the 1960s. Part of the appeal of the Delphi method resides in the presumed superiority of group rather than individual opinions (Martino, 1972).

Though the Delphi method was originally intended to be used as a forecasting tool, its more promising educational applications have been developed in the following areas: 1) as a method for studying the process of thinking about the future, 2) as a pedagogical tool which forces people to

think about the future in a more complex manners than they would as individuals, and 3) as a planning tool used to aid in probing priorities held by members and constituencies of an organization (Weaver, 1971). The many advantages of this method, including its simplicity and directness, ease of administration, minimal application time requirements, and low cost, make it particularly well-suited to educational research.

Usually one or more of the following properties of the application leads to the need to employ a Delphi method (Samahito, 1984):

1) The problem does not lend itself to precise analytical techniques, but can benefit from subjective judgments on a collective basis.

2) The individuals needed to contribute to the examination of a broad or complex problem have no history of adequate communication, and may represent diverse backgrounds with respect to experience or expertise.

3. The opinions of greater numbers of individuals who can effectively interact in face-to-face exchanges are needed.

4. Time costs make frequent group meetings infeasible.

5. The efficiency of face-to-face meetings can be increased by a supplemental group communication process.

6. Disagreements among individuals are so severe or politically unpalatable that the communication process must be referred and/or anonymity assured.

7. The heterogeneity of the participants must be preserved to assure the validity of the results (e.g., avoidance of domination by quantity or by strength of personality).

A conventional "Delphi exercise" was employed for the present study. A paper-and-pencil questionnaire consisting of a series of items was developed, based upon the matching of items and objectives. This questionnaire was submitted to a Delphi panel established for the purpose of validation of the questionnaire as the study instrument. The three critical conditions required for application of a success-ful Delphi method were present (Delbecq, Van DeVen, & Gustafson, 1975):

1) Adequate time. Delphi should not be used when time is limited. Most Delphi studies take more than a month to implement. As a standard, the minimal required time for a Delphi process is about 45 days.

2. Participants skilled in written communications. Delphi should not be used with groups that have difficulty reading or in expressing themselves in written communications.

3. High participant motivation. Like all other
    group processes, the quality of responses is in-
    fluenced by the interest and commitment of the
    participants. Delphi requires especially high
    participant motivation, since other individuals
    are not present to stimulate and maintain motiva-
    tion.

Summary

It has been determined that the development of effec-
tive techniques to search CD-ROM databases has mandated the
improvement of end-user training procedures, particularly
as concerns instruction in the development of basic search
strategies. This problem has become extended and increas-
ingly serious as the number of vendors of CD-ROM databases
has increased, while at the same time no single CD-ROM
database system has gained acceptance as an industrial
standard. Thus, institutions are unable to develop single
manuals which could be usefully applied to multiple data-
bases in use as educational tools. The existence of these
conditions in research institutions mandates the develop-
ment of improved educational tools and training methods.
Previously completed research studies provide a body of
knowledge upon which teachers and educators may draw for
information on CD-ROM database end-user searching tech-
niques and practices. Therefore, providing students with

the best education and effective instruction are respon-
sibilities incumbent upon teachers, educators, and
reference librarians.

Several questions remain to be answered in future
research: Will end-users be able to effect transitions
from one CD-ROM based system to another? How do males and
females react to proposed learning situations? What will
be the structure and nature of effective training methods?

CHAPTER 3

METHODOLOGY AND DATA COLLECTION

Introduction

This study was an experimental investigation of appropriate methods for instructing students in the use of CD-ROM database search techniques. Research questions focused on training methods and the gender of college students at Oregon State University (Corvallis, Oregon) with respect to the use of the *WilsonDisc* and *SilverPlatter* CD-ROM databases.

Selection of Subjects

Native English-speaking undergraduate students enrolled in various classes at Oregon State University (OSU) were asked to participate in this study. To establish a subject pool, the researcher contacted the instructors of high enrollment classes such as the introduction to business computer systems, computers applications and implications, geography, engineering, pharmacy, public health, and writing. In addition, notices concerning the research project were posted in Kerr Library, the chairs of various departments of the College of Liberal Arts, the College of

Health and Human Performance, and the College of Agricul-
tural Science were contacted, and the advertising was
placed in the OSU campus newspaper.

To directly recruit subjects for the study, 10-minutes
of class time were spent in each participating classroom to
promote the study. Native English-speaking students with
no background in CD-ROM database formal instruction were
encouraged to agree to participate in the study. At the
end of each classroom presentation, the researcher met with
the instructor to obtain a list of the students who wished
to participate. A total of 87 students, each of whom was
subsequently contacted for purposes of scheduling, agreed
to participate in the study. Scheduling conflicts caused
several participants to drop out of the study before the
pretest. Of the 51 students volunteers who remained on the
list, four were determined not to be qualified for partici-
pation on the basis of experience of previous database
search training. The resultant sample of 47 subjects was
then randomly divided into two sections, consisting of 23
subjects who received conventional instruction and 24
subjects who received only self-instruction in the use of
CD-ROM databases.

Following the administration of pretest procedures,
four students failed to appear for the first-week assign-
ments, five did not appear for the second-week assignments,
and one subject telephoned to withdraw from the study. Of
the total of 37 volunteer subjects who completed the study,

22 of the subjects were assigned to the conventional in-
struction group and 15 subjects were assigned to the self-
instruction group.

Instruments and Supportive Resources

Instruments and supportive resources used in the
conduct of the present study are as follows:

1)   CD-ROM Database Competency Test (Appendix A):   A

competency test developed by the researcher to

measure the effectiveness of subject knowledge

with respect to training methods.   The test con-

sisted of 16 multiple choice questions, for which

subjects were asked to select the single best

answers.   The CD-ROM database competency test was

constructed based upon experience derived by the

researcher during five years as a CD-ROM consul-

tant at Kerr Library, OSU.   Following initial

test design, the instrument was analyzed and

critiqued by a recognized CD-ROM expert.

However, analysis by a single expert in the field

was not considered to be sufficient evidence of

the validity of the test content.   Therefore,

content-related evidence of validity was estab-

lished through the application of the Delphi method.

2) A demographic questionnaire (Appendix B) was utilized to gather supportive information from the subjects.

3) CD-ROM database search instruction (Appendix C) provided the instructional plan which was given to the subjects.

4) CD-ROM databases *Wilsondisc* and *SilverPlatter* were selected for the study based on the frequent usage by the students at Oregon State University (each briefly described in Appendix D).

5) Subject evaluations, the purpose of which was to allow the subjects to express individual opinions about the validity and usefulness of the training process (Appendix E).

Training instructions were designed to teach the basic concepts of searching skills and database content, as suggested by Johnson and Rosen (1990) and Huston (1989). Weston and Lauderdale (1988) have stated that database content instruction for specific search areas will provide a contribution to the success of end-users. In addition, teaching transfer skills involves instruction in general skills that can be applied to any system, encompassing an introduction to the basic concepts of database structure, Boolean logic, field searches, truncation, the use of function keys, and uses of the help screens and help guides.

Teaching database concepts involved description of information contained within a database, enabling end-users to understand what could be retrieved and how retrieval could be accomplished. Awareness of how citations or records were arranged helped end-users understand how to retrieve records. A strategy worksheet was given to each end-user subject to assist in the organization of topics of concern.

Instrumental Validation

Five librarians, each an expert in CD-ROM electronic information retrieval systems, were requested to participate on the Delphi panel. Three of the selected experts were from Oregon State University, one was from the University of Oregon, and the final participant was from Western Oregon State College.

At the beginning of the test construction procedure, test items were developed under the supervision of a CD-ROM specialist. The Delphi members were then asked to provide comments upon the validity of the question developed. Each Delphi panelist received a package of materials which included summaries of the objectives and lesson plans for instruction and a copy of the proposed CD-ROM database competency test. For the first round, the panelists were asked to check whether each of 16 test items was representative of the study objectives. The panelists indicated

whether they believed each test item should be retained, rejected, or revised. If panelists chose to revise an item, they were asked to provide specific revision instructions. Following the first Delphi round, a revised edition of the CD-ROM database competency test was circulated among the panel members for appropriate comment and analysis. The results of the first round responses included the retention and revision of several of the 16 question items. Panel members reached consensus after the second round. The 16 question CD-ROM database competency test was shown in appendix A.

Research Hypotheses

The present study investigated responses to the following research questions:

1) There are significant posttest mean scores higher than the pretest mean scores on a CD-ROM database competency test.

2) There are significant adjusted mean score differences on a CD-ROM competency test between subjects placed in a conventional instruction group and subjects taught by self-instructional methods.

3) There are significant adjusted mean score differences on a CD-ROM database competency test between male subjects and female subjects.

3) There are significant adjusted mean score differences on a CD-ROM database competency test between male subjects and female subjects.

4) There are significant interaction for adjusted mean scores on a CD-ROM competency test between levels of training methods and gender.

Based upon utilization of the .05 level of significance, the null hypotheses used to test hypotheses 1 through 4 were expressed as follows:

HO_1: $\mu_{Pretest} = \mu_{Post-test}$

HO_2: $\mu_{Instruct} = \mu_{Self-Instruct}$

HO_3: $\mu_{Male} = \mu_{Female}$ and

HO_4: $\mu_{Instruct \times Male \times Female} = \mu_{Self-Inst \times Male \times Female}$

Research Design and Data Analysis

The design applied to the data in this study consisted of an experimental pretest-posttest control group testing process. An analysis of covariance (ANCOVA) procedure was utilized to evaluate responses to the null hypotheses HO_2, HO_3, and HO_4. Hypothesis HO_1 was analyzed using the t-test statistical procedure.

The results of the data analysis were used to determine the impact of those factors which affected changes in the mean scores for subjects' comprehension of the techniques of CD-ROM database searches in relation to gender. These results were compared to parallel results for the two

The experimental units were considered to be homogeneous, the numbers of units were small, and the treatments were assigned at random to units within blocks wherein each treatment was administered once to each block. This design constituted a logical approach (Petersen, 1985). The design consisted of two levels of training (conventional instruction and self-instruction) and two genders (female and male). The ANCOVA statistical tool was used since it provides for adjusted posttest determination of mean scores, reducing the effect of differences that existed between or among subject groups. The assumptions necessary for the use of the ANCOVA are as follows (Courtney, 1986):

1) Within each distribution, the values of both the dependent variable and the independent variables are normally distributed.

2) In the assignment of individuals to groups, sampling should be random.

3) The regression line depicting the data is linear and the regression slope for the dependent variable on the independent variable is equal for all treatment groups.

4) There is a rational need to adjust post-measure means using covariance as the statistic tool.

From Cohen (1988), for a power of .80 and an effect size of .40 at an alpha level of .05, it was suggested that a minimum of 17 subjects would be required for each training method (conventional instruction/self-instruction) x

gender (female/male) cell. The experimental design displaying the sampling arrangement is illustrated in Table 1:

Table 1. Sampling Matrix.			
	Gender		
Method	Male	Female	$\Sigma\Sigma$ =
Instruction	9	13	22
Self-Instruction	8	7	15
$\Sigma\Sigma$ =	17	20	37

The dependent variable was the adjusted CD-ROM database competency posttest score, where N=13 was the cell size, $1 - \beta$ = .80, and α = .40 (Cohen, 1988). The mathematics model, based upon a two-way fixed design for ANCOVA, was:

$$Y_{ij} = \mu + \alpha_i + \beta_j + \alpha\beta_{ij} + \alpha(X_{ij} - \overline{X}) + \epsilon_{ij} ,$$

where μ was an unknown constant,

α_1 was the differential effect associated with the instructional method,

β_i was the differential effect associated with gender,

$\alpha\beta_{ij}$ was associated with the interaction effect,

$\alpha(X_{ij} - \overline{X})$ was the adjustment of the posttest measure

and,

ϵ_{ij} was the residual effect, assumed to be

independently and normally distributed with

a mean of zero and a variance of σ^2.

The t-test was utilized to analyze differences between pretest and posttest scores for the CD-ROM Database Competency Test. In summary, the study was conducted administering a CD-ROM database competency pretest and posttest, a two-way fixed design ANCOVA, and a true experimental design. As suggested by Campbell and Stanley (1966), randomized subject selection was used to maintain group equivalency. The pretest-posttest control group design is based upon

$$R \; O_1 \; X \; O_2$$

$$R \; O_1 \; X \; O^2$$

where R indicates the random assignment of the subjects into two groups, experimental and control, X indicates the treatment, conventional instruction and self-instruction, and O_1 indicates the pretest and O_2 is the posttest analysis. The variables for the study were as follows:

    1)   Independent Variables:

        a)   Training method: two levels, conventional instruction and self-instruction; and

        b)   Gender: two levels (female and male);

    2)   Dependent Variable: CD-Rom Database Competency adjusted posttest score; and

    3)   Control Variables:

a) Instructional databases: *Wilsondisc* and
    SilverPlatter);

b) Experience with the microcomputer for data-
    base search strategies based upon novice or
    inexperience user status; and

c) Motivation to participate (all subjects were
    volunteers).

Data Collection Procedures

Data were collected during winter term, 1993, using
selected classes of OSU undergraduate students. Students
were asked to indicate voluntary participation in the study
by signing a consent form and by completing a demographic
questionnaire. Students who had no formal instruction or
training in CD-ROM database searches, or who may have used
databases other than *Wilsondisc* or *SilverPlatter*, were
selected and randomly assigned as subjects to either a con-
ventional instruction or self-instruction group. Each
group contained native English-speaking male and female
subjects.

All selected participants were pretested using the CD-
ROM Database Competency Test (Appendix A) to measure indi-
vidual knowledge with respect to performance of CD-ROM
database searches. Prior to training, an introduction to
the CD system and to the Kerr Library CD Center was given
to all selected participants. The subjects were taught how

to operate CD-ROM databases using a personal computer, based upon either a conventional training or self-instruction treatments. The total time required to conduct the experiment was six weeks, including an initial meeting during the first week, an instruction training period of four weeks, and a post-training meeting held during the sixth week. During the post-training meeting, all subjects in both the conventional instruction and self-instruction groups were posttested using the CD-ROM Competency Test. Subjects were then asked to complete subject evaluation forms.

Conventional Instruction Training

Conventional instruction training covered four lessons on the *Wilsondisc* indexes and three lessons on the *Silver-Platter* databases. Students selected class sessions that met with individual scheduling time requirements. Subjects were instructed for one hour twice each week for four weeks. Subjects were then asked to complete a series of tasks and assignments for each lesson. Time lines and content outlines are shown in Appendix F. All assignments were corrected by the researcher.

Self-Instruction Training

Subjects assigned to the self-instruction group were expected to use the vendors' printed manuals, In-House CD user's guides, and the key templates provided with each

database to learn how to perform CD-ROM database searches at their own pace. They were asked to complete assignments twice each week that were identical to those assigned to the conventional instruction group. Subjects were allowed to use only online help resources and the help guides provided at the CD center, Kerr Library (OSU). The researcher assisted subjects only with the use of the function keys and did not provide assistance with the development of search strategies. Subjects performed CD-ROM database searches and assignments at their own convenience within a time frame of approximately four weeks.

Summary

The present study consisted of a true experimental pretest-posttest control group design. The Delphi method was utilized to validate content-related evidence of validity for the CD-ROM Database Competency Test. Thirty-seven native English-speaking volunteer undergraduate students from various classes at OSU were randomly divided into two training groups, including conventional and self-instruction treatments. The length of the study was six weeks.

Conventional instruction was given for one hour, two times per week for four weeks. The self-instruction group was assigned to use only institutional and vendor provided manuals and online (disc-based) help aides to complete the

weekly assignments. Both groups received the same weekly worksheets. All participants were given the CD-ROM Database Competency Test before and after the training. The ANCOVA was used to test results for null hypotheses 2, 3, and 4, and the t-test was used to assess hypothesis 1.

CHAPTER IV

THE RESULTS OF THE STUDY

Introduction

This chapter reports the results of the study. The objective of the study was to provide an understanding of the training techniques required to facilitate end-user CD-ROM database searches. The two training procedures (treatments) used in the study were a conventional instruction method and a self-instruction method. The study's hypotheses were to determine if there were:

1) pretest and posttest mean score differences on the CD-ROM database competency test for students placed in conventional instruction and self-instruction group,

2) adjusted mean score differences on the CD-ROM database competency test between the subjects placed in conventional instruction and in self-instruction groups,

3) adjusted mean score differences on the CD-ROM database competency test between male and female subjects, and

4) the presence or absence of interaction effects for levels of training methods and for gender

among subjects on the CD-ROM database competency
test.

Reliability of the CD-ROM Database Competency Test

The CD-ROM database competency test is a multiple
choice test which has responses valued as 1 for each
correct item and 0 for each incorrect item. The Kuder-
Richardson (K-R 20) procedure was utilized to determine the
reliability of the CD-ROM database competency test. The
Kuder-Richardson (K-R 20) formula is as follows:

$$
\text{K-R 20} \quad r = \frac{k}{k-1}\left[1 - \frac{\Sigma p_i q_i}{\sigma^2}\right]
$$

Where k is the number of the test items
$\Sigma p_i q_i$ is the sum of the individual item variances
σ^2 is the variance of the score total of
individual subjects

n is the total number of the subjects

$$
p_i = \frac{\text{number of subjects who got item i correct}}{\text{number of subjects}}
$$

$q_i = 1 - p_i$

$$
\sigma^2 = \frac{\sum_{i=1}^{n} fx^2 - (\Sigma fx)^2}{n(n-1)}
$$

When the K-R 20 formula was applied to the study's test scores, the resulting correlation was computed as .63. This result reflects a degree of association for internal consistency in the instrument. The reliability was considered to be acceptable for the study.

Statistical Testings

The design of the study was a pretest-posttest control group model (Campbell & Stanley, 1966). STATGRAPHIC version 5.0 was utilized to calculate the results for the study. The computation utilized the Type III sum of squares procedure, which is used for unbalanced designed data and computes the additional sum of squares for each factor as if it were added to the model last. A two-tailed paired t-test was applied to answer Hypothesis 1 and ANCOVA was utilized to respond to Hypotheses 2,3 and 4. The null hypotheses included the following:

1) There is no significant difference between pretest mean score and posttest mean score on the CD-ROM database competency test for students instructed by the conventional instruction group and subjects taught by self-instruction.

    $HO_1: \mu_{Pretest} = \mu_{Posttest}$

2) There is no significant adjusted mean score difference on the CD-ROM competency test between groups of students instructed by the conventional

instruction and subjects taught by self-instruc-
tion.

$$HO_2: \mu_{Instruct} = \mu_{Self-Instruct}$$

3) There is no significant adjusted mean score dif-
ference on the CD-ROM database competency test
between male subjects and female subjects.

$$HO_3: \mu_{Male} = \mu_{Female}$$

4) There is no significant interaction for adjusted
mean scores on the CD-ROM competency test between
levels of training method and gender.

$$HO_4: \mu_{Instruct \, x \, Male \, x \, Female} = \mu_{Self-Instr \, x \, Male \, x \, Female}$$

Findings of the study

The dependent variable in this experiment was the CD-
ROM database competency test score, which measured the
basic skills of CD -ROM database searches. The test was
utilized in order to assess the improvement of comprehen-
sion skills made by each participant and was administered
before and after the 6-week training period. A sample of
37 native English-speaking undergraduate students at Oregon
State University provided data for the study.

A two-tailed t-test performed on the pretest and
posttest mean scores indicated that a significant differ-
ence ($p < .05$) existed when data were analyzed for all
participants (see Table 2). The posttest mean score was
found to be higher than the pretest for the combined treat-

ment groups with the difference occurring in favor of the posttest.

Table 2. Two-tailed t-test Results on CD-ROM Database Competency Test Scores					
Test Scores	N	Mean	Standard Deviation	Computed t Value	D.F.
Post - Pretest	37	3.973	2.6298	9.18949*	36

*Significance level at .05

This result was not unexpected; it was assumed that students would have significantly higher scores on the posttest, regardless of their membership in the two (2) instructional groups.

Table 3 reports the pretest and posttest mean scores. As shown in Table 3, those students who received conventional instruction had slightly higher pretest scores than did those in the other group. This trend carried into the posttest result as well. However, when these data were subjected to analysis using the t-test, pretest scores were found not to be significantly different for the two methods. Posttest raw score results did show a significant difference in favor of the conventional method sample.

Table 3. Training Methods Pretest and Posttest Mean Scores

Training Methods	Number of Students	Pretest Mean	Posttest Mean
Conventional Instruction	22	7.045	11.409
Self-Instruction	15	5.800	9.200

Pretest and Posttest gender mean scores are presented in Table 4. Gender differences were non-existence when raw scores were analyzed using the ANCOVA.

Table 4. Pretest and Posttest Gender Mean Scores

Gender	Number of Students	Pretest Mean	Posttest Mean
Females	20	6.750	10.450
Males	17	6.294	10.588

The graphic presentation of the two training method mean scores and gender mean scores from above tables were also displayed by the histogram bar charts (see Appendix G)

Figure 1 shows the scatterplot for pretest and posttest raw scores.

Plot of Posttest vs Pretest Scores
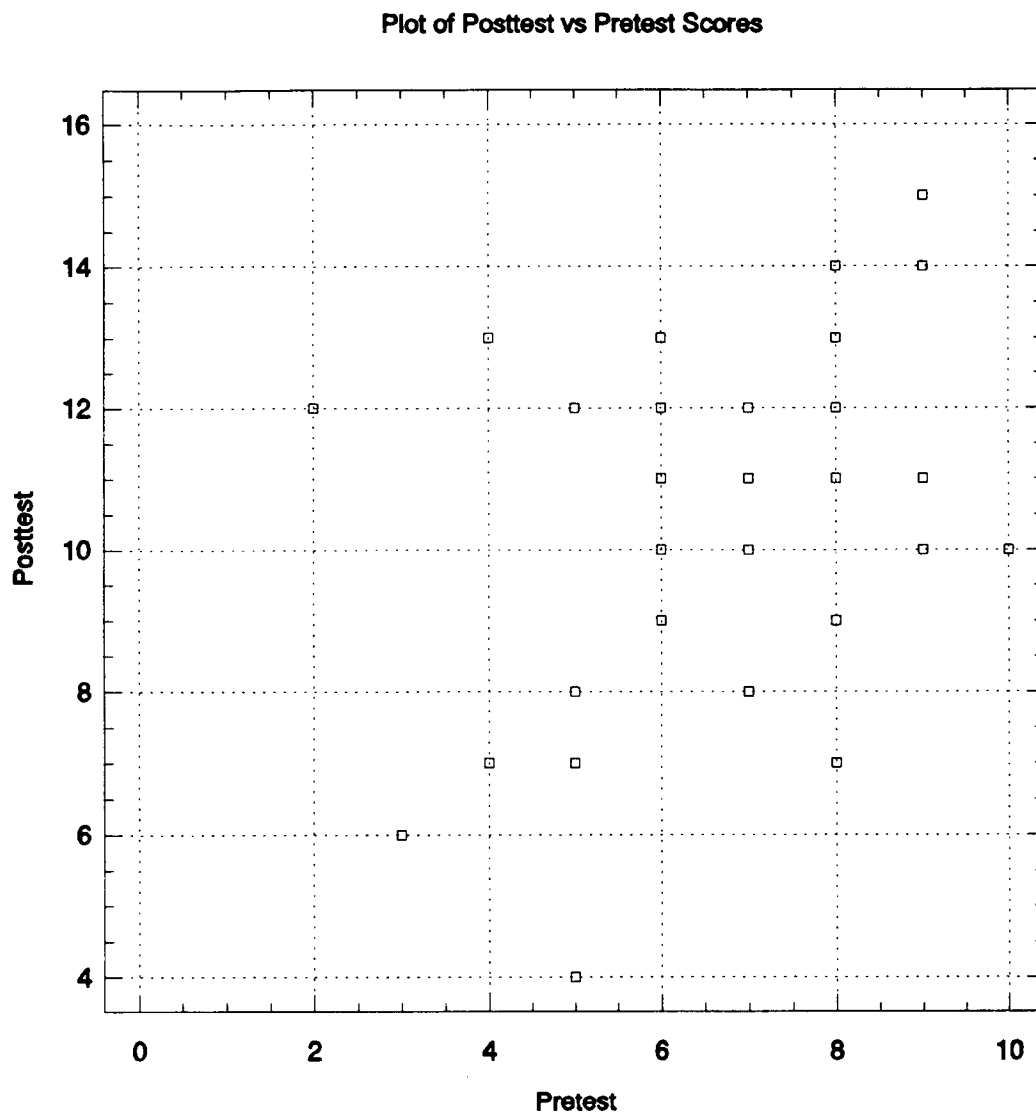
Figure 1. Plot of Posttest Vs Pretest Scores

The resulting correlation between pretest and posttest scores was determined to be .63. This correlation was found to be significant at the .05 level.

The pretest mean scores of the two instructional methods did not show significant differences. Table 5 displayed the results of the significant testing of the pretest mean scores different between conventional instruction and self-instruction groups.

Table 5. Descriptive Pretest Results for the Two Instructional Methods			
Pretest Scores	N	Mean	Standard Deviation
Conventional Instruction	22	7.045	1.675
Self-Instruction	15	5.800	2.077

The results indicated that there were no significant pretest differences between the two instructional groups (t = 2.0142, df = 35, α > .05).

Two-way analysis of covariance was utilized for the testing of significance differences for main effects. Testing was initially completed to include interaction to establish whether levels of group and gender means were significantly different. The F-test showed that there was no significant interaction effect for the data. Therefore, the interaction source of variation was dropped from the analysis for purposes of establishing the existence of differences between adjusted mean scores for the two (2)

main effects (group and gender). Consequently, the pooling of the interaction degree of freedom with that of the error term strengthened the power of the significance testing by mathematically decreasing the value of the error mean square. The decision was made to analyze the data using the Type III sum of squares model for analysis of covariance without testing for interaction. These results are shown in Table 6:

Table 6. Results of Significant Testing Using Analysis of Covariance.					
Source of Variation	Sum of Squares	D.F.	Mean Square	F-ratio	Sig. Level
COVARIATES Pretest	18.9186	1	18.9186	3.230	.0814
MAIN EFFECTS Groups	25.0617	1	25.0617	4.279	.0465*
Gender	2.5698	1	2.5698	.439	.5193
RESIDUAL	193.2722	33	5.8567		
TOTAL (CORR.)	257.2432	36			

* Significance at the .05 level.

The results indicated that there was no significant difference between pretest mean scores ($\alpha = .08$), but that differences did exist for adjusted mean scores representing group effect.

Tables 7, and 8 present the adjusted means of
CD-ROM database competency test scores on training
methods and gender.

Table 7. Adjusted Mean Training Method Scores			
Training Methods	Number of Students	Adjusted Mean	P- Value
Conventional Instruction	22	11.2294	.04
Self-instruction	15	9.4706	

Table 8. Adjusted Mean Gender Scores			
Gender	Number of Students	Adjusted Mean	P- Value
Females	20	10.0543	.51
Males	17	10.6458	

These results verify that gender differences did not
exist for the sample means in the study. However, the
sample receiving the instructional method scored signifi-
cantly higher on the CD-ROM database competency test than
did the sample which participated in self-instruction (p =
.04).

Demographic Survey Results

Demographic information collected during the study
showed that most participants were liberal arts and science
majors. More juniors participated in the research than did
students from other classes. A graphic display of these
data are shown in Figures 2 and 3.
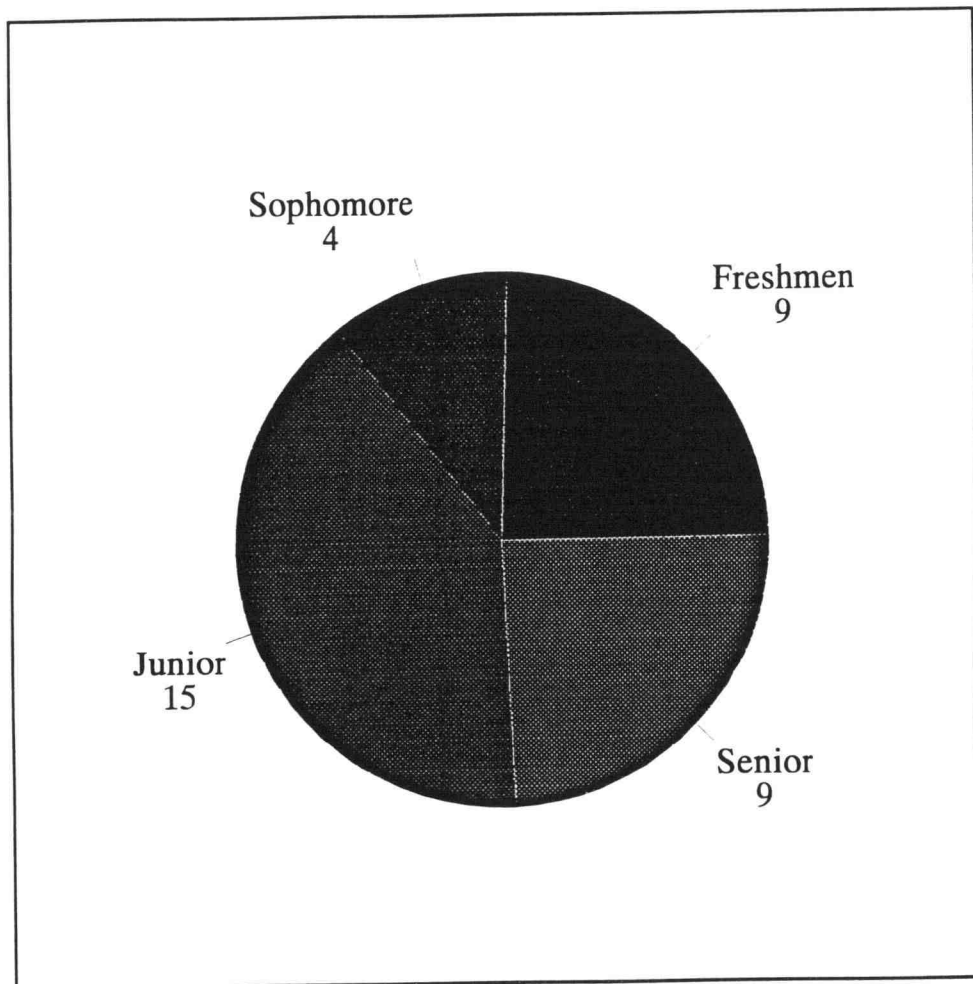
Figure 2. Undergraduate Status Data.
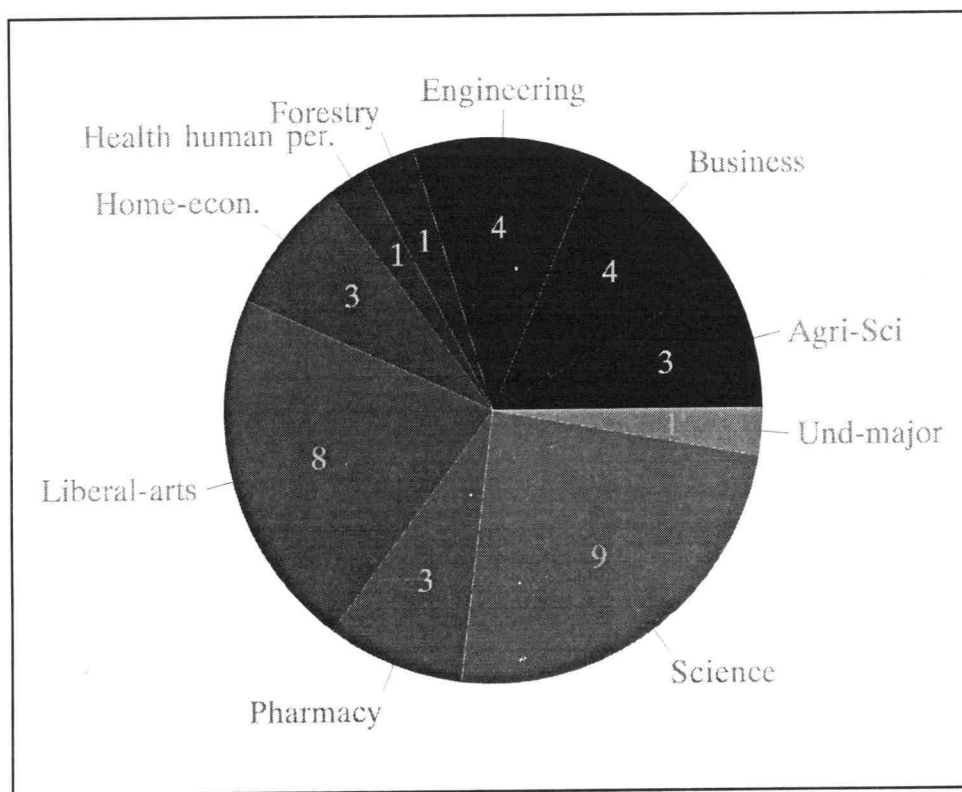
Figure 3. Academic Classification Data.

Status and classification data were not used as independent variables in the study. They are reported for purposes of describing the population of interest of the research. Demographic data for the study revealed that the participant ages ranged from 18 to 44 years and that the average age was 20 years old. Most participants in this study were familiar with microcomputers and software such as word processing, spreadsheet and database. Perhaps college students in the 80's may have grown up with the technology age, which allowed them to experience some computer software applications.

Student Evaluation Results

Supplemental to the study were student evaluations. At the end of the experiment and after the posttest was given, all students were asked to evaluate the CD-ROM database training. The results of student evaluations showed that 89% of the participants rated formal training as being very helpful and saved them time in retrieving information, and improved the effectiveness of their searches. When they were asked how necessary is formal training in searching CD-ROM databases, 46% rated it as very necessary and 54% rated formal training as being somewhat necessary. While 84% of the participants preferred to receive conventional instruction, 8% preferred the combination of both conventional instruction and self-instruction, and 8% had no preference.

Regarding the paper manuals and user's help guides, 40% of the students in the self-instruction group reported using the manual and help guides, 47% sometimes used the manual and help guides, and 13% did not use any manual or help guides. When students were asked how they used the paper manuals and help guides in their searches, 80% reported using the manual only when they could not figure something out, 13% said they did not use the manuals, and 7% actually read the manuals and help guides before and during assignments when they could not figure something out. Fifty-three percent felt the paper manual and help

guides were somewhat helpful, 27% said they were very helpful, 13% rated not helpful and 7% said they were not applicable. The results showed that 33% of the students in the study reported using the user's manual for *ERIC Silver-Platter* and 75% of those who used the manual rated it at 3 or less out of 5 on clarity. Most students were satisfied with the length of the training, but some preferred to receive instruction three times per week or extend it to one or two more weeks. The students in the conventional instruction group commented that they felt more confident in performing the CD-ROM database searches than did those in the other group.

Summary

In conclusion, the results of the study revealed the following:

1) The internal consistency reliability of the instrument was found to be .63, which was considered to be adequate for purposes of collecting data for the study.

2) When all treatment samples were combined, the posttest mean score was significantly higher than the pretest mean score on the CD-ROM database competency test.

3) There was a significant adjusted mean score dif-
ference on the CD-ROM competency test between
groups of students instructed by the conventional
instruction method and subjects taught by self-
instruction.

4) There was no significant adjusted mean score
differences on the CD-ROM database competency
test between male and female students.

5) There was no significant interaction between
levels of training method and gender.

6) In the evaluations, students rated formal train-
ing as being very helpful in improving the effec-
tiveness of their CD-ROM database searches.

Thus, the CD-ROM database competency test was consid-
ered appropriate for the research. The results substan-
tiated that, for these samples, the instructional method
used in the study provided significant assistance to stu-
dents in their understanding of CD-ROM applications.

CHAPTER V

CONCLUSIONS, DISCUSSIONS AND SUGGESTIONS

Introduction

This chapter presents the summary of the study, conclusions, a discussion of the findings, and suggestions for further study. The goal of the study was to recommend an effective training method to facilitate end-users to successfully utilize CD-ROM database technology.

Summary of the Study

Problem statement

The primary question to be answered as a result of the research was: Do native English-speaking undergraduate students learn CD-ROM database search skills more effectively through the use of conventional instruction method or by training confined to a written manual self-instructional method?

Research objectives

The purposes of the study were to determine if there were: 1) Pretest and posttest mean score differences on the CD-ROM database competency test for students placed in

conventional instruction and self-instruction group; 2)
adjusted mean score differences on the CD-ROM database
competency test between subjects placed in conventional
instruction and in self-instruction groups; 3) adjusted
mean score differences on the CD-ROM database competency
test between male and female subjects; and 4) the presence
or absence of interaction effects for levels of training
methods and gender on the CD-ROM database competency test.

The Null Hypotheses statements

The following null hypotheses were tested at the .05
significance level:

1) There is no significant difference between pre-
    test mean score and posttest mean score on the
    CD-ROM database competency test for students
    instructed by the conventional instruction group
    and subject taught by self-instruction.

2) There is no significant adjusted mean score dif-
    ference on the CD-ROM competency test between
    groups of students instructed by the conventional
    instruction and subjects taught by self-instruc-
    tion.

3) There is no significant adjusted mean score dif-
    ference on the CD-ROM database competency test
    between male subjects and female subjects.

4) There is no significant interaction for adjusted mean scores on the CD-ROM competency test between levels of training method and gender.

Methodology and Data Collection

Subjects

Subjects used in the study consisted of a total of thirty-seven (37) native English-speaking undergraduate students enrolled at Oregon State University. None of the subjects who participated in the study had formal CD-ROM database training.

Instruments and supportive resources

The study employed the following instruments and supportive resources:

1) The CD-ROM database competency test, consisting of sixteen multiple choice questions,

2) A demographic questionnaire,

3) CD-ROM search instruction,

4) CD-ROM databases (*Wilsondisc*, *SilverPlatter*), and

5) Subject evaluations.

A panel of 5 experts from the University of Oregon, Western Oregon State College and Oregon State University was formed to determine content related evidence of validity for the CD-ROM database competency test. The reliabili-

ty of CD-ROM database competency test was .63, which was computed using the Kuder-Richardson (K-R 20) formula. The reliability was calculated from data, which were collected by subjects who participated in the study and indicated the internal consistency reliability of the CD-ROM instrument.

Design of the study

A pretest-posttest/control group design (Campbell & Stanley, 1966) was utilized for this study. Volunteer native English-speaking students were randomly assigned to one of two training methods (conventional instruction and self-instruction). The length of the study was six weeks. All participants were premeasured using the CD-ROM database competency test prior to the application of any treatments. Students received training two times a week for four weeks. Students in the conventional instruction group learned CD-ROM procedures using formal instruction while students in the self-instructional group were assigned to the use of paper manuals. During the week following the training all students were postmeasured using the CD-ROM database competency test.

The study was designed to determine if the conventional instruction method would significantly increase student CD-ROM database competency test scores when compared with the other method. The design of the study considered if

gender and training methods were factors in effecting differences in the CD-ROM database competency score.

Data analysis

The analysis of covariance and the t-tests were the primary statistics used for analyzing differences for mean scores of the CD-ROM database competency test.

Conclusions of the Study

The results of the analyses enabled the study researcher to arrive at the following conclusions:

1) Subjects in both treatment groups experienced significant pretest-posttest gains in the CD-ROM database competency test score.

2) Those subjects which were assigned to the conventional instruction group had significantly higher scores on the CD-ROM database competency test than did subjects who participated in the self-instruction group.

3) Subject gender was determined not to be a factor when differences were considered from test results.

4) Interaction did not play a significant role in influencing the data results.

The major conclusion drawn from the study was that the native English-speaking students at Oregon State University

learned CD-ROM searching skills more effectively through the conventional instruction method than those student who were trained by self-instruction. A comparison of learning CD-ROM database searches for male and female college students failed to yield significant differences.

Discussion of the Findings

This study found that the conventional instruction method was effective in training CD-ROM database searches for college students, a conclusion supported by Stewart and Olsen (1988). The study was intended to determine whether the use of selected training methods, either through human interaction in a classroom-like setup or with paper manuals and help guides, could influence learning CD-ROM databases searches. The study confirmed that, when provided with some formal instruction, the end-users did search more effectively and successfully. This finding concurs with the statements of a number of researchers (Bostian & Robbins, 1990; Culbertson, 1992; Haines, 1982; Nash & Wilson, 1991; Stewart & Olsen, 1988). Student evaluations from the current study samples reported that some students may have difficulty understanding the paper manuals. This result is similar to data reported by Rholes and Caldwell-Wood (1987).

The results of the present study identified a significant increase between pretest and posttest CD-ROM database

competency mean scores for the conventional instruction group. On the other hand, the mean CD-ROM database competency score of students in the self-instruction group, assigned to use the paper manuals and help guides, reflected a slight but not significant increase between pretest and posttest scores.

The content of the conventional instruction was focused on five goal objectives as suggested by Johnson and Rosen (1990): 1) What information is stored in the *Wilsondisc* and *SilverPlatter* databases; 2) the basic searching strategies of the *Wilsondisc* and *SilverPlatter* databases; 3) what documents will be retrieved and how to retrieve specific information on the *Wilsondisc* and *SilverPlatter* databases; 4) how to structure the search in both *Wilsondisc* and *SilverPlatter* databases; and 5) how to use the Boolean (logical) operators and other connectors in the *Wilsondisc* and *SilverPlatter* databases. In addition, the search strategy worksheet utilized in the study were methods which were originally employed by Reddy (1988). The instruction goal was to teach students the theoretical framework of basic skills advocated by many researchers (Charles & Clark, 1990; Johnson & Rosen, 1990; Silvia & Kilman, 1991). It was found that the end-users lacked the ability to transfer the basic search skills from one system to another. Since each database covers information which might overlap another database, may hold a different type of journal, and may be produced by a different vendor,

teaching the basic skills helps to facilitate the end-users with effective database searches. The assignments given to the subjects in the study provided hands-on experience with various problem selections. Subjects in the instruction group received exercises to practice what they had just learned and they had to do them on their own. They were allowed to ask questions. Subjects in the self-instruction group received the same exercises and they were expected to use the paper manual to help them solve the problems. The topics on the assignments were general knowledge to the students. The assignments were reviewed by an expert in the field and field tested by four (4) novice users for clarity of the instruction. These assignments were considered to be meaningful learning as a process of connecting new material to knowledge already existing in memory, and problem solving.

The present study found no significant differences between males and females in learning how to perform database searches. This finding supported by Kamala (1991), who determined that females reflected equal or higher levels of computer affinity and visual ability across academic groups. In her study, there were no significant gender differences in the performance of novice subjects in the use of CD-ROM databases. Some researchers (Eastman, 1991; Nye, 1991) have found that there were differences between males and females in learning computer systems. Allen and Allen (1993) found that females scored higher on

visual perception speed than did their male counterparts.
As stressed by Sein and Bostrom (1990), high-visual learn-
ers performed better in learning to use the software system
than did the low-visual ones. This visual ability may
relate to strategy of problem solving. However, this study
indicated that if instruction could be provided to both
males and females, where they would spent the same amount
of time with the computer, and if the background knowledge
with computers was similar for both genders, then it may be
possible that there would be no differences in learning CD-
ROM database searches.

CD-ROM database competency test scores revealed that
students still have difficulty understanding Boolean logic,
search structures and the transfer the knowledge from one
system to the other. For example, the hyphenated terms
would not be retrieved by the computer when students typed
in the term without the hyphen on the Wilsearch mode of
Wilsondisc, but would be retrieved by SilverPlatter. The
concept of search structures and Boolean logic were diffi-
cult for the students to learn in a short time. It was
observed that during the instruction time, students were
taught to perform search strategies by breaking down
the topic into the concepts and finding the related term
for each concept before connecting all terms with appro-
priate Boolean logic. Some students still typed in the
title of the topic into the computer and did not follow the
search structure they had just learned. This indicates

that some students may have problems in designing their search structure effectively.

Suggestions for Further Study

Based upon the results of the research, the following are suggested for further study:

1) This study demonstrated that there was a significant difference between conventional instruction and self-instruction on CD-ROM database test scores. More research is needed to determine if the computer-based training or video presentation would be effective as training methods.

2) This study is specific only with regard to the *Wilsondisc* and *SilverPlatter* databases. More research is needed using a different database, such as *ProQuest* databases by *University Microform International (UMI)*.

3) More research is needed to determine the effectiveness of a combination of training methods of conventional instruction and self-instruction and using assignments, in addition to instruction class time, to reinforce the knowledge learned by the student.

4) The length of the present method was to administer treatments two times per week for four weeks of training time. More research is needed in

extending the training to three times per week

for a academic quarter or a semester.

5) Research is needed to determine if teaching ac-

cording to the student's learning style relates

to the learning of the CD-ROM database searches.

Summary

CD-ROM databases claim to be user-friendly, but many

researchers emphasized that formal training would help the

end-users to be successful and effective in performing CD-

ROM database searches. CD-ROM databases are not standard-

ized and the vendors have not developed materials which

help train the end-users. The development of CD-ROM data-

base training materials for the current study is considered

to be a valuable contribution to the existing resources for

instruction in this area.

The CD-ROM database search instruction is not included

in the college curriculum at Oregon State University.

Student evaluations revealed that more than 80% of the

students in the study expressed that they would prefer to

be trained by conventional instruction if they had a

choice. The results of the study indicate that students

don't learn CD-ROM database searching techniques very well

on their own. The study's findings suggested that college

students should receive formal CD-ROM database instruction

in order to be more successful in performing database

searches.

REFERENCES

Allen, G. (1990). CD-ROM training: What do the patrons want?. RQ, 30, 88-93.

American psychological association (1983). Publication manual. (3rd ed.). Washington, DC: Author.

American psychological association (1985). Standards for educational and psychological testing. American Psychological Association, American Educational Research Association, National Council on Measurement in Education, Washington, DC.

Ankeny, M. (1989). Mediated searching on end-user systems: An inexpensive Online resource. RQ, 28, 506-516.

Armstrong, C. J. (1991). New approaches in the training and education of Online users. Online Review, 15(3-4), 147-171.

Barbuto, D. M., & Cevallos, E. E. (1991). End-user searching: Program review and future prospects. RQ, 31, 214-227.

Barlow, D., Karnes, B., & Marchionini, G. (1987). CD-ROM in a highschool library media center a research project. Library Computing, 34, 66-68, 70-72.

Belanger, A-M., & Hoffman, S. D. (1990). Factors related to frequency of use of CD-ROM: A study of Eric in an academic library. College and Research Library, 51, 153-162.

Berger, P. (1989). On-Line databases and CD ROM. Media & Methods, 26, 40-41

Blumenthal, C., Howard, M. J., & Kinyon, W. R. (1993). The impact of CD-ROM technology on a bibliographic instruction program. College & Research Libraries, 54, 11-16.

Bodi, S. (1988). Critical thinking and bibliographic instruction: The relationship. Journal of Academic Librarianship, 14, 150-153.

Bodi, S. (1990). Teaching effectiveness and bibliographic instruction: the relevance of learning styles. College & Research Libraries, 51, 113-119.

Bostian, R., & Robbins, A. (1990). Effective instruction for searching CD-ROM indexes. Laserdisk Professional, 3, 14-17.

Bostrom, R. P., Olfman, L., & Sein, M. K. (1988). End user computing: A framework to investigate the training/learning process. In J. M. Carey (Ed.), Human Factors in Management Information Systems (pp. 221-250). Norwood, N.J.: Ablex Publishing Corporation.

Bostrom, R. P., Olfman, L., & Sein, M. K. (1990). The importance of learning style in end-user training. MIS Quarterly, 14, 101-119.

Campbell, D. T., & Stanley, J. C. (1966). Experimental and quasiexperimental designs for research. Rand McNally.

Cates, W. M. (1985). A practical guide to educational research. New Jersey: Printice-Hall.

Charles, S. K., & Clark, K. E. (1990). Enhancing CD-ROM searches with Online updates: An examination of end-user needs, strategies, and problems. College and Research Libraries, 51, 321-328.

Clever, E. C., & Dillard, D. P. (1991). What do CD-ROM users really need? Information Services & Use, 11, 141-153.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2rd ed.). New Jersey: Lawrence Erlbaum Associates.

Compton, L. (1991). A study of the use of CD-ROM computer system and print indexes at the University of Georgia Main Library. (Eric Document Reproduction Service No. ED 333-892)

Courtney, E. W. (1986). Design for research. Corvallis, Or: Sanderling.

Culberton, M. (1992). Analysis of searches by end-users of science and engineering CD-ROM databases in an academic library. CD-ROM Professional, 5, 76-79.

David, S. D. (1989). <u>Training novice users of computer systems: The roles of the computer interface, training methods, and learner characteristics</u>. Unpublished doctoral dissertation, Indiana University, Bloomington, IN.

Delbecq, A. L., VandeVen, A. H., & Gustafson, D. H. (1975). <u>Group techniques for program planning: A guide to nominal group and Delphi process</u>. Glenview, Illinois: Scott, Foresman and Co.

Donel, J. & Holbo, R. (1993). The CD network experiment at Oregon State University. <u>Online</u>, <u>17</u>, 104-106.

Eastman, B. (1991). Women, computers, and social change. <u>Computers in Human Services</u>, <u>8</u>, 41-53.

Eisenberg, M. B., Trombly, C. K. & Ruth, L. D. (1990). <u>Trends & issues in library & information science</u>. (ERIC Document Reproduction Service No. ED 335-061).

Engeldinger, E. A. (1988) Bibliographic instruction and Critical thinking: The Contribution of the annotated bibliography, <u>RQ</u>, <u>28</u>, 195-202. Winter.

Gaul, K. (1986). Learning to search: How people become database searches. <u>Online Review</u>, <u>10</u>, 355-367.

Gayeski, D. M. (1989). Why information technology fail. <u>Educational Technology</u>, <u>29</u>, 9-17.

Haines, J. S. (1982). Experiences in training end-user searchers, <u>Online</u>, <u>6</u>, 14-23.

Hehmeyer, L. (1988). <u>How to use the Eric and CIJE Indexes on computer</u>. (Eric Document Reproduction Service No. ED 321-730)

Helmer, O. (1966). <u>The use of the delphi technique in problems of educational innovation</u>. Santa Monica, California: The Rand Corporation.

Hoover, D. G. (1991). Teaching Eric on CD-ROM: An update. <u>Behavioral & Social Sciences Librarian</u>, <u>10</u>, 83-89.

Huston, M. M. (1989). May I introduce you: Teaching culturally diverse end-users through everyday information seeking experiences. <u>RSR</u>, <u>17</u>, 7-11.

Jewell, T. (1989). CD-ROM and End-User: The University of Washington Experience. <u>CD-ROM Librarian</u>, <u>4</u>, 15-20.

Johnson, M. E., & Rosen, B. S. (1990). CD-ROM end-user instruction: A planning model. <u>Laserdisk Professional</u>, <u>3</u>, 35-40.

Kamala, T. N. (1991). Individual differences in the use of CD-ROM databases. Doctoral Dissertation University of Hawaii, Manoa.

Keef, J. W. (1990). Learning style: Where are we going? <u>Momentum</u>, <u>21</u>, 44-48.

Kenney, R. F., & Schroeder, E. (1992). An evaluation of a training and assistance program for the CD-ROM databases: reflections on the process. <u>RSR</u>, <u>20</u>, 41-48.

Kern, J. F. (1990). <u>Using "Reader's Guide to Periodical Literature" on CD-ROM to teach database searching to high school students</u>. (Eric Document Reproduction Service No. ED 324-004)

Kinvig, C. A. (1987). Relating experiential and classroom learning---A study in bible college curriculum (CANADA). (Doctoral Dissertation, Michigan State University) <u>Dissertation Abstracts Ondisc Jan 1988-Dec 1992</u> [Compact disc]. Ann Arbor, MI: University Microfilms.

Kolb, D. A. (1984). <u>Experiential learning: Experience as the source of learning and development</u>. Englewood Cliffs, New Jersey.: Prentice-Hall.

Kuder, G. F. & Richardson, M. W. (1937). The theory of the estimation of test reliability. <u>Psychometrika</u>, <u>2</u>, 151-160.

Lathrop, A. (1989). <u>Online and CD-ROM databases in school libraries: Reading</u>. Englewood, Colorado: Libraries Unlimited.

Ley, K. L. (1989). CD-ROM: Searching with speed. <u>Media and Methods</u>, <u>25</u>, 8,48-51.

Linstone, H. A., & Turoff, M. (1975). <u>The Delphi method: Techniques and applications</u>. Massachusetts: Addison-Wesley.

Litchfield, C. A. (1990). Vendor training: A question of commitment to user success. Journal of Library Administration, 12, 3-12.

Martino, J. P. (1972). Technological forecasting is alive and well in industry. The Futurist.

Maxymuk, J. (1990). Instructional materials for CD-ROM databases. (Eric Document Reproduction Service No. ED 326-211).

Maxymuk, J. (1991). Considerations for CD-ROM instruction. CD-ROM Professional, 4, 47-9.

Mendrinos, R. B. (1989). CD-ROM research strategies for a lifetime. In A. Lathrop (Compl.), Online and CD-ROM databases in school libraries: Readings (pp. 91-93), Englewood, Colorado: Library Unlimited.

Miller, F. W., & Loeding, D. V. (1989). The Market place: An internal view of the future of CD-ROM- The perspectives of the H. W. Wilson company. RSR, 17, 21-23, 64.

Montgomery, J. D. (1987). First Toronto conference on database users. Training of end-user searchers: Use and perceived benefits of online and non-online information sources. Canadian Journal of Information Science, 12, 107-123.

Mushrush, J. L. (1990). Options in learning: Instructor led and computer based training (CBT). Journal of Library Administration, 12, 47-55.

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

Nickerson, G. (1991). Developing In-house tutorials. CD-ROM Professional, 4, 45-47.

Nye, E. F. (1991). Computers and Gender: noticing what perpetuates inequality. English Journal, 80, 94-95.

Oregon Department of Education (1993). Toward implementation of the Oregon educational act for the 21th century: Working designs for change. (Report of the Oregon State Board of Education to the Oregon Legislative Assembly January 1993). Salem, OR: Author.

Oregon State University, Kerr Library (1990). CD center statistics. Corvallis, OR: Author.

Oregon State University, Kerr Library (1992). CD center statistics. Corvallis, OR: Author.

Oregon State University, Kerr Library. (1993). CD User's Guides. Corvallis, OR: Author.

Paulk, B. D. (1986). The Facilitation of direct searching of Online service by the end user in academic libraries (Doctoral Dissertation, the Florida State University). Dissertation Abstracts Ondisc Jan 1982 - Dec 1987 [Compact disc]. Ann Arbor, MI: University Microfilms.

Petersen, R. G. (1985). Design and analysis of experiments. New York: M. Dekker.

Phillipo, J. (1989). CD-ROM: A new research and study skills tool for the classroom. Electronic Learning, 8, 40-41.

Potter, L. A. (1992). Measuring library staff time spent training patrons to use health-related CD-ROM databases. Bulletin of the Medical Library Association, 80, 299-300.

Puttapithakporn, S. (1990). Interface design and user problems and errors: A case study of novice searchers. RQ, 30, 195-204.

Reddy, M. A. (1988). Search strategy skills: A two method comparison of teaching CD-ROM bibliographic searching techniques. Doctoral Dissertation, University of Pittsburgh.

Reese, C. (1988). Manual indexes versus computer-aided indexes: Comparing the Readers' Guide to Periodical Literature to InfoTracII. RQ, 27, 385-389.

Rholes, J. M., & Caldwell-Wood, N. (1987). Eric SilverPlatter: Is it user friendly? (Eric Documentation Reproduction Service No. ED 286-522)

Richardson, M. W. & Kuder, G. F. (1939). The calculation of test reliability coefficients based upon the method of rational equivalence. Journal of Educational Psychology, 30, 681-687.

Sackman, H. (1974). Delphi assessment: Expert opinion, forecasting, and group process. Santa Monica: Rand Corporation.

Salomon, K. (1988). The Impact of CD-ROM on reference departments. RQ, 28, 203-211,214-219.

Samahito, S. C. (1984). Competency needs for physical education master's degree programs in Thailand. Unpublished doctoral dissertation, Oregon State University.

Schmidmaier, D. (1991). CD-ROM and user education (Rader Hannelore, Trans.). College & Research Library News, 52, 449-450.

Sein, M. K. (1988). Conceptual models on training novice users of computer systems: Effective of abstract vs analogical models and influence of individual differences. Unpublished doctoral dissertation, Indiana, University, Bloomington, IN.

Sein, M. K., & Bostrom, R. P. (1989). Individual differences and conceptual models in training novice users. Human Computer Interaction, 4, 197-229.

Sichel, B. (1991). Training endusers on MathSci Disc. Special Libraries, 82, 282-287.

Siitonen, L. M. (1985). Online searching: Relationships between online and users' search behavior, their search results and their satisfaction with search results (information retrieval) (Doctoral Dissertation, University of Pittsburgh). Dissertation Abstracts Ondisc Jan 1982 - Dec 1987 [Compact disc]. Ann Arbor, MI: University Microfilms.

SilverPlatter International N.V. (1992). SPIRS User's Manual. Norwood, MA: SilverPlatter Information.

SilverPlatter International N.V. (1992). SPIRS Quick Reference Guide. Norwood, MA: SilverPlatter Information.

Silvia, M. & Kilman, L. (1991). Searching on CD-ROM in an academic environment. Computers in Libraries, 11, 44-46.

Smalley, L. & Brady, S. (1984). Technology literacy test. (Eric Document Reproduction Service No. Ed 255-637).

Statistical graphics co. (1991). <u>Statgraphics user manual</u> (ver. 5), Rockvill, MD: STSC.

Statistical graphics co. (1991). <u>Statgraphics reference maual</u> (ver. 5), Rockvill, MD: STSC.

Stern, D. (1991). Local databases and training. <u>Illinois Libraries</u>, <u>73</u>, 161-174.

Stewart, L., & Olsen, J. (1988). Compact disk databases: Are they good of users? <u>Online</u>, <u>12</u>, 48-52.

Stricker, U. D. (1990). User training for CD-ROM, or: It's so easy, anyone can do it... but how well?. <u>CD-ROM EndUser</u>, <u>2</u>, 35-36.

The H.W. Wilson Company. (1992). <u>Wilsondisc Teaching Guide</u>. Bronx, NY: Author.

Weaver, T. W. (1971). The delphi forecasting method. <u>Phi Delta Kappan</u>, <u>52</u>, 267-271.

Weston, E. P., & Lauderdale, D. S. (1988). How do we learn what a database includes? A case study using Psychology Dissertations. <u>RQ</u>, <u>28</u>, 35-41.

Whitaker, C. S. (1990). Pile up at the reference desk: Teaching users to use CD-ROMs. <u>Laserdisk Professional</u>, <u>3</u>, 30-34.

Wozny, L. A. (1988). College students as end user searchers: one university's experience. <u>RQ</u>, <u>28</u>, 54-61.

Youngman, M. B. (1979). <u>Analysis social and educational research data</u>. London, United Kingdom: McGraw-hill book company (UK) limited.

APPENDICES

APPENDIX A

CD-ROM DATABASE COMPETENCY TEST

CD-ROM DATABASE COMPETENCY TEST

Direction: Circle the best answer.

1. In SilverPlatter when you type in the phrase "Air Pollution", the computer will retrieve

   a. ONLY documents which contain the word "Pollution."
   b. ALL documents which contain the phrase "Air Pollution."
   c. ONLY documents which contain the phrase "Air and Water Pollution."
   d. ALL documents which contain the phrase "Polluted Air"
   e. All of above

2. If you search for a subject in Wilsondisc's Browse mode and no records are found, this means:

   a. You should change to a different database.
   b. The subject does not exist.
   c. You should try searching in Wilsearch or Wilsonline modes too.
   d. You should try using a different subject heading, synonym, or a related term.
   e. Both c and d

3. Which statement is true?

   a. The Library contains <u>all</u> journals, articles, and other materials within the CD-ROM databases.
   b. Several databases may have to be searched in order to find complete information on a given topic.
   c. CD-ROM databases are the <u>only resource</u> to search for articles in periodicals or journals.
   d. All CD-ROM databases have abstracts.
   e. Most CD-ROM databases have information from the 1970s.

4. In Wilsearch mode, when you type in "Single parents and child abuse", the computer will retrieve:

   a. Only records which contain the four terms single and parents and child and abuse.
   b. Only records about child abuse in the family.
   c. Only records about parents who abuse their children.
   d. Only records which contain the terms single parent or single-parent and child abuse.
   e. Only records which contain the terms single-parent and child and abuse.

5. In SilverPlatter, when you type in "Teen*" or "Teen?"
    what is the difference in what the computer retrieves?

    a. When you use "*", records will contain the terms:
        Teens, Teen, Teenager, Teenagers, Teenaging, Teeny,
        or Adolescents and
        when you use "?", records will contain the terms:
        Teens, Teenagers, Adolescents, or Youths.
    b. When you use "*", records will contain the terms:
        Teen, Teens, Teeny, or Juvenile and when you use
        "?" records will contain the terms: Adolescent or
        Adolescence.
    c. Records will contain the terms: Teens, Teen,
        Teenagers, Teenager, Teeny, or Teenaging when you
        use "*" and the records will contain the terms:
        Teens, Teeny or Teen, when you use "?".
    d. Records will contain the terms: Teen, Teeny or
        Teens when you use "*" and the records will contain
        the terms: Teen, Teens, Teenagers, Teeny or
        Teenaging when you use "?".
    e. Both a and b

6. What search capability do the Wilsearch and Wilsonline
    modes and SilverPlatter have in common?

    a. You can mark the records to be printed later.
    b. You can use the Index searching mode with
        SilverPlatter but not with Wilsondisc databases.
    c. If you have many search sets (terms), you may save
        your search set using the History-command.
    d. You can display any fields you want in the display
        mode and print any fields you want in the printing
        mode.
    e. You can search a specific author or a specific
        journal or a specific year for any subject.

7. If your subject is about computer software and you type
    in "computer software" and the computer retrieves more
    than 200 records, what will be your next step?

    a. You found what you want, therefore you will print
        all 200 records.
    b. Browse titles and descriptors and find some new
        terms to limit your search.
    c. Limit the search by browsing the subject indexes.
    d. Look up in the thesaurus for a better term or
        related term.
    e. You should do b, c, and d

8. If you are looking for a specific type of document such as editorial or review articles, what would you do?

   a. Type in the word "editorial or review articles" on my search request.
   b. Find out in the user guides if the database has an option for searching a specific type of document.
   c. Type in "editorial" and "review articles".
   d. This search capability is not available.
   e. Both a and b

9. In SilverPlatter and Wilsonline mode, if your topic is elderly in nursing homes, what terms would retrieve relevant citations?

   a. "(aging or elderly or older adults) and (nursing home or housing)"
   b. "elderly in nursing home".
   c. "elderly and nursing and home".
   d. "elderly and housing".
   e. Try option a and also look up in the thesaurus for related subject term.

10. In SilverPlatter, what would the computer retrieve if you type in "yew and cancer"

    a. All documents that contain the word Yew and cancer including authors named "yew" who did research about cancer.
    b. All documents about the cancer cured by the yew tree.
    c. All documents that have anything to do with any type of cancers.
    d. Documents which contain the word "Yew" in the title and the Journal of Cancer.
    e. Both a and d

11. In Wilsonline, what would the computer do, when you type in "NBR Jackson, Michael"?

    a. Display the listing of the subject indexes.
    b. Display Jackson, Michael as the subject.
    c. Print Michael Jackson documents.
    d. Display the phrase Jackson, Michael in an alphabetically listing of authors, titles and subject headings.
    e. Find documents with Michael Jackson in the title.

12. In SilverPlatter or Wilsonline when you type in "Smoking or Tobacco", the documents found will contain these terms:

   a. Smoking, smoke, and tobacco
   b. Either the term Smoking or the term Tobacco or both
   c. Both terms Smoking and Tobacco
   d. Smoke, smoking, tobacco or cigarattes
   e. The phrase cigaratte smoking.

13. When you type in "the case study in business" in Wilsonline mode. What would the computer search for?

   a. Documents which contain the phrase "the case study in business"
   b. Case study documents in the subject of business.
   c. All of the case study articles in that database.
   d. Documents which contain the phrase "the case study" and the term "business" and combine the two concepts.
   e. Documents in the subject indexes.

14. In Wilsonline, when you are looking for an author name "Brown, Murphy" in a journal name "Broadcasting", what would you type in?

   a. "Murphy Brown and Broadcasting"
   b. "Murphy and Brown and Broadcasting"
   c. "Brown, Murphy: (AU) and Broadcasting (JN)" or "(AU) Brown, Murphy: and (JN) Broadcasting"
   d. You should do C and also look up the authors and journals in the Index using the NBR command.
   e. Wilson databases do not have this option.

15. Which statement below would be a good strategy in searching for the topic of body-weight and exercise programs?

   a. "overweight and exercises"
   b. "body-weight and fitness"
   c. "obesity and exercise near6 fitness"
   d. "(overweight or obesity or body-weight) and (exercise? or physical fitness)"
   e. "(overweight and obesity and body-weight) and ((exercise? or physical fitness) near6 programs)"

16. In SilverPlatter, what will be the result of set #5?

No.	Records	Request
#1	412	vegetable
#2	1,000	fiber
#3	5,590	vitamin
#4	9,800	nutrition
#5		#1 and (#2 in Ti or #3 in De) and #4 in De

a. find "fiber" in the title field, find "vitamin" in the descriptor field then "OR" them together; find "nutrition" in the descriptor field; find "vegetable" in any field; and combine all sets together with AND.

b. find "vegetable" and "fiber" in the title field, then "OR" with "vitamin" in the descriptor field and "nutrition" in the descriptor.

c. find "vitamin" in the descriptor field and find "nutrition" in the descriptor field, find "fiber" in the title field, and find "vegetable" and the "OR" all terms together.

d. find "vegetable" and "fiber" in the title field, then "OR" with "vitamin" in the descriptor field and combine all terms with "nutrition" in the descriptor field.

e. find "vegetable" in any field, combine with "nutrition" in the descriptor field, combine with "fiber" in the title field "OR" "vitamin" in the descriptor field.

APPENDIX B

A DEMOGRAPHIC QUESTIONNAIRE

A Demographic Questionnaire

Please response to the following questions

All responses will be anonymous and held in strictest confidence.

1. What is your age? _____

2. What is your gender?
   a. Female
   b. Male

3. Are you native English-speaker?
   a. Yes, I am.
   b. No. I am not.

4. What is your ethnic background?
   a. Asian-American   b. Anglo-American
   c. African-American   c. Native-American
   d. Hispanic   e. Others_____

5. What is your current status at Oregon State University?
   a. Freshmen   d. Senior
   b. Sophomore   e. Post-baccalaureate
   c. Junior   f. Graduate

6. What is your college name?
   a. Liberal arts   g. Health and human performance
   b. Science   h. Home economics & education
   c. Agricultural sciences i. Oceanography
   d. Business   j. Pharmacy
   e. Engineering   k. Others_____
   f. Forestry

6. Have you had any previous experience with microcomputers?
   a. Yes   b. No

   6.1. If yes, how often do you use microcomputers?
        a. Once a month   b. 2-3 times a month
        c. 4-5 times a month   d. Use regularly
        e. Others, please indicate_____

   6.2. If your answer is yes, please indicate below:
        a. Word processing(wordperfect, MS Word)
        b. Database (D-base)
        c. Spreadsheet (Lottus, Quattro)
        d. Programming languages (Basic, Fortran, Pascal, C++)
        e. Others, please indicate_____
7. Have you used the Wilsondisc or SilverPlatter databases?
        a. Yes   b. No

   7.1. If yes, please indicate how often?
        a. Once a month   b. 2-3 times a month
        c. 4-5 times a month   d. Use regularly
        e. Others, please indicate_____

8. Have you had formal training on how to perform a
   database search?
   a. Yes, I have
   b. No, I have not

APPENDIX C

CD-ROM DATABASE SEARCH INSTRUCTION

The appendix materials are included for purposes of clarifying the experimental treatment in the study. These consist of outlines of the instructional content for the group receiving the formal instruction for the research. Details of the instructional proceedings are available from the author upon request.

CD-ROM DATABASE SEARCH INSTRUCTION

Conventional Instruction Group Lesson Plan

<u>Lesson 1</u>

   TOPIC: Introduction to CD-ROM Technology

   GOALS:

      1)   To provide necessary sources of information in Kerr Library.

      2)   To provide students with an overview of the CD center and CD-ROM databases.

   CONTENT OUTLINE:

      1)   Introduction to CD-ROM.

      2)   How the Computer Works.

      3)   What Information is Stored on the CD.

      4)   How to Select CD-ROM Database(s).

      5)   When to Use CD-ROM.

      6)   Hands-on experience

<u>Lesson 2</u>

   TOPIC: *Wilsondisc* three search modes.

   GOALS:

      1)   To acquire hands-on experience with the PC system and to log on to the *Wilsondisc* databases.

      2)   Introduction to basic searches using Wilsondisc.

3)   Introduction to browse, Wilsearch, and
     Wilsonline modes of the *Wilsondisc* database.

CONTENT OUTLINE

Wilsondisc search modes, including:

1)   Before Performing a Basic Search.

2)   How to Run Efficient Searches.

3)   How to Display or Show Records.

4)   How to Print Records.

5)   Assignment 1.

Lesson 3

TOPIC: Search Strategies and Basic Search Operators
         in Wilsearch mode

GOALS:

1)   Introduction to search strategies using sub-
     ject terms, synonyms, or a thesaurus.

2)   Introduction to search strategies using
     Boolean operators.

3)   Student search performances in Wilsearch
     mode.

CONTENT OUTLINE:

1)   Search Strategy.

2)   Basic Search Operators.

3)   Assignment 2.

Lesson 4

TOPIC: Operating *Wilsonline* Mode and NBR (or Neigh-

bor command)

GOALS:

1)   Introduction to *Wilsonline* (free text) mode.

2)   Performance of command driven index searches

using the NBR command.

CONTENT OUTLINE:

1)   *Wilsonline* Mode.

2)   NBR Command.

3)   Assignment 3.

Lesson 5

TOPIC: *Wilsondisc* Truncations, Field Qualifiers and

Download of Information onto a Floppy Dis-

kette.

GOALS:

1)   Using truncation (wildcards) in Wilsearch

and Wilsonline modes.

2)   Search field qualifiers.

3)   Using download options.

CONTENT OUTLINE:

1)   Truncations.

2)   Search Field Qualifiers.

3)   Downloading to Diskette.

4)   Assignment 4.

<u>Lesson 6</u>

TOPIC: Basic Searches in the *SilverPlatter* Data-

bases

GOALS:

1)   Introduction to the *SilverPlatter* databases.

2)   Introduction to the free-text search mode.

3)   Introduction to the index search mode.

4)   Introduction to lateral searching.

CONTENT OUTLINE:

1)   Searching a Free-Text Mode.

2)   Index Mode.

3)   Lateral Searching.

4)   Display Menu.

5)   Printing Menu.

6)   Assignment 5.

<u>Lesson 7</u>

TOPIC: Searching in SilverPlatter Using the Opera-

tors (WITH, NEAR, IN), Field Qualifiers, and

the History Command.

GOALS:

1)   Introduction to the operators (WITH, NEAR,

IN).

2)   Introduction to the field qualifiers.

3)   Introduction to the History command.

CONTENT OUTLINE:

1)   The Operators (WITH, NEAR, IN).

    2)   Searching By Field Qualifiers.

    3)   Reusing Search Sets With the History Command.

    4)   Assignment 6.

Lesson 8

TOPIC: Operating Truncations, Thesaurus, and Down-loading.

GOALS:

    1)   Introduction to truncation.

    2)   Introduction to thesaurus.

    3)   Introduction to download.

CONTENT OUTLINE:

    1)   *SilverPlatter* Truncations.

    2)   On-line Thesaurus Command in the Medline.

    3)   Records to Download.

    4)   Assignment 7.

Assignment 1 Wilsondisc

Name_____

Date_____ Time In_____ Time Out_____

****
* Read the Assignment Carefully before starting the search.   *
* Observe what is on the screen.   *
* Please use any check-out materials to complete the assignment. *
* Select A) NETWORK Disks - Search Kerr Library CD Network   *
****

Select Database: Social Sciences Index

I. **Select Browse Mode**

    1. Type in "happiness"

    2. Write down how many entries or citations you find...........

    3. Find the subject "hard of hearing" using the PgDn key.

    4. Find as many as you can on the subjects related to "hard of
    hearing" and write down the related subject which has the most
entries found:......................................

II. Find as many citations as you can on the topic of
    Automobile seat belts

    1. **Select Browse Mode**

        1.1 Please write down term(s) you type in

            a) Type in subject term(s) or search terms.............

            b) How many entries or records or citations are
            found.....................................

        1.2 If you type in new term(s) or phrase(s), write down

            a) Alternate term(s)...................................

            b) How many entries or records or citations are
            found.....................................

        1.3 Print one record for the most recent publication and
            underline the search term(s).

    2. **Select Wilsearch Mode**

        2.1 Repeat the same search terms as you did on **Browse mode**

            a) Subject term(s) or search terms......................

            b) How many entries or records or citations are found...

        2.2 If you type in new term(s) or phrase(s), write down

            a) Alternate term(s)....................................

            b) How many entries or records or citations are found...

2.3 Write down the name of the author(s) and publication
date of the most recent record..........................

....

2.4 Print the oldest record and underline the
search term(s).

3. **Select Wilsonline Mode**

3.1 Repeat the same search terms as you did on **Browse mode**

a) Subject term(s) or search terms......................

b) How many entries or records or citations are found...

3.2 If you type in new term(s) or phrase(s), write down

a) Alternate term(s)....................................

b) How many entries or records or citations are found...

3.3 What happens if you type in "seat belts"

How many entries are found..............................

3.4 What happens if you type in "seat belts, automobile"

How many entries are found..............................

3.5 On this Wilsonline mode, what subject term or phrase
did you use which found the most entries................

....

III. How many years are covered (Indexed) by Social Sciences Index?
....

Exit Social Science Index

Select Database: General Science Index

Find as many citations as you can on the topic of recycling paper.

1. **Select Browse mode**

1.1 What subject term did you type in?......................

....

1.2 What subject heading has the most citations?............

....

1.3 How many citations do you find?........................

2. **Select Wilsearch mode**

Repeat steps 1.1, 1.2, and 1.3

2.1 What subject term did you type in?......................

2.2 What subject heading has the most citations?.............

    ....

2.3 How many citations do you find?........................

3. **Select Wilsonline mode**

    Repeat steps 1.1, 1.2, and 1.3

    3.1 What subject term did you type in?......................

    ....

    3.2 What subject heading has the most citations?............

    ....

    3.3 How many citations do you find?........................

Please answer the following questions in your own word:

1. What is the BROWSE mode used for?

2. What is the WILSEARCH mode used for?

3. What is the WILSONLINE mode used for?

4. What does the F5 function key do?

Please Exit Wilsondisc when you completed the assignment.

Please remember to attach the two print-outs to this assignment.

Assignment 2 Wilsearch mode on Wilsondisc

Name_____

Date_____ Time In_____ Time Out_____

```
****************************************************************
* Read the Assignment Carefully before starting the search.   *
* Observe what is on the screen.                              *
* Please use any check-out materials to complete the assignment. *
* Select A) NETWORK Disks - Search Kerr Library CD Network    *
****************************************************************
```

Select Database: General Science Index
Select Wilsearch mode

1. Type in "waste, utilization of paper"
   Write down how many entries or citations you find...............

2. Type in "waste utilization paper"
   Write down how many entries or citations you find...............

3. Type in "national parks"
   Write down how many entries or citations you find...............

4. Type in "/national parks"
   4.1 Write down how many entries or citations you find...........

   4.2 Modify this search by adding the term "forest"
       On the screen you should have the following:
       Subject Words: /national parks
         2nd Subject: forest

   4.3 Write down how many entries or citations you find...........

   4.4 Modify this search by adding the term "/forest"
       On the screen you should have the following:
               Subject Words: /national parks
               2nd Subject: /forest

   4.5 Write down how many entries or citations you find...........

5. How many articles has this author, Brown, Arthur M., published
   in "Science" journal?......................................

6. Find the author of the following citation:
        Title: Common sense guide to growth and nutrition

   Journal: Journal of the american dietetic association v92, p1181-2
            September '92

   Write down the author's name you find........................

READ Search Strategy (this page) before contining the assignment on the topic of nutrition related to child growth.

Search Strategy

- Write out the topic to be searched on the top line.
- Breakdown your search topic into major concepts.
- Identify the special terms and/or phrases that clearly describe the topic to be searched and/or use a thesaurus to find appropriate words or terms
- List possible synonyms, related terms or singular-plural terms (check for accurate spelling) and combine all terms with the boolean "OR".
- Combine all concepts with the boolean "AND".

First concept   Second concept   Third concept
         AND   **AND**

....

OR............   OR..............   OR..............

OR............   OR..............   OR..............

OR............   OR..............   OR..............

Example: If you want to find articles about how snakes eat their prey, the first concept is snakes, second concept is eat and third concept is prey.

  1. Combine all possible synonyms or related terms with the boolean "OR"

     First concept terms are   a. <u>snakes OR snake</u>

     Second concept terms are   b. <u>eat OR eating OR feed OR feeding</u>

     Third concept terms are   c. <u>pray OR prays OR food OR foods</u>

  2. Combine all terms together with the boolean "AND"
          (snakes OR snakes)
               AND
       (eat OR eating OR feed OR feeding)
               AND
       (prey OR preys OR food OR foods)

  3. Another possible way would be:
     snake OR snakes
        AND
     foods OR food OR feed OR feeding
        AND
     habit OR habits

I. Your search topic is: **Nutrition related to child growth.**

Select General Science Index and Select Wilsearch Mode

1.1 Write down the search topic concepts:
   Concept1_____
   Concept2_____
   Concept3_____

1.2 You may use a Thesaurus to find appropriate words, terms or subject headings

1.3 List Terms (Subject terms, Descriptors, Subject Headings, synonyms, related terms, singular-plural terms)

List of terms for concept1	List of terms for concept2 **AND**	List of terms for concept3 **AND**
. . . .	. . . .	. . . .
OR.	OR.	OR. . . . .
OR.	OR.	OR. . . . .
OR.	OR.	OR. . . . .

1. Type in all terms listed for concept1 by using the Boolean "OR"
2. Type in all terms listed for concept2 by using the Boolean "OR"
3. Type in all terms listed for concept3 by using the Boolean "OR"
4. Combine all concepts by using the Boolean "AND"
5. Write down how many entries or citations you find.......

II. Find as many citations as you can on the topic of **the population of deer which have white tails.**

   Write down how many entries or citations you find.......

III. Please answer the following questions in your own words:

   1. In Wilsearch mode, what do you do when you want to combine all search terms with the Boolean "AND"?

   2. In Wilsearch mode, what do you do when you want to combine all search terms with the Boolean "OR"?

   3. What is the "/" symbol used for?

Search Strategy Work Sheet

1. Search topic is: the population of the deers which have white
                      tail.
2. Write down the search topic concepts:

    Concept1_____

    Concept2_____

    Concept3_____

3. Identify the special terms and/or phrases that clearly describe the
   topic to be searched and/or use thesaurus (or library of congress
   subject headings book) to find appropriate terms or subject
   headings)

4. List possible synonyms, related terms or singular-plural terms (check
   for accurate spelling) and combine all terms with boolean "OR".

First concept   Second concept   Third concept
                AND   AND
. . . . │ . . . . │ . . . .

OR. . . . .   │ OR. . . . .   │ OR. . . . .

OR. . . . .   │ OR. . . . .   │ OR. . . . .

OR. . . . .   │ OR. . . . .   │ OR. . . . .

5. Combine all concepts with boolean "AND".

Assignment 3 Wilsonline mode on Wilsondisc

Name_____

Date_____ Time In_____ Time Out_____

```
***********************************************************************
* Read the Assignment Carefully before starting the search.     *
* Observe what is on the screen.                                *
* Please use any check-out materials to complete the assignment.*
* Select A) NETWORK Disks - Search Kerr Library CD Network      *
***********************************************************************
```

Select Database: Social Sciences Index
Select Wilsonline mode

1. Type in "children bonding"
   Write down how many entries or citations you find............

2. Type in "children AND bonding"
   Write down how many entries or citations you find............

3. Type in "children OR child"
   Write down how many entries or citations you find............

4. Type in "bonding OR attachment"
   Write down how many entries or citations you find............

5. Type in " (children or child) and (bonding or attachment) "
   Write down how many entries or citations you find............

6. Type in " (children or child) and (bonding or attachment) and
            mother"
   Write down how many entries or citations you find............

7. Type in "children and attachment and mother"
   Write down how many entries or citations you find............
   Display and view all citations
   Add a phrase to this search by typing in:
        "children and attachment and mother not child development"
   Write down how many citations you find.......................
   Display and view all citations

8. Type in "brown, judith"
   Write down how many citations you find.......................

9. Type in "nbr brown, judith"
   Type in "get 11"
   Write down how many citations you find.......................

10. Type in "nbr brown, judith"
    Type in "get 7-12"
    Write down how many citations you find......................
    Type in "nbr pacific affairs"
    Type in "get 7"
    Write down how many citations you find......................
    Combine these two search sets with the Boolean "AND"
    Write down how many citations you find......................

_____

I. Select Social Sciences Index and Select Wilsonline mode

1. Find as many citations as you can on the topic of
   Adolescents attitudes toward Aids disease.

   Write down how many citations you find.................

2. Find the author(s) and volume number of this article

   Title: Strategies for coping with food consumption
          shortage in the Mandara Mountains region of
          north Cameroon
   Journal: Social Science & Medicine p. 2117-27 '82

   Write down the author(s) name...........................

   ....

   Write down the volume number......................

3. Find how many articles each of these authors published?

   ....Barbara Brown
   ....Barbara A. Brown
   ....Barbara B. Brown

II. Please answer the following questions in your own words:

   1. What is the Boolean "AND" used for?

   2. What is the Boolean "OR" used for?

   3. What is the Boolean "NOT" used for?

   4. What do you think the Neighbor (NBR) command does?

   5. If you want to find the author name Colleen Johnson, and the
      articles she wrote about elderly and family
      relationships.

      What would you do? Please explain

Assignment 4 Wilsonline mode on Wilsondisc

Name_____

Date_____ Time In_____ Time Out_____

```
***********************************************************************
* Read the Assignment Carefully before starting the search.      *
* Observe what is on the screen.                                 *
* Please use any check-out materials to complete the assignment.*
* Select A) NETWORK Disks - Search Kerr Library CD Network       *
***********************************************************************
```

Select Agriculture - Biological Sciences
Select database: Biological & Agricultural Index

1. Type in "vitamin"
   Write down how many entries or citations you find.............

   Type in "vitamins"
   Write down how many entries or citations you find.............

   Type in "vitamin or vitamins"
   Write down how many entries or citations you find.............

   Type in "vitamin#"
   Write down how many entries or citations you find.............
   1.1 Can you use this "#" symbol in Wilsearch or Wilsonline
       modes or both?

   1.2 What happens when you type in "colo#r"

2. Type in "deficiency or deficiencies or deficient"
   Write down how many entries or citations you find.............

   Type in "deficien:"
   Write down how many entries or citations you find.............

3. Type in "johnson, a"
   Write down how many entries or citations you find.............

   Type in "johnson, a:"
   Write down how many entries or citations you find.............

   Type in "nutrition and johnson, a:"
   Write down how many entries or citations you find.............
   Display and view all citations

   3.1 Can you use this ":" symbol in Wilsearch or Wilsonline modes or
       both?

   3.2 What happens when you use ":" after the term?
       Example: type in "reserv:"

4. Type in "nutrient"
   Write down how many entries or citations you find.............

   Type in "nutrient (sh)"
   Write down how many entries or citations you find.............

5. Type in "(sh) deficiency and vitamins and children and nutrition"

   Write down how many entries or citations you find.............
   Display and view all citations

6. How many citations did these two authors have published
   together? Lurie, Susan and Klein, Joshua

I. Select your own topic or choose from the following topics
           Greenhouse effects and environment
           Alcohol related accidents
           Using computers to teach handicapped students
           How violence on television and in films effects children

     1. Write down your topic....................................
     2. Write down the Wilsondisc database(s) you have selected
     (you may use more than one database)
     ....

     ....
     3. Select 10-15 citations from your searches on the topic that you
        have chosen.

     4. Save (Download) these citations on the provided floppy disk,
     5. Named your file "home4"

Note: please select the citations which can be found in Kerr Library.
      The citations should relate to the topic you have chosen as much
      as you can.

      At the CD center: 3.5 is B drive
                         5.25 is A drive
                         PRN is printer

      At Rm. 202 MCC: 3.5 is A drive

II. Please answer the following questions on your own words:

     1. What is the "#" used for?

     2. What is the ":" used for?

Assignment 5 SilverPlatter

Name_____

Date_____ Time In_____ Time Out_____

****
* Read the Assignment Carefully before starting the search.   *
* Observe what is on the screen.   *
* Please use any check-out materials to complete the assignment.*
****

Introduction to SilverPlatter databases.
The following CD-ROM databases are produced by SilverPlatter:

Agricola
Agrisearch
Biological Abstracts
CAB Abstracts
Eric
GeoRef
Medline
MLA Bibliography
NTIS
Predicast's F&S Index
PsycLit

You may check-out the following materials in the Box:

* SilverPlatter Quick Reference (Biological Abstracts on Compact Disc)
* SPIRS User's Manual (Small Gray Ring-Binder)
* SPIRS Full Text Quick Reference Guide
* CD User Guide: SilverPlatter
* Ask CD Monitor for SilverPlatter Key Template

Select A) NETWORK Disks - Search Kerr Library CD Network
Select A) Agriculture - Biological Sciences
Select Agricola 1984-1992 (Agricola 1984-1991 and Agricola Jan-Dec 1992)

1. Searching in Free text, Index and Lateral searching

    Type in "defrost"
    Type in "defrosted"
    Type in "defrosting"

    1.1 Combine these three sets using the Boolean "OR"
        On the screen you should have the Following:
        "defrost or defrosted or defrosting" (you may use search
                                        statement numbers)
    1.2 Display all citations found.

    1.3 Select the term "preparation" (use lateral searching) from
     the Abstract field in citation title: Food: handle with care

    1.4 Use the Index command and retrieve the phrase "food-safety"
    1.5 Combine all terms from 1.1, 1.3, 1.4 with the Boolean "AND"
    1.6 Write down how many citations you find...................

**Go back to Free text search mode and start a new search

2. from 2.1 through 2.12 are continuing searches

2.1 Type in "tropical rainforest"
2.2 Type in "tropical rain forest"
2.3 Use the Index command and retrieve the following phrase:

   "tropical-rain-forests"

2.4 Combine sets for those terms.
2.5 Display records found.
2.6 Change display menu to show only Title and Descriptors
2.7 Use lateral searching to retrieve the following terms:

   "Mexico and Costa-Rica" in the descriptor field

2.8 Combine sets from lateral searching to **broaden** (increase) the
   search results
2.9 Combine previous sets (2.4) with this set (2.8). There should
   be 89 citations.
2.10 Display records found.

2.11 Mark records 1 and 3
2.12 Change print menu to print field: CITN and then print the
   Marked records.

3. Use two or three search techniques to find as many citations as you
   can on the topic of making wines by the fermentation

   Write down how many citations you find........................

4. Please answer the following questions on your own words:

   1. What is Free text searching for?

   2. What is Index searching?

   3. What is Lateral searching?

Assignment 6 SilverPlatter

Name_____

Date_____ Time In_____ Time Out_____

```
******************************************************************
* Read the Assignment Carefully before starting the search.    *
* Observe what is on the screen.                               *
* Please use any check-out materials to complete the assignment.*
* Select A) NETWORK Disks - Search Kerr Library CD Network     *
******************************************************************
```
Select Agricultural - Biological Sciences
Select Agricola (1984-1992)

DO NOT CLEAR THE SEARCHES OR SCREEN ON THIS ASSIGNMENT

I. Connectors WITH, NEAR and NEAR#
   a.) Type in "soybean AND cooking"
   b.) How many citations did you find?......................
   c.) Display and view some of the records found.
       In what fields (ti, de, ab, etc.) were the terms found in
       the citations?

       ....
   d.) Type in "soybean WITH cooking"
   e.) How many citations did you find?......................
   f.) Display and view some of the records found.
       In what field(s) were both terms found in the citations?

       ....
   g.) Type in "soybean NEAR cooking"
   h.) How many citations did you find?......................
   i.) Display and view some of the records found.
       Do both terms appear in the same sentence on the citations?

       ....
   j.) Type in "soybean near3 cooking"
   k.) How many citations did you find?......................
   l.) Display and view all citations found.
   m.) Type in "soybean near2 cooking"
   n.) Display and view all citations found
   o.) Repeat j to n with the terms "chicken near3 cooking"
   p.) How many words were allowed in between the terms in the
       citations when you connect them with the following?

       Near3..

       Near2..

II. Searching By Field Qualifiers
    2.1 Type in "smoked fish in de"
        Display the citations and change display options to show: CITN,DE

        What field(s) do the terms "smoked fish" appear in the citations?

    2.2 Type in "smoked salmon in ti"
        Display and view all citations
        What field(s) do the terms "smoked salmon" appear on the
        citations?

2.3 Find the author(s) and volume number of this article

    Title: Effect of heating variables and storage on color of
          chicken cooked and stored in polyester pouches
    Source: Poultry science. October 1992

    Write down the author(s) name............................

    ....

    Write down the volume number............................

2.4 Type in "groundwater and drinking and water-quality"

    2.4.1 Type in "py=1992"
          Combine 2.4 and 2.4.1 with the Boolean "AND"
          Display and view all citations
          How many citations were published in 1992?........

    2.4.2 Type in "py>1990"
          Combine 2.4 and 2.4.2 with the Boolean "AND"
          Display and view all citations
          How many citations were published after 1990?......

    2.4.3 Type in "py>=1991"
          Combine 2.4 and 2.4.3 with the Boolean "AND"
          Display and view all citations
          How many citations were published since 1991?......

2.5. Type in "(tippett and mickle and roidt) in au"

    What field(s) do these three terms appear on the citations?
    ....

    Write down the title of this article...................

    ....
2.6 What are the differences when you typed in
    "Sweet and Fruits and Crops" and when you typed in
    "Sweet in au and (fruits and crops) in de"

III. Use History command key
    3.1. Save Search options to Drive A:
       -Change filename to: Lesson6.str

    3.2. Quit Agricola 1984-1992

    3.3. Select Agricola 1979-84
    3.4. Use History command key
       -Run Search sets: Lesson6.str

    3.5. Write down how many citations found in Agricola 1979-1984 on
       each of the following search sets:

        3.4.1   soybean and cooking............................
        3.4.2   soybean with cooking...........................
        3.4.3   soybean near cooking...........................
        3.4.4   soybean near3 cooking..........................
        3.4.5   soybean near2 cooking..........................
        3.4.6   chicken near3 cooking..........................
        3.4.7   chicken near2 cooking..........................

Please answer the following questions in your own words:

1. What are the differences between using the connectors "WITH" and "AND"?

2. What are the differences between using the connectors "NEAR" and "NEAR2 or NEAR3 or NEAR5"?

3. Explain the advantage(s) of using each of the operators (AND, WITH, NEAR, and NEAR3).

Please remember to turn in the floppy disk with this assignment

Assignment 7 SilverPlatter

Name_____

Date_____ Time In_____ Time Out_____

```
****************************************************************
* Read the Assignment Carefully before starting the search.   *
* Observe what is on the screen.                              *
* Please use any check-out materials to complete the assignment.*
* Select A) NETWORK Disks - Search Kerr Library CD Network    *
****************************************************************
```
Select Social Sciences (PsycLit/SSI)
Select PsycLit 1987-1992
Select Journal articles
DO NOT CLEAR THE SEARCHES OR SCREEN ON THIS ASSIGNMENT

I. Truncation symbols
  1. Type in "learns or Learn or learnt"
    Type in "learn?"

    1.1 Use the Index command and retrieve the following phrases:

      problem-solve, problem-solver, problem-solvers, problem-solving
    1.2 Type in "Problem solv???"
    1.3 Type in "problem-solv???"

    What are the differences between the phrases in 1.2 and 1.3?

  2. What happens when you type in "Vaccin*"?
    Display and view all citations
    After this use the Index command to look up this term.

    How many records found on each term from the root word "vaccin"?

  3. If you want to search for the terms

      "happy or happiness or happily", what would you do?

      Would you truncate the root word?
      What truncation symbol would you use?
      OR Would you look them up in the Index? Please explain.

II. Thesaurus command
    1. Use the Thesaurus command and look up the phrase
      "Life-Satisfaction"

    From the Term Details for **Life-Satisfaction,**

    what year was this term introduced?......................

    what is the Broader Term(s)?.............................

    what are the Related term(s)?............................

  2. Select the phrase "Life-Satisfaction"

3. Display and view some ciations found.
   In what field was the phrase "Life-satisfaction" found?

III. Select your own topic or choose from the following topics:
     *the causes of students dropping out of school
     *Effects of anxiety and stress on dreams

   1. Write down your topic.................................
   2. If you choose the topics above, select **PsycLit** database
      2.1 If you choose to do your own topic, write down the
          SilverPlatter database(s) you have selected...........

          ....
   3. Select 10-20 citations from your searches on the topic that
      you have chosen

   4. Select Download and Change Options to the following:
              Fields to Download: Citation, descriptors, abstract
              Record to Download: Record that you have marked
              Field Labels: Short labels
              Download searches: Say Yes
              Drive: Select drive A:
              Filename: Home7.doc

   5. Save (download) these citations on the floppy disk provided,

Note: The citations should relate to the topic you have chosen as
      much as possible.

      At the CD center 3.5 is B drive
                       5.25 is A drive

    At Rm. 202 MCC: 3.5 is A drive
    At Kerr Lab   : 3.5 is A drive

III. Please answer the following questions in your own words:

   1. What is the "?" used for?

   2. What is the "*" used for?

   3. What does the Thesaurus command do?

Please remember to turn in the floppy disk with this assignment.

Self-Instruction Group Lesson Plan

From the second through the fifth weeks, the subjects used *SilverPlatter* user's guide (called *SPIRS* user's manual), *Wilsondisc* teaching guides and help guides from the CD center to complete assignments at their own pace. The assignments for this group were identical to those assigned the conventional instruction group.

The goal of this study is to learn to become familiar with Wilsondisc and SilverPlatter databases. You will be learning with the help of weekly assignments. You will complete the assignment at your convenience.

You will be given 2 assignments per week. There is no time limit for each assignment. Each assignment is designed to be completed in one hour, but if you wish to spend more time on it, I appreciate your time and effort.

The total length of the training is four weeks.

Please, Check-Out the following materials at the CD center:

* Compact Disk Database Selection Guide.
* Compact Disk - Subject Selection Guide.
* Wilsondisc Teaching Guide (In "NATTAYA CD DATABASE TRAINING BOX")
* CD User Guide: Wilsondisc and Wilsondisc Key Template

Please **do not** ask anyone to help you in the search strategy. You may ask for help in the use of function keys only. If you have questions regarding instructions, please contact Nattaya.

Each week you will be given two assignment sheets from Nattaya. After completing your assignments, please put them in the yellow envelope and leave it in NATTAYA CD DATABASE TRAINING BOX at the CD center.

Your effort in completing the study is very much appreciated. It will help educators in the understanding of learning and teaching at the college level for future education. In addition, the educators and CD-ROM vendors will learn more about the effectiveness of the user interface.

If you have any question, please contact Nattaya at one of the following:

I will be at CD center working on Wed 10:00am. - 1:00pm.
                                  Thu 8:00am. - 10:00am.
                                  Sat 7:00pm. - Midnight
Or you may leave me a message at the CD center any time.

Day time phone : 737-7279 leave a message with John Donel

Home phone   : 757-0825 (early morning, early evening, or
                           you may leave a message)

Thank you very much for participating in the study

Introduction

CD-ROM (Compact-Disc-Read-Only-Memory) means the information on the disc cannot be changed. The CD-ROM databases allow you to perform liturature searches by typing keywords or subject terms into a computer. There are many CD-ROM vendors, or producers, such as Wilsondisc, SilverPlatter, Compact Cambridge, and UMI etc. Wilsondisc produces CD-ROM databases covering a variety of subjects such as:

Applied Science & Technology Index

Biological & Agricultural Index

Business Periodicals Index

Education Index

Essay & General Literature Index

General Science Index

Humanities Index

Social Sciences Index

APPENDIX D

CD-ROM DATABASES (*WILSONDISC, SILVERPLATTER*)

Wilsondisc databases were produced by H. W. Wilson company.
The databases cover various subjects with resemblance
to the print indexes which Oregon State University is
subscribing. The *Wilsondisc* databases used in the
study are the following:

Applied Science and Technology Index

Biological & Agricultural Index

Business Periodical Index

Education Index

General Science Index

Social Science Index

The databases have three search modes, a subject
search (Browse), multi-subjects search (Wilsearch),
and command search (Wilsonline) modes.

SilverPlatter databases were produced by SilverPlatter
Information System. *SilverPlatter* contains various
databases which uses the command menu interface. The
databases used in the experiment were as follows:

Agricola (Bibliography of Agriculture)

CAB Abstracts (Commonwealth Agricultural Bureau)

Medline (Index Medicus)

PsyClit (Psychological Abstracts)

All databases used in the study are accessible via the
Oregon State University campus network. Databases were

equipped with the online help screen and came with the print manuals.

APPENDIX E

SUBJECT EVALUATIONS

CD-ROM TRAINING EVALUATIONS
Conventional Instruction Group

Name..

Please circle one (1,2,3, or 4) which apply to you.

1. How helpful do you think formal training of searching CD-ROM

    databases will be for your future research papers?

    1. Very helpful

    2. Somewhat helpful

    3. Not very helpful

    4. Not helpful

2. How helpful do you think formal training of searching CD-ROM

    databases will be in saving you time in retrieving information from

    the compact-disc databases?

    1. Very helpful

    2. Somewhat helpful

    3. Not very helpful

    4. Not helpful

3. Do you think formal training will improve the effectiveness of your

    information searches on CD databases?

    1. Very helpful

    2. Somewhat helpful

    3. Not very helpful

    4. Not helpful

4. In your opinion, how necessary is formal training in searching CD-

    ROM database?

    1. Very necessary

    2. Somewhat necessary

    3. Unnecessary

    4. Not helpful

5.   Do you prefer searching with Wilsondisc or SilverPlatter CD-ROM
      databases?

      1. Wilsondisc

      2. SilverPlatter

      3. Both Wilsondisc and SilverPlatter

      4. Neither

6.   How often do you search CD-ROM databases besides class time or class
      assignments?

      1. Use only during class time

      2. one-two time per week

      3. three-five times per week

      4. More than five times per week

7.   If you search CD-ROM databases on your own, what CD-ROM databases
      did you use?

      1. Wilsondisc

      2. SilverPlatter

      3. Both Wilsondisc and SilverPlatter

      4. Other, please specify...........................

8.   If you had a choice, which instruction method would you prefer?

      1. Instruction

      2. Self-instruction (independent study)

      3. Other, please specify...........................

9.   Do you think two times per week for four weeks is sufficient time
      for CD-ROM database training?

      1. Too long

      2. About right

      3. Too short

      4. Other, please specify...........................

10.   Do you think the level of difficulty of the teaching method or teaching instruction was?

1. Too difficult

2. About right

3. Too easy

4. Other, please specify.........................

11.   Other comments:

CD-ROM TRAINING EVALUATIONS
Self-Instruction Group

Name..

Please circle one (1,2,3,or 4) which apply to you.

1.   How helpful do you think formal training of searching CD-ROM

     databases will be for your future research papers?

     1. Very helpful

     2. Somewhat helpful

     3. Not very helpful

     4. Not helpful

2.   How helpful do you think formal training of searching CD-ROM

     databases will be in saving you time in retrieving information from

     the compact-disc databases?

     1. Very helpful

     2. Somewhat helpful

     3. Not very helpful

     4. Not helpful

3.   Do you think formal training will improve the effectivness of your

     information searches on CD databases?

     1. Very helpful

     2. Somewhat helpful

     3. Not very helpful

     4. Not helpful

4.   In your opinion, how necessary is formal training in searching CD-

     ROM database?

     1. Very necessary

     2. Somewhat necessary

     3. Unnecessary

5.   Do you prefer searching with Wilsondisc or SilverPlatter CD-ROM

     databases?

     1. Wilsondisc

     2. SilverPlatter

     3. Both Wilsondisc and SilverPlatter

     4. Neither

6. How often do you search CD-ROM databases besides class time or class assignments?

    1. Use only during class time

    2. One-two time per week

    3. Three-five times per week

    4. More than five times per week

7. If you search CD-ROM databases on your own, what CD-ROM databases did you use?

    1. Wilsondisc

    2. SilverPlatter

    3. Both Wilsondisc and SilverPlatter

    4. Other, please specify...........................

8. If you had a choice, which instruction method would you prefer?

    1. Instruction

    2. Self-instruction (independent study)

    3. Other, please specify..........................

9. Do you think two times per week for four weeks is sufficient time for CD-ROM database training is?

    1. Too long

    2. About right

    3. Too short

    4. Other, please specify..........................

10. Do you use the paper manuals and help guides to help you in CD-ROM database searches?

    1. Yes, I use the paper manual and help guides.

    2. I sometime use the paper manual and help guides.

    3. No, I don't use any of the paper manual or help guides.

    4. Other, please specify..........................

11. How do you use the paper manuals and help guides to help you in CD-ROM database searches?

    1. I read the manuals and help guides before doing assignments.

    2. I used the manuals only when I can't figure something out.

    3. I don't use the manuals.

12. How helpful are these paper manuals and help guides when performing
    CD-ROM database searches?

    1. Very helpful

    2. Somewhat helpful

    3. Not very helpful

    4. Not helpful

13. What kind of computer interfaces are you familiar with?

    1. IBM, Dos

    2. IBM, Windows

    3. MacIntosh

    4. Other, please specify.........................

14. Do you think the level of difficulty of the instructions for the
    assignments was?

    1. Too difficult

    2. About right

    3. Too easy

    4. Other, please specify.........................

15. Other comments:

APPENDIX F

TIME-LINE FOR THE STUDY

TIME-LINE FOR THE STUDY

First Week, Initial Meeting

All students read and sign the consent form, complete
a demographic questionnaire, and take the CD-ROM Competency
Test. Selected participants were randomized into either
the conventional instruction group or the self-instruction
group. Selected subjects placed in the conventional
instruction group were contacted subsequently to schedule
class sessions.

Subjects in the conventional instruction group were
trained in the techniques to search the *Wilsondisc* and
SilverPlatter databases for up to one hour, twice each week
for four weeks. They were be given seven assignments to
complete during a four-week period. The students in the
self-instruction group were asked to review the paper
manuals, which were produced by the CD-ROM vendors, and
other In-House CD-ROM help guides provided in the Kerr
Library at the CD center. They also were provided with a
CD-ROM database listing containing explanations of the
information within each database. They were given seven
assignments identical to those assigned the conventional
instruction group to complete during a four-week period.
Subjects were allowed to ask for assistance from the
researcher with computer function keys, to the exclusion of
assistance with searching strategies. Subjects in the

self-instruction group were perform the database searches
at their own pace.

All assignments were corrected by the researcher.

Weeks Two Through Five

Conventional Instruction Group Lesson Plan

Lesson 1

TOPIC: Introduction to CD-ROM Technology

Lesson 2

TOPIC: *Wilsondisc* three search modes.

Lesson 3

TOPIC: Search Strategies and Basic Search Operators
in Wilsearch mode

Lesson 4

TOPIC: Operating *Wilsonline* Mode and NBR (or Neigh-
bor command)

Lesson 5

TOPIC: *Wilsondisc* Truncations, Field Qualifiers and
Download of Information onto a Floppy Dis-
kette.

Lesson 6

TOPIC: Basic Searches in the *SilverPlatter* Data-
bases

<u>Lesson 7</u>

    TOPIC: Searching in SilverPlatter Using the Opera-

               tors (WITH, NEAR, IN), Field Qualifiers, and

               the History Command.

<u>Lesson 8</u>

    TOPIC: Operating Truncations, Thesaurus, and Down-

               loading.
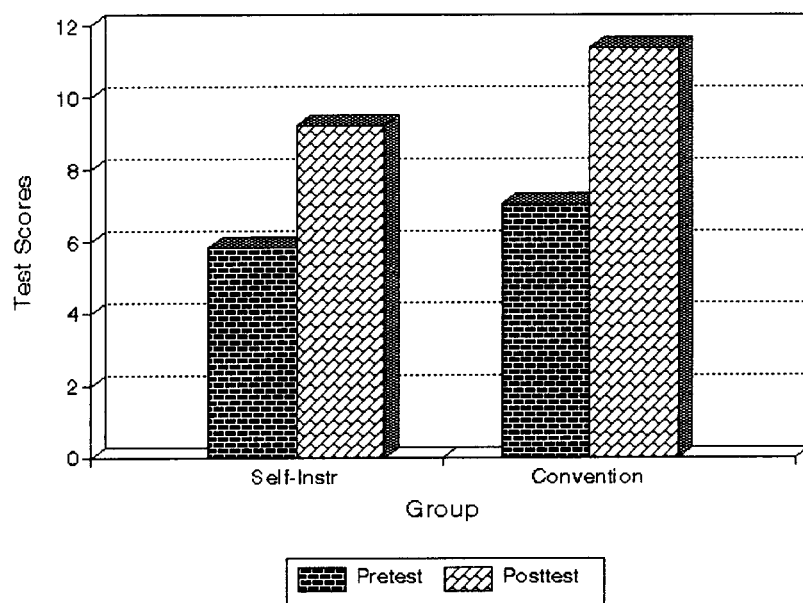
<u>Self-Instruction Group Lesson Plan</u>

From the second through the fifth weeks, the subjects
used *SilverPlatter* user's guide (called *SPIR* user's
manual), *Wilsondisc* teaching guides and help guides from
the CD center to complete assignments at their own pace.
The assignments for this group were identical to those
assigned the conventional instruction group.

<div align="center">Sixth Week</div>

All participants were administered a posttest using
the CD-ROM database competency test, and were asked to
complete a subject evaluation form.

APPENDIX G

MEAN SCORES

Training Method Mean Scores

Gender Mean Scores