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ABSTRACT
              End-user interfaces for the online public access
catalogs (OPACs) of OhioLINK, a system linking major university and
research libraries in Ohio, and its 16 member libraries, accessible
through the Internet, are compared and evaluated from the
user-oriented perspective. A common, systematic framework was used
for the scientific observation of the OPAC system's functional
capabilities and interface characteristics. Particular emphasis was
given to the mode of interaction and user assistance provided. The
observations were made over about a 2-week period in 1992. Interface
design alternatives were identified and analyzed qualitatively. The
17 OPACs studied used only 6 different software packages, but
provided very different interfaces for the same software, as well as
a variety of interaction modes. Suggestions are given for the future
development of the OhioLINK system to increase ease of use.
Appendixes provide examples of output formats and help screens.
(Contains 17 references.) (SLD)

COMPARISON AND EVALUATION OF END-USER INTERFACES
FOR ONLINE PUBLIC ACCESS CATALOGS

A Master's Research Paper submitted to the
Kent State University
School of Library and Information Science
in partial fulfillment of the requirements
for the degree Master of Library Science

by

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June, 1993

COMPARISON AND EVALUATION OF END-USER INTERFACES FOR ONLINE PUBLIC ACCESS CATALOGS

ABSTRACT

End-user interfaces for OPACs of OhioLINK and its 16 member libraries, accessible by Internet, are compared and evaluated from the user-oriented perspective. A common, systematic framework is used for the scientific observation of OPAC systems functional capabilities and interface characteristics. Particular emphasis is given to the mode of interaction and user assistance provided. Interface design alternatives are identified and qualitatively analyzed.

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CHAPTER 1

INTRODUCTION

Background

The vast expansion in library collections over the past two decades has forced librarians to deal with an increasing burden of the production and maintenance of library catalogs. The need to control costs on one hand while optimizing the resources o the other hand has led to centralized shared cataloging and automated catalogs. The next logical step was to offer the online catalog to the user. In the last ten years, most libraries have replaced their card catalogs with online public access catalogs (OPACs) and it is safe to say that the ones that have not done so yet are planning to do it in the near future.

At bottom, an OPAC is, and should primarily be, a library catalog. As such, it has the four functions of any bibliographic instrument: the finding or identifying function, the gathering function, the collocating function, and the evaluative or selecting function[1]. The goals of OPAC design should include improving the accessibility and the

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[1]D. Katryn Weintraub, "The Essentials of Desiderata of the Bibliographic Record as Discovered by Research," Library Resources and Technical Services 23 (1979): 391-405.

1

availability of the information while reducing the time and money spent on obtaining the relevant information. It is the ideal of satisfying the user's information needs with the minimal effort from his/her side that we have to pursue in designing the OPACs.

There is a need to examine and compare various existing systems in order to develop design guidelines for future OPACs. New and improved systems can be built using (good and bad) experience acquired by predecessors. One possible approach of studying OPACs (or any other computer application) is to explore them from the end-user's perspective.

When the computers were first introduced, they were not meant to be used directly by end-users and the programmers were concerned almost exclusively with the algorithms and their efficiency. Later the technology for interactive processing became available and that transition was particularly dramatic in electronic searching. Recently information seeking is being revolutionized by the widespread use of personal computers, CD-ROM databases, easy access to online databases, and last but not least, OPACs.

There are many definitions of human-computer interface (HCI), ranging from the ones considering only hardware to the ones considering only software. The broadest possible definition is: HCI is what the user sees, hears and touches in interacting with a computer system. These interfaces have been also labeled MMI (man-machine interface), HSI (human-systems

interface), CHI (computer-human interaction), or, lately, GUI (graphic user interface).

The study of HCI is a broad interdisciplinary field with both theoretical and applied aspects and it is important for two reasons. First, it is apparent that peoples' time is a major component of the cost of computing, therefore it is very important that computer applications are easy to learn and easy to use in order to save time. Secondly, computer applications are not judged by the functionality only. The interface often determines the success of an application and many information systems are judged primarily on the way the user interacts with them.

Although librarians are users of OPACs, too, in this paper the term end-user will be limited to library patrons. The patrons vary from completely inexperienced ones (who may also be afraid of computers) to highly sophisticated ones. It is very challenging to design one single interface, that will help all (different) users to satisfy their (different) information needs.

Statement of the problem

State-of-the-art surveys and analyses can be useful; they give us an understanding of how far we have come and give us realistic expectations for the near future. They can also serve as mechanisms for the cross-fertilization of ideas.

The goal of this research is to study end-user interfaces of selected OPACs available through Internet. OhioLINK and its libraries are the primary investigation objects.

There are five functional areas of OPAC interfaces:

- operational control

- search formulation control

- access points

- output control

- user assistance

Each of the functions is studied from the end-user's perspective.

The OhioLINK libraries are currently in a transition period. Six of them have already joined the network's union cataloging service. The central catalog contains items owned by these members which are using the same software for their local catalogs. Other member libraries will follow in the next two years. The analysis of existing user interfaces is important for several reasons:

- even the libraries using the same software do not have identical interfaces, so they could benefit from the comparison with other libraries.

- the libraries which will make the transition soon will be able to design the future interface using the experience of other libraries.

- the system chosen for OhioLINK is not static. In future development, suggestions from this research could be useful.

Limitations

The interfaces are compared and analyzed according to a conceptual model, with an emphasis on mode of interaction and user assistance provided. The research is not dealing with the database quality, quality of subject access, or efficiency of the search process.

Finally, guidelines for designing 'good' OPAC interfaces are given.

Only Internet access to OPACs is studied and only the information available to any off-site users is taken into consideration. No off-line documentation from either the libraries or vendors was used.

Definition of terms

Online public access catalog (OPAC) is a computer-based and supported library catalog (bibliographic database) designed to be accessed via a terminal so that library patrons may directly and effectively search for and retrieve bibliographic information without the assistance

of an intermediary such as a specially trained member of the library staff[2].

End-user is a person who ultimately desires, receives, and uses the information and related services provided through the use of an interactive retrieval system[3]. In this study, the term is used for library patrons.

Interface in general is the point or process which joins two or more system components. In this study the term will be used for the software component of OPAC which enables the user to interact with the system.

OhioLINK is a statewide integrated library and information network linking major university and research libraries in Ohio. There are now 18 members[4] and the OhioLINK central catalog currently contains items owned by six members[5].

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[2]Charles R. Hildreth, Online Public Access Catalogs: The User Interface (Dublin, Ohio: OCLC, 1982): 235.

[3]Ibid., 228.

[4]Only 16 catalogs are accessible by Internet.

[5]Request for Proposal for OhioLINK, 1989.

CHAPTER 2

LITERATURE REVIEW

The first large research in OPACs was the Online Catalog

Public Access Project, funded by the Council on Library

Resources in the early 1980's. Several reports followed.

Hildreth[6] studied ten OPACs from the user perspective and

provided a uniform, systematic conceptual framework and

terminology for analyzing and comparing OPAC functional

capabilities and interface characteristics. He also identified

crucial interface design alternatives. A glossary was produced

and checklists were created to capture in detail each

component and feature of the end-user interface. That

conceptual framework was used by Salmon[7] in his description

of 20 OPACs.

The functional characteristics studied were: the search

method, access points, search commands, limiting and

broadening searches, record displays, and user assistance. The

conclusions include suggestions about what characteristics

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[6]Hildreth, Online Public Access Catalogs: The User
Interface.

[7]Stephen R. Salmon, "Characteristics of Online Public
Catalogs," Library Resources and Technical Services (January
1983): 36-67.

online systems should have.

Bills and Helgerson[8] provide a more recent comparison of user interfaces for six online catalog products on CD-ROM; comparisons are made on the basis of screen design, user commands, and online user aids. There is a particular emphasis on consistency. A general summary evaluation of each product is given, followed by detailed descriptions.

Matthews[9] suggested guidelines for screen layout according to current understanding of how online catalogs are used. His guidelines include: consistent display formats, consistent labeling of information, and brevity.

An interesting comparative study of the friendliness of online "help" in interactive systems was done by Trenner[10]. General guidelines for the design of a "help" facility are drawn up and these are used to evaluate the quality and friendliness of the "help" provided by each system. The analysis indicates that user assistance is often inadequate, especially on the commercial online systems. Some ways in which online "help" can be improved are suggested.

Issues of designing user-friendly online catalogs were

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[8]Linda G. Bills and Linda W. Helgerson, "User Interfaces for CD-ROM PACs," Library Hi Tech 6, no. 2 (1988): 73-113.

[9]Joseph R. Matthews, "Suggested Guidelines for Screen Layouts and Design of Online Catalogs," Library Trends (March 1987): 555-567.

[10]Lesley Trenner, "A Comparative Survey of the Friendliness of Online "Help" in Interactive Information Retrieval Systems," Information Processing & Management 25, no. 2 (1989): 119-136.

discussed at the 23rd Annual Clinic on Library Applications of Data Processing at Urbana-Champaign in 1986[11]. Several suggestions were made on how to make systems easier to use and more attractive. The design principles suggested can be used as a basis of evaluation of "friendliness" of OPAC interfaces.

Shires and Olszak[12] discussed the general principles of screen layout design, menus and commands and provided the basic principles and practical checklists.

Hildreth[13] reviewed and summarized developments of online catalog design. Among other research, state-of-the-art surveys and comparative studies are discussed.

Current research on user interfaces was reviewed by Yee[14]. The features discussed are: the demonstration of relationships between records, the provision of entry vocabularies, the arrangement of multiple entries on the screen, the provision of access points, the display of single records, and the division of the catalog into separate files

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[11]Emily Gallup Fayen, "User Interfaces for Online Library Catalogs," in What is User Friendly? ed. F. W. Lancaster (Urbana-Champaign: University of Illinois, Graduate School of Library and Information Science, 1987).

[12]Nancy L. Shires and Lydia P. Olszak, "What our Screens Should Look Like: An Introduction to Effective OPAC Screens," RQ (March 1992): 357-369.

[13]Charles R. Hildreth, "Online Public Access Catalogs," Annual Review of Information Science and Technology 20 (1985): 233-286.

[14]Martha M. Yee, "System Design and Cataloging Meet the User: User Interface to Online Public Access Catalogs," JASIS 42, no. 2 (1991):78-98.

or indexes. Issues of effective user interfaces are identified and implications for system design are listed. There is a nice overview of user problems with OPACs. Shaw[15] also gives a review of research in interface design for information retrieval, one chapter is dealing with online catalogs.

Several works[16] [17] [18] [19] identify the problems users have when using OPACs. They provide general guidelines for improving the online catalog. Hildreth[20] discusses OPACs in general, dividing them in three generations according to the quality of subject access. For this research, his "OPAC Interface Adequacy Assessment Guide" is particularly valuable.

The issues of designing better ("new generation") OPACs

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[15]Debora Shaw, "The Human-Computer Interface for Information Retrieval," Annual Review of Information Science and Technology 8 no. 2 (1991): 87-103.

[16]Thomas Basista, H. Mary Micco, and Linda Rambler, "Designing the OPAC User Interface to Improve Access and Retrieval," Microcomputers for Information Management 8, no. 2 (1991): 87-103.

[17]Natalie N. Mitev, "Ease of Interaction and Retrieval in Online Catalogues: Contributions of Human-Computer Interaction Research," in The Online Catalogue, ed. Charles R. Hildreth (London: Library Association, 1989).

[18]Natalie N. Mitev," Human-Computer Interaction and Online Catalogues," in OPACs and Beyond (Dublin, Ohio: OCLC, 1989).

[19]Karen Markey, "Barriers to Effective Use of Online Catalogs," in Online Catalogs, Online Reference: Converging Trends (Chicago: American Library Association, 1984).

[20]Charles R. Hildreth, "Pursuing the Ideal: Generations of Online Catalogs" ibid.

were discussed in August 1992 on PACS-L discussion group[21]. The common trait of all the contributions was that the system should be responsive to each individual user's preferences and needs. While some contributors focused on improved query formulation (post-Boolean: probabilistic, relevance-feedback...) and improved subject access, they all emphasized ease of use as the most important feature.

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[21]PACS-L@UHUPVM1, the subjects were Boolean & Probabilistic, OPAC functionality, Third generation OPAC, and CLR-OPAC study

CHAPTER 3

METHODOLOGY

Descriptions of system's components, capabilities and interface characteristics may be based on the documentation prepared by the system producer, reports from users, questionnaires completed by system producers or owners, or by first-hand use by the reviewer. The latter is suggested as the best by Hildreth[22].

Scientific observation method is used for this research. The conceptual framework and classification of features is based on Hildreth[23]. Some of the observed features (about one half) are taken directly from his work, others are added or modified mostly due to the new developments in the recent years. The features are compared on the basis of their functionality (WHAT they offer) and how they are implemented (HOW the user can perform the function). The features of interfaces are summarized and evaluated following Matthews[24],

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[22]Hildreth, "Online Public Access Catalogs".

[23]Hildreth, Online Public Access Catalogs: The User Interface.

[24]Matthews, "Suggested Guidelines for Screen Layouts and Design of Online Catalogs."

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Trenner[25], Shires and Olszak[26], and Hildreth[27]. In the final critical analysis, particular emphasis is given to mode of interaction and user guidance provided.

The OPACs of OhioLINK and its member libraries, accessible by Internet, are the population studied.

All OPACs were accessed using Telnet from the VAX at Kent State University and with an IBM-PC compatible as a terminal.

The actual observation took place between May 15 and June 1, 1993. All the findings are based only on the features observed in that time period.

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[25]Trenner, "A Comparative Survey of the Friendliness of Online "Help" in Interactive Information Retrieval Systems."

[26]Shires and Olszak, "What our Screens Should Look Like: An Introduction to Effective OPAC Screens."

[27]Hildreth, "Pursuing the Ideal: Generations of Online Catalogs."

CHAPTER 4

RESEARCH RESULTS

OhioLINK is a statewide integrated library and information network linking major university and research libraries in Ohio. End-user interfaces for OPACs of OhioLINK and 16 member libraries, accessible by Internet, are compared and evaluated in this study.

The 17 OPACs studied are using only 6 different software packages (INNOPAC, NOTIS, Textrieve, LCS, VTLS, and Dynix), yet the differences in the interfaces go far beyond the differences in software alone. The findings of the study are summarized in six sections:

- Access to OPACs

- Operational control

- Access points

- Search formulation control

- Output control

- User assistance

In each section, there is a table in which the features of individual OPACs are recorded and identified. The percentages of OPACs having each feature are given in the tables, too.

4.1 Access to the OPACs

All OPACs studied were accessed through Internet, using the addresses from Hytelnet directory available from access.usask.ca (login: hytelnet). An alternative source is the directory available through OhioLINK. Both directories contain the same information. Some actual logon procedures are different from the ones listed in the directories and the corrected (or updated) procedures are shown in Table 1.

Three kinds of access were identified by the study:

1. The first and the most desirable access to an OPAC is the one where no action is required from the user after entering the Internet address. The only OPAC offering this kind of access is Case Western Reserve University.

2. The second possible (and convenient) procedure is to give step-by-step instructions and prompts to the user. The OPACs with that kind of access are identified in the table by the phrase "follow directions".

3. The third and the most inconvenient access is to require a username and a password the user can only get from directories or other sources. There are two problems with that solution: the user may have trouble locating the source of information about the logon procedure and the sources are not always updated regularly. Unfortunately, among the OPACs studied, several fall into this category. All network

administrators should consider at least giving online instructions on access to the OPAC.

For most OPACs the logoff procedure is not a problem. A user can simply follow the directions provided either on the introductory screen or online help. Unfortunately there are two sites where such information is not available (University of Akron and Youngstown State University). In that case the user has to close the connection ("hang up") and that is not a good solution.

TABLE 1

ACCESS TO OPACS

OPAC	Code	Internet number	Internet name	System used	Logon procedure
Bowling Green University	BGU	129.1.10.2	robin.bgsu.edu	INNOPAC	follow directions
Case Western University	CWR	129.22.138.1	catalog.cwru.edu	INNOPAC	.
Central State University	CEN	144.50.30.1	hallie.ces.edu	INNOPAC	login: library<Ret>
Cleveland State University	CSU	137.148.2.2	vmcms.scuohio.edu	NOTIS	8<Ret>; Username:<Ret>; scholar<Ret>
Kent State University	KE	131.123.1.9	catalyst.kent.edu	NOTIS	<Ret>; follow directions
OhioLINK central catalog	C	130.108.120.25	cat.ohiolink.edu	INNOPAC	follow directions
Miami University	MIA	134.53.24.2	watson.lib.muohio.edu	INNOPAC	follow directions
NEOUCOM	NEO	140.220.1.2	scotty.neoucom.edu	Textrieve	follow directions
Ohio State University	OSU	128.146.15.141	lcs.us.ohio-state.edu	LCS	follow directions
Ohio Northern University	OU	140.228.25.1	polar.onu.edu	INNOPAC	login: library<Ret>
Shawnee State University	SSU	146.85.4.6	beartrack.shawnee.edu	INNOPAC	login: library<Ret>
University of Akron	AKR	130.101.226.100	library.uakron.edu	VTLS	follow directions
University of Cincinnati	CIN	129.137.108.5	ucolk3.olk.uc.edu	INNOPAC	login: uclid<Ret>
University of Dayton	DAY	131.238.1.14	udapri.oca.udayton.edu	Dynix	At OK, type login<Ret> userid? pub02<Ret> password? public<Ret>
University of Toledo	TOL	131.183.1.2	uoft01.utoledo.edu	NOTIS	(use TN3270) <Ret>; dial mvs; utmost
University of Youngstown	YSU	192.55.234.14	library.ysu.edu	VTLS	follow directions
Wright State University	WSU	130.108.128.200	desire.wright.edu	INNOPAC	Username: libnet<Ret> Password: library<Ret>

NOTE: The codes listed are used by OhioLINK

25

24

4.2 Operational control

Operational control functions are those functions that are performed prior to, during, or after the actual search process to facilitate the retrieving and displaying of information. The typical operational control functions include logon and logoff, database selection, error correction, saving of search commands, and mode of interaction.

Since all logon procedures for all OPACs are listed and discussed in the previous section, the analysis in this section deals only with the interfaces the user is exposed to after successfully reaching the OPAC.

Table 2 shows operational control capabilities.

Explanation of entries in Table 2

Select desired function

The OPAC may be ready for the user to search the bibliographic database. In other cases there are several possible functions the user can perform (interlibrary loan, materials on reserve, library information, news, access to databases and other OPACs, suggestions...) and the user is expected to perform an explicit action to start searching the library catalog. The latter OPACs are marked in the table.

Default for function

A predetermined function (usually catalog searching) is assumed by the system and the user can start immediately.

Select dialogue mode

The system offers a choice of several dialogue modes (e.g. command-driven and menu-driven) and the user can explicitly choose between them.

Select dialogue level

Provisions are made for the user to identify his/her experience with the OPAC (e.g. beginner, intermediary, expert) and subsequently the dialogue is changed accordingly. For such systems the 'beginner mode' is the usual default.

Edit input (erase/modify)

The system allows the user to edit his/her commands. In the case of this research, the function is additionally demanding because terminal emulation is used.

Command language

The user formulates his/her requests by entering commands.

Menu selection

The user chooses among listed alternatives when performing a function.

Directive prompts

The dialogue is guided by the system. It is based on a preestablished course of action, and consists of messages which direct the user to a required action.

Suggestive prompts

They inform the user of possible action(s) which the user may

or may not take. The user is typically not limited to the listed choices.

TABLE 2

OPERATIONAL CONTROL

	BGU	CWR	CEN	CSU	MIA	KE	C	NEO	OSU	OU	SSU	AKR	CIN	DAY	TOL	YSU	WSU	%
Select desired function	+	+	+	-	+	-	+	+	-	+	+	-	+	+	-	-	+	65
Default for function	-	-	-	+	-	+	-	-	+	-	-	+	-	-	+	+	-	35
Select dialogue mode	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+[2]	-	12
Select dialogue level	-	-	-	-	-	-	-	-	-	-	-	+	-	+[1]	-	+[2]	-	18
Command language	-	-	-	+	-	+	-	+	+	-	-	+	-	-	+	+	-	41
Menu selection	+	+	+	+	+	+	+	-	-	+	+	+	+	+	+	+	+	88
Prompts-directive	+	+	+	-	+	-	+	-	-	+	+	-	+	-	-	-	+	53
Prompts-suggestive	-	-	-	+	-	+	-	+	+	-	-	+	-	+	+	+	-	41

+   Capability available or under the control of the user

-    Capability not available

NOTES:

1 Help level can be selected

2 Offered, but not working

The discussion of operational control is focused on the mode of interaction.

Even though a variety of interfaces has been designed for OPACs, they fall in one of the two alternatives:

- command-driven dialogue
- menu-selection dialogue

Command-driven dialogue is the one that was first used for information retrieval and was developed in the early 70s by the major database vendors (e.g. DIALOG and BRS). It is still the prevalent interaction mode with those systems and is primarily designed for the use by trained intermediaries. In the basic form of a command-driven system commands are entered in an artificial, highly structured language; system response is limited to simple prompts and terse error messages. There is no real dialogue between the system and the user, but on the other hand a broad array of commands may be provided, giving the user increased control and flexibility.

With menu-selection users do not have to learn a specialized language. Instead, the system offers a series of menus listing choices for commands and parameters. The user indicates his/her choice from the displayed list, usually by typing the entry number or letter code. The system retains control of the dialogue and the user can only select from the menu currently being displayed.

The menus are generally considered the more user-friendly

mode od interaction, because they can be easily used by novice users and they prevent the user from making errors. Some disadvantages have to be mentioned, too:

- usually they do not allow much flexibility (the designer has determined what a "typical" search is)
- the number of choices is relatively limited
- even the experienced user must go through the whole menu-selection process, which is very time consuming if there are several levels of menus

The command mode, on the other hand, allows more flexibility for the user, who can change the direction before a search sequence is complete, or choose a direct path to the retrieval goal. The big disadvantage is, of course, that the more complex command languages are not easy to learn and practically cannot be used by a novice.

Among the systems studied, there is one with a "classical" command language (NEOUCOM). It is a very flexible system, allowing the full capability of information retrieval systems, but one that is extremely difficult for an occasional user. Although there is some limited online help available, the system was probably not designed to be used by novice users at all.

The system used by Ohio State University is basically command-driven, too, with a very limited number of available commands. There are some suggestive prompts that help the

user.

On the other side there are several OPACs using INNOPAC software (which is also the system chosen for OhioLINK). This is a pure menu-driven system. It is very easy to use, but occasionally cumbersome when the user has to display three or more menu screens to perform one function. There is an additional problem with OhioLINK central OPAC. The menu labels are not used consistently (O and M are used for "Additional options" and the same code if used for different purposes in different menus).

All other systems use both command languages (they are limited to query formulation) and menus as mutually supportive components of the same interface. This approach uses advantages of both systems.

When discussing the future development in OPAC design, most authors predict that user-adaptable interface will be one of the most important features of "better" OPACs. Some limited adaptability is offered by the systems analyzed. One system (University of Akron) allows the user to choose between the command mode (which is default) and a menu-driven novice mode. The option is mentioned in the other VTLS OPAC (Youngstown State University), but does not work. University of Dayton OPAC offers another interesting provision: the user can choose the length of system error messages according to his/her experience.

4.3 Access points

The choice of access points is one of the most important features of OPACs. Currently many researchers are investigating this problem, particularly the subject access.

The investigation of access is not a goal of this paper. This section is added only to give a more rounded description of OPACs studied and no analysis of the features is added here.

Access points are listed in Table 3.

TABLE 3

ACCESS POINTS

	BGU	CWR	CEN	CSU	MIA	KE	C	NEO	OSU	OU	SSU	AKR	CIN	DAY	TOL	YSU	WSU	%
Personal author	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	100
Corporate author	+	+	+[3]	+	+[3]	+	+	+	+	+[3]	+[3]	+	+	+[3]	+	+	+	100
Author/title	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	6
Title	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	100
Subject	+[1]	+[2]	+[1]	+[1]	+[1]	+[6]	+[2]	+[4]	+[1]	+[1]	+[2]	+[1]	+[2]	+[1]	+[1]	+[1]	+[2]	100
Local call number	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	100
OCLC number	+	+	-	-	-	-	+	-	-	+	+	+	+	+	+	+	+	47
ISBN	+	+	-	-	-	-	+	-	-	+	+	+	+	+	-	-	+	53
ISSN	+	+	-	-	-	-	+	-	-	+	+	+	+	+	-	-	+	53
Government doc number	+	+	+	-	+	+	+	-	-	+	+	+	+	+	-	-	+	65
Other numbers	-	+	-	-	-	+	+	-	-	+	+	-	+	+	-	-	+	47
Additional access points	-	-	-	-	-	-	-	+[7]	-	-	-	-	-	+[5]	+	-	+	12
LC classification	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	100
Dewey classification	+	+	+	-	+	-	+	-	-	+	+	+	+	-	-	+	-	47

+   Capability available or under the control of the user

-    Capability not available

NOTES

1 LCSH
2 LCSH, MeSH
3 Possible, but not mentioned

5 Series
6 LCSH, local
7 All fields

4.4 Search formulation control

The search (or query) function is the central and most important function for an OPAC user. It includes logical or matching operations on specified search terms for identifying and isolating relevant document descriptions (records). This function enables the user to formulate his/her information request and the way the function is implemented affects profoundly the user's success in fulfilling the information need.

Features of the search function for the OPACs studied are tabulated in Table 4.

Explanation of terms in Table 4

Search is default function

When the user accesses the OPAC, it is assumed that he/she will start by formulating a query.

Controlled term searching

The feature is limited here to the ability to use a controlled vocabulary (thesaurus or subject headings) for subject access to catalog records.

Free-text searching

This type of access is often referred to as 'keyword searching' or even 'natural language searching'. Words that appear in one or more fields of a record may be entered as

search terms. The free-text searching of the entire record (also called full-text searching) enables the user to access documents which contain the specified word anywhere in the record. Some systems allow the user to specify the fields in which the searching is performed, while others restrict the user to some predefined fields (the title is the most common).

Restrict/limit search results

After the search is performed, it may be further qualified by additional parameters (like language or date of publication). That feature enables the user to reduce the results of a search to a desired domain.

Show search history

In order to facilitate subsequent query formulation, the user can review a list of previous queries.

Broadening/narrowing search results

If the query resulted in too many or too few records, the user can reformulate the query by adding more terms without re-entering the previous query statement.

Boolean operators

The standard Boolean operators (AND, OR and NOT) may be used to combine two or more terms in the query. The use of operators may be restricted to selected fields or keywords only. The operators may be entered explicitly, or are used implicitly. In the latter case the system assumes an operator (usually AND) when several terms are entered.

Relational operators

Using some symbolic expression of "greater than", "less than", or "equal to", the user may limit the query to a specific range of values of the field.

Implicit right truncation

Most systems permit some form of shortening a search term for the purpose of broadening a search. With implicit right truncation, all terms entered are assumed to be truncated on the right without requiring the user to use any special symbol.

Explicit truncation

A special symbol (e.g. * or ?) has to be entered to indicate truncation.

Proximity operators

Often referred to as "positional operators", they are used in free-text searching to enable the user to specify the position of search terms in a field or fields in relation to one another. Typical requirements are that the terms appear immediately adjacent, a specified number of words apart, in the same subfield, or the same field.

Indexes available

The systems that enable the user to see the indexes of specified fields are shown. The user can choose his/her term(s) directly from the list.

Authority control

Full online authority control requires not only an online file of authority records with cross-references ("see" and "see

also"), but also links between the bibliographic record and authority record.

Not case sensitive

Regardless of the actual appearance of the term in the record, the system accepts the term either in upper or lower case.

Save search statements

The user can save one or several search statements in order to execute them at a different time or with a different catalog.

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TABLE 4

SEARCH FORMULATION CONTROL

	BGU	CWR	CEN	CSU	MIA	KE	C	NEO	OSU	OU	SSU	AKR	CIN	DAY	TOL	YSU	WSU	%
Search is default function	.	.	.	+	.	+	.	.	+	.	.	+	.	.	+	+	.	35
Controlled term searching	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	100
Free-text searching																		
entire record	.	.	.	+	.	+	.	+	.	.	.	+	.	.	+	+	.	35
default fields	+[1]	+[6]	+[7]	.	+[7]	.	+[20]	.	+[18]	+[7]	+[7]	.	+[12]	+[18]	.	.	+[6]	65
user-selected fields	.	.	.	+	.	+	.	+	.	.	.	+[9]	.	.	+	.	.	29
Restrict/limit search results	+[2]	+[2]	+[2]	.	+[2]	.	+[2]	+	.	+[2]	+[2]	.	+[2]	.	.	.	+[2]	59
Show search history	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	6
Broadening/narrowing	+[3]	+[3]	+[3]	.	+[3]	.	+[21]	+	.	+[3]	+[3]	+[14]	+[3]	+[14]	.	.	+[3]	65
Boolean operators																		
on any field	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	6
on selected fields	.	.	.	+[10]	.	+[15]	.	.	.	.	.	+[22]	.	.	.	.	.	18
on free-text	+[4]	+	+[8]	+	+[8]	+	+	+	.	+[8]	+[8]	+	+	+	+	+[8]	+	94
explicit	+[4]	+[4]	+[8]	+	+[8]	+	+[4]	+	.	+[8]	+[8]	+	+[8]	.	+	+[8]	+[4]	88
implicit	+[5]	+[5]	+[8]	.	+[8]	.	+[5]	.	.	+[8]	+[8]	+	+[8]	+[13]	.	.	+[5]	59
Relational operators	.	.	.	.	.	.	.	+[11]	.	.	.	.	.	.	.	.	.	6
Implicit right truncation	+	+	+	+	+	+	+	.	+	+	+	+	+	+	+	+	.	94
Explicit truncation																		
right	+	+	+[8]	+	+[8]	+	+	+	+	+[8]	+[8]	+[8]	+	+	+	+[8]	+[8]	100
left	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	6
imbedded	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	6
Proximity operators	.	.	.	+	.	+	.	+	.	.	.	.	.	+	.	.	.	18
Indexes available	+[16]	+[16]	+[16]	+[16]	+[16]	+[16]	+[16]	+	+[17]	+[16]	+[16]	+[16]	+[16]	+[16]	+[16]	+[16]	+[16]	100
Authority control	+	+	+	+	+	+	+	.	+	+	+	+	+	+	+	+	+	94
Not case sensitive	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	100
Save search statements	+[22]	+[22]	+[22]	.	+[22]	.	.	.	.	.	.	.	+[22]	.	.	.	+[22]	35

+   Capability available or under the control of the user

.   Capability not available

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TABLE 4 (cont.)

NOTES

1   Title, subject, note
2   Year, language,publisher, location, type, keywords
3   Same subject near on shelf
4   OR, NO (=NOT)
5   AND
6   Title, corporate author, note
7   Title
8   Not explicitly mentioned
9   Title, author, subject
10 Title, author, subject, language, year, note
11 Ranges

12 Title, series, conference, organization, note
13 AND only
14 Keywords
15 Subject, title, author, type, language, year
16 Author, subject, call numbers
17 Author, subject
18 Title, subject
19 Author, title, subject
20 Title, note
21 Same subject
22 Searching in the central catalog

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Search formulation control is the area of user-computer interaction, where the functionality is by far the most important aspect. Bibliographic records have to be accessible at least by:

- author
- (partially remembered) title
- subject

All systems reviewed allow the user to use a controlled vocabulary for subject access (mostly Library of Congress Subject Headings, some also Medical Subject Headings). Some form of free-text searching is provided, too. The approach differs, though. In most systems the user is restricted to search for keywords in default fields (title is the most common, sometimes subject and/or notes are added). The most flexibility is provided by the systems that allow both searching on the entire record and letting the user choose the specific field he/she wants to do keyword searching in (Cleveland State University, Kent State University, NEOUCOM, University of Toledo). With the exception of NEOUCOM, the use of the option is well explained and easy to use.

Restricting or limiting a search result is a very useful option of narrowing a search, particularly if several criteria can be used. The most important criteria include the language, year of publication, type of material, and location. This option is nicely realized in all INNOPAC installations.

Broadening or narrowing the search result is an important

strategy in formulating the query. The user can add additional information to the previous query (without reentering it) in order to either reduce or increase the number of records retrieved. With the exception of NEOUCOM, no other system offers it in that sense. INNOPAC sites offer broadening of the search, retrieving the records with the same subject heading(s) or the records that have similar call numbers (i.e. the material can be found on the same shelf). University of Dayton offers broadening and narrowing in keyword searching.

Taking into account that only the last search result can be manipulated in most systems (except NEOUCOM), the option of reviewing the search history will be discussed in Chapter 9.

It is known that Boolean query formulation is not the ideal model and many enhancements and alternative methods (ranking, relevance feedback, natural-language interfaces) have been proposed. There is no clear consensus among researchers as to which of the improved designs is the best. This lack of a clear choice can be partially blamed for the fact that most commercial information retrieval systems still use Boolean search strategy. That is also the case with all OPACs studied. Only Ohio State University OPAC offers no combining of terms in a search statement, all others offer Boolean operators in some form. Most systems allow them for free-text searching only, although in several INNOPAC sites (Central State University, Miami University, Ohio Northern University, and Shawnee State University) the option is not

even mentioned in the help screens, so the user assumes that it is not available. In addition to that, a mixture of explicit and implicit operators in INNOPAC is not a good solution (OR and NOT are explicit, AND is assumed when two terms are entered). Regardless of the fact that Boolean operators may be difficult to use, it is certainly easier for the user to use all operators in the same way.

Only NEOUCOM offers relational operators in a very limited fashion, allowing the user to enter intervals of values. This system is also the only one that does not assume implicit right truncation for all values entered.

It is also interesting to note that while all systems allow explicit right truncation of keywords, the option is not mentioned in the help screens of 7 systems, so the user is not aware of the possibility and/or does not know which special character to use. '*' is used in most, '-' in Ohio State University, and '?' in University of Dayton. For NEOUCOM, '*' is used for several characters and '?' as a wildcard. Only NEOUCOM offers left and imbedded truncation, although the option ia usually requested when designing a new OPAC.

Proximity operators for keyword searching are offered only by NOTIS sites, where several kinds of operators are used (e.g. within the same field, within the same subfield, immediately adjacent). At least adjacency should be possible in all systems (this request interferes with the implicit use of AND in INNOPAC systems).

All systems allow the user to use either upper or lower case (or mixed) in query formulation, which is a basic requirement for a user-friendly interface.

While all systems offer some kind of index display for subject headings, authors and call numbers, only NEOUCOM displays the keyword index and allows the user to choose the terms from the list to include directly in a query. Others display the keywords and frequencies, but do not allow the user to choose among them. That could have been an interesting enhancement, which would really make truncation of keywords meaningful.

Only the INNOPAC OPACs that have joined the central catalog offer the option of executing the last query on the central (combined) catalog. That saves the user the effort of remembering the search statement and reentering it after logging on the different OPAC.

4.5 Output control

Considerations of output control design features may be grouped into two categories:

- the features t ' e.ble the user to manipulate the results of a search according to his/her needs
- the characteristics of the visual presentation of bibliographic information.

Given the variety of human needs and preferences, and capabilities present in computer catalogs, the design issues are both many and complex. The most important characteristics of output control in the OPACs studied are given in Table 5.

Explanation of terms used in Table 5

Explicit command to display.

Systems using a formal command language as the primary interaction mode provide a specific command for requesting the display of a retrieved record. If the query results in multiple records, the user may have to qualify the display command with a record number or range, and a format qualifier. Some OPACs provide defaults for these qualifiers.

Automatic display

Some OPACs do not require any action from the user to display

the records. A successful query results in an automatic display.

Choice of predefined formats

All of the OPACs examined offer the user more than one format for the display of a retrieved record.

Select specific record(s) for display

When multiple records are retrieved in a single search, the user is given the capability to choose one or more among them to display.

Select specific fields to display

The capability permits the user to select one or more fields of the retrieved record(s) for display.

Sort records for display

For either display or download purposes, the user may wish to have the results of a search arranged sequentially by a particular field, for example by date of publication or author name.

Merge results from several searches

The capability to combine the results of several queries in a single output.

Display forward

The user is able to move forward to the next page or screen while displaying either the index or the records.

Display backward

Not all OPACs enable the user to see the previously displayed record or screen. Only the systems that offer the option are

listed, not the ones in which the user must reiterate the search in order to display the record again.

Scroll

Scrolling is an alternative to page-by-page display of records. It permits a continuous display of information line by line until the end of the information.

Interrupt scroll

If scrolling is used as a mode of display, the user should be able to temporarily stop the scrolling to view carefully the record, or to discontinue the display altogether.

Download

With the use of microcomputers as terminals, downloading has become an important feature of OPACs. It enables the user, to obtain a copy of the records on a file on the microcomputer. The user can afterwards either print the results locally or reformat them for future use.

Upper/lower case

To increase legibility, both upper and lower case must be used to display the bibliographic records.

Labels

Labels are used to identify parts of the bibliographic display as opposed to the traditional main entry card format.

Kinds of display

Available formats are classified according to the amount of information provided.

TABLE 5

OUTPUT CONTROL

	BGU	CWR	CEN	CSU	MIA	KE	C	NEO	OSU	OU	SSU	AKR	CIN	DAY	TOL	YSU	WSU	%
Explicit command to display	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	12
Automatic display																		
for one-record result	+	+	+	+	+	+	+	-	-	+	+	+	+	+	+	+	+	88
for multiple-record result	+	+	+	+	+	+	+	-	-	+	+	+	+	+	+	+	+	88
Choice of predefined formats	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	100
Number of formats																		
used by system	4	4	4	3	4	3	4	8	3	4	4	4	4	2	3	3	4	
user can choose from	4	4	4	2	4	2	4	8	3	4	4	4	4	2	2	3	4	
Select record(s) for display																		
one	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	100
several	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	6
Select fields to display	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	6
Sort results	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Merge results	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Display forward	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	94
Display backward	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	94
Scroll	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	6
Interrup scroll	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Download	+	+	+[1]	-	+[1]	-	+	-	-	+[1]	+[1]	-	+[1]	-	-	-	+	53
Upper/lower case	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	100
Labels	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	94
Kinds of display																		
index	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	94
brief	-	-	-	+	-	+	-	+	-	-	-	-	-	-	+	+	-	29
full	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	100
MARC	+	+	+	-	+	-	+	+	-	+	+	+	+	-	-	-	+	59

NOTES: +   Capability available or under the control of the user

       -    Capability not available

1   Implicitly by capturing

The user is not offered many options to manipulate the results in any of the systems studied. No sorting or merging the results from different searches is possible. Particularly sorting (in combination with downloading) would have been an important enhancement. An option of saving a bibliography is mentioned in the help screen of University of Dayton OPAC, but it is not explained how to create one.

As a rule, the user can use (and choose from) several predefined formats for one record at a time, with the exception of NEOUCOM, where several records can be chosen and also the user can specify the fields to be displayed. This system is also the only one using scrolling, unfortunately there is no way of interrupting the display. All other systems allow the user to display one screen at a time and also to review previous screen.

Downloading is an important feature. The users that know Telnet well can accomplish that by capturing the session, but that knowledge cannot be expected from a casual user. Only INNOPAC sites offer downloading either explicitly (Bowling Green University, Case Western Reserve University, and Wright State University) or as a PRINT option which actually captures the displayed information.

There is a large variety of different predefined formats the user can choose from. They fall into four categories:

- index formats (the short initial display including e.g.

the author, title and call number)

- a copy of a classic catalog card

- a labelled display of the whole record

- MARC record

Index formats are used by all systems, while only Ohio State University offers a catalog card display. All others use some form of labelled format. The MARC format, although of limited use to the library patron, is offered by several OPACs.

All systems reviewed use upper and lower case to improve legibility of the records. As a rule, all formats, though different, are well designed.

Examples of different output formats are given in Appendix A.

4.6 User assistance

Operational control features facilitate the basic use of a search and retrieval system, but additional user assistance may be needed for a full understanding of the system and its most effective use. Even an experienced user, may occasionally need additional information to perform a less common function; it is even more important to guide a novice user, or the one who is not familiar with the system.

Table 6 lists a wide range of user assistance features offered and expected from OPACs studied.

Explanation of terms used in Table 6

Introductory screen

After the user enters the system, a screen is displayed, where the user gets the basic information how to use the system and how to get additional information.

List available files

Some OPACs offer the capability to search several catalogs (or other databases) through the same interface. In that case, the available options have to be listed.

List commands

A list of available commands is given either on the intrcductory screen or on demand.

List searchable fields

All access points have to be listed either on the introductory screen, in a menu, or on demand.

Show index or thesaurus

The system enables the user to display values of fields for the records in the database.

Show search history

The user can review (on demand) previously entered search statements.

Show news

The user can access online news or other important information about the library, its services, or the catalog itself.

Explain system messages

All the messages the user sees as a reaction to his/her actions must be clear and understandable.

Indicate item location

After a bibliographic record is retrieved, the user also gets the information on where the item is located.

Indicate item availability

The user has access to the information whether the item is currently available and under which conditions.

Online help

For an off-site user, the online help is the only help available. There are several ways to classify it. It can be either on demand (the user must request it) or implicit (the system gives the information without any action from the user. Context sensitive help is the one that takes into account the

user's previous actions and attempts at giving only the information appropriate to the situation in which the user is. Some systems also offer tutorials for inexperienced users.

<u>Information on exit</u>

Wherever the user is, some information must always be available: how to exit the system, how to retrace the steps taken, or at least how to return to the introductory screen.

TABLE 6

USER ASSISTANCE

	BGU	CWR	CEN	CSU	MIA	KE	C	NEO	OSU	OU	SSU	AKR	CIN	DAY	TOL	YSU	WSU	%
Introductory screen	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+	+	+	94
List available files	+	+	+	-	+	-	-	+	-	-	+	-	+	+	-	-	+	56
List commands	na	na	na	+	na	+	na	-	-	na	na	+	na	na	+	+	na	
List searchable fields	+	+	+	+	+	+	+	-	-	+	+	+	+	+	+	+	+	88
Show index or thesaurus	+[1]	+[1]	+[1]	+[1]	+[1]	+[1]	+[1]	+	+[2]	+[1]	+[1]	+	+[1]	+	+[1]	+	+[1]	100
Show search history	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	6
Show news	+	+	-	+	+	-	+	+	-	+	-	-	+	-	+	-	+	59
Explain system messages	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	100
Indicate item location	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	94
Indicate item availability	+	+	+	+	+	+	÷	-	+	+	-	+	+	+	+	+	+	88
Online help																		
On demand																		
anywhere	-	-	-	+	-	+	-	+	+	-	-	+	-	+	+	-	+	41
from first screen	+	+	+	+	-	+	.+	+	+	-	-	+	-	+	+	+	+	70
Implicit																		
with error message	na	na	na	+	na	+	na	+	+	na	na	+	na	+	+	-	na	
in dialogue	+	+	+	-	+	-	+	-	-	+	+	-	+	+	-	-	na	59
Context sensitive	+	+	+	-	+	+	+	-	-	+	+	+	+	+	+	-	+	82
Tutorial	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	6
Exit information available	+	+	+[3]	+	+[3]	+	+	+	-	+[3]	+[3]	-	+	+	+	-	+	82

NOTES:

+   Capability available or under the control of the user

-   Capability not available

na   Not applicable

1   Author, subject, call numbers

2   Author, subject

3   No information on how to cancel the searching

It is the user assistance that determines to a large degree the user-friendliness of an interactive system. When using a system, the user may want to ask questions like:

- What have I done wrong?

- Where am I and what is to be done next?

- How do I perform a function?

- Can I do this?

- How do I exit the session?

An OPAC should be able to answer these questions quickly, meaningfully and accurately in the form of online help, which can be designed in a form of introductory screens, prompts, error messages, tutorials, or help screens that are displayed on demand. Good online help is particularly important for novice users, however, virtually all users need assistance at some stages in their interaction with the system.

There are several approaches to providing help, ranging from giving information only when the user requests it, to responding to a user's apparent need for help without his/her explicit action.

Some important guidelines in designing good user assistance include:

- only features that are operational in a given system should be mentioned

- all important features should be mentioned

- an introductory screen must be provided

- help should be available at all times

- every screen should include information on how the user can retrace his/her steps, return to the introductory screen, and/or exit the system

- the user should return to the original context after receiving the information

- only requested (or appropriate) information should be displayed)

- help should be well written, constructive, without the use of codes or jargon

- examples must be provided

- user assistance should accommodate more than one level of users

- unless requested otherwise, the help provided should be context sensitive

- the user should always be able to cancel any process he/she has begun

The first request seems obvious, yet there are some instances (mentioned in the previous chapters), where the help screens include options which are not operational. The reason is (probably) that the help screens provided by the vendor are used, regardless of the actual implementation. There are even more OPACs that do not provide a l the important information (particularly on the use of truncation and Boolean operators).

The administrators of these OPACs should include that information in the help screen or prompts.

There is a surprising number of OPACs which provide online help only from the introductory screen. Although INNOPAC offers information with all prompts, additional advice and examples should be available on demand. Some INNOPAC sites (Central State University, Miami University, Shawnee State University and University of Cincinnati) do not offer any help, although the prompt screens are not instructive enough.

Virtually all OPACs studied provide an introductory screen. The information in the screen, though, varies from one line instruction on how to get help to full explanation of the system. Examples of introductory screens are given in Appendix B.

It is very important that the user knows at all stages how to return to the introductory screen and how to exit the system. Not all systems provide the information (and the problem with VTLS was mentioned in Chapter 4). All OPAC administrators should consider providing this information. It is a small detail, but it gives the user a sense of being in control and that is very important.

As a rule the help screens studied do not contain jargon and are mostly well written. With the exception of University of Dayton they do not provide help for more than one level of users. A novice or occasional user would probably need more guidance and examples in all systems. It is also surprising

that only Ohio State University offers a tutorial. It is an excellent way of instructing the user who requests it, without interfering with searching.

A detailed analysis of all user assistance of all systems is beyond the scope of the paper. It could be concluded, though, that virtually all systems could benefit by a thorough revision of help provided, making it more consistent in particular. Further examples of help screens are given in Appendix B.

CHAPTER 5

CONCLUSIONS

The 17 OPACs studied are using only 6 different software packages (INNOPAC, NOTIS, Textrieve, LCS, VTLS, and Dynix), yet the differences in the interfaces go far beyond the differences in software alone. Very different interfaces for the same software package were encountered. The variety of interaction modes is interesting, too. Both command-driven and menu-driven systems are used, as well as combinations of both. It can easily be said that virtually every system studied offers some capabilities that could be used as a model for others. Identifying good solutions was one of the goals of this research. Conclusions about specific functional capabilities are given in corresponding chapters.

INNOPAC was chosen as the software system for OhioLINK and in the following years all OPACs studied will start using it. For that reason it seems appropriate to conclude with some suggestions for the future development of this system.

INNOPAC is a menu-driven system which is easy to learn and use. The amount of user assistance provided with prompts and help screens varies and is not adequate with some systems. That could easily be taken care of by simply modelling the

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interface on better examples. All menus should be checked for consistency of labels and more than three levels of menus should be avoided.

A wish list for future development of OhioLINK system was compiled during the study. The suggestions given could be assigned different levels of importance and are not listed in that order.

1. Additional help could be provided on demand (and not only from the introductory menu), when the prompt screens are not informative enough.

2. Some form of user-adaptability could be included in the interface, both in terms of assistance provided and query formulation.

3. More functionality in search formulation could be provided (more truncation and wildcards, more complex search statements, relational operators, broadening and narrowing the search...). The searching capability offered now may be enough for an inexperienced user, it is not enough for more demanding one and particularly not for database searching, taking into account that the same interface is used for other databases.

4. Sorting of search results and other provisions for bibliography creation could be a very useful addition to the system.

5. As a help in search formulation the user could have

access to a list of previously entered query statements.

With the continuous collaboration of the OhioLINK administrators and the vendor, and following further research in user interface design and advancements in hardware and communications this system has the potential of becoming a model of a good OPAC.

APPENDIX A

EXAMPLES OF OUTPUT FORMATS

1. INNOPAC (Case Western Reserve University)

Index format

```
You searched for the AUTHOR: shera                              EuclidPLUS
14 entries found, entries 1-8 are:                              LOCATIONS
Shere Jesse Hauk 1903
      1  "The compleat librarian"; and other essays      Frei, MSASS, UL
      2  Documentation and the organization of knowledge  Frei, Sears
      3  Documentation in action                          Frei
      4  The foundations of education for librarianship   Frei
      5  Foundations of the public library: the origins of Frei
      6  Historians, books and libraries; a survey of hist Frei
      7  Information resources; a challenge to American sc  Frei
      8  Information systems in documentation; based on th Sears, Frei


Please type the NUMBER of the item you want to see, OR
F > Go FORWARD                        A > ANOTHER Search by AUTHOR
R > RETURN to Browsing                P > PRINT
N > NEW Search                        O > OTHER options
Choose one (1-8,F,R,N,A,P,L,J,E,U,O)
```

Bibliographic format

```
You searched for the AUTHOR: shera                              EuclidPLUS

AUTHOR        Shera, Jesse Hauk, 1903-
TITLE         Documentation and the organization of knowledge.
IMPRINT       Hamden, Conn., Archon Books, 1966.
DESCRIPT'N    185 p.
SUBJECT       Library science.
              Documentation.
              Libraries --Automation.
OCLC #        574300.


   ┌─────────────────────────────────────────────────────────────────┐
   │    LOCATION           CALL NO.                    STATUS          │
   │ 1 > Freiberger Stacks  Z665.S418                  CHECK SHELVES   │
   │ 2 > Sears Stacks       Z665.S418                  CHECK SHELVES   │
   │ 3 > Freiberger Stacks  Z665.S418 c.2              CHECK SHELVES   │
   └─────────────────────────────────────────────────────────────────┘
               ───────────── 3 volumes/copies to view ─────────────
R > RETURN to Browsing        A > ANOTHER Search by AUTHOR
F > FORWARD browse            Z > Show Items Nearby on Shelf
B > BACKWARD browse          S > SHOW items with the same SUBJECT
N > NEW Search               O > OTHER options
Choose one (R,F,B,N,A,Z,S,P,T,E,U,O)
```

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MARC format

```
You searched for the AUTHOR: shera                              EuclidPLUS
001     574300
005     19780623145641.0
008     730308?1966???????              ???????eng?unamI1
010     66006146
040     |cWSU|dCWR|dm.c
049     CWRR
090     Z665|b.S418
099     Z665.S418
100  10 Shera, Jesse Hauk,|d1903-
245  10 Documentation and the organization of knowledge
260   O  Hamden, Conn.,|bArchon Books,|c1966
300     185 p
650   0 Library science
650   0 Documentation
650   0 Libraries|xAutomation
966     |c1|1F*BK|mUBK|sZ665.S418|b39156004023367
966     |c1|1S*BK|mUBK|sZ665.S418|b39156002156623
966     |c2|1F*BK|mUBK|sZ665.S418|b39156003975757
LOCATIONS   fx,sx
```

```
    LOCATION            CALL NO.                    STATUS
1 > Freiberger Stacks   Z665.S418                   CHECK SHELVES
2 > Sears Stacks        Z665.S418                   CHECK SHELVES
3 > Freiberger Stacks   Z665.S418 c.2               CHECK SHELVES
               ———————— 3 volumes/copies to view ————————
M > MORE BIBLIOGRAPHIC Record          N > NEW Search
R > RETURN to Browsing                 A > ANOTHER Search by AUTHOR
F > FORWARD browse                     Z > Show Items Nearby on Shelf
B > BACKWARD browse                    O > OTHER options
Choose one (M,R,F,B,N,A,Z,S,P,T,E,U,O)
```

2. NOTIS (Kent State University)

Index format

```
Search Request: K=DOCUMENTATION AND KNOWLEDGE                    CATALYST
Search Results: 9 Entries Found                            Keyword Index
-----------------------------------------------------------------5E80
     DATE  TITLE:                                    AUTHOR:
  1  1989  Information, knowledge, evolution : procee FID Congress      KE
  2  1988  Basic clinical skills <visual>                               ST
  3  1988  44th FID Conference and Congress : August  FID Congress      KE
  4  1966  Documentation and the organization of know Shera, Jesse Hauk KE
  5  1966  Documentation and the organization of know Shera, Jesse Hauk TL
  6  1966  Universe of knowledge: its structure and d Bangalore, India (C KE
  7  1965  Libraries and the organization of knowledg Shera, Jesse Hauk KE
  8  1965  Libraries and the organization of knowledg Shera, Jesse Hauk TU
  9  1956  Documentation in action                    Conference on the P KE




----------------------------------------------------------------------
   COMMANDS:           Type line # to see individual record
                       H  Help
   O Other Options

NEXT COMMANO:
```

Short format

```
Search Request: K=DOCUMENTATION AND KNOWLEDGE                    CATALYST
BOOK - Record 4 of 9 Entries Found                             Brief View
------------------------------ Screen 1 of 1 -------------------------5E80
Author:          Shera, Jesse Hauk, 1903-

Title:           Documentation and the organization of knowledge

Published:       Hamden, Conn., Archon Books, 1966.

Subjects:        Library science.
                 Documentation.
                 Libraries--Automation.
------------------------------------------------------------------------
   LOCATION:                 CALL NUMBER              STATUS:
 1. MAIN LIBRARY (see        Z665 .S418              Not checked out
    building guide)


------------------------------------------------------------------------
   COMMANDS:           LO Long View      I  Index
                       N  Next Record    H  Help
   O Other Options     P  Previous Record
```

Long format

```
Search Request: K=DOCUMENTATION AND KNOWLEDGE                    CATALYST
BOOK - Record 4 of 9 Entries Found                              Long View
------------------------------ + Screen 1 of 2 ---------------------------5E80
Author:        Shera, Jesse Hauk, 1903-

Title:         Documentation and the organization of knowledge, by Jesse H.
                  Shera. Edited and with an introd. by D. J. Foskett.

Published:     Hamden, Conn., Archon Books, 1966.
Description:   xxi, 185 p. 23 cm.

Subjects:      Library sci      ..
               Documentat.
               Libraries--Automation.

References:    (OCoLC)00574300

   LOCATION:                CALL NUMBER            STATUS:
1. MAIN LIBRARY (see        Z665 .S418             Not checked out
     building guide)
```

```
-----------------------------------------------------------------------------
COMMANDS:          BR Brief View     P  Previous Record
                   B  Back           I  Index
O Other Options    N  Next Record    H  Help

NEXT COMMAND:
```

3. LCS (Ohio State University)

Index format

```
AUT/Shera, Jesse Hauk, 1903-                                      Page 1
DSL/  LIB  ----------------- 1-7 OF 29 TITLES ------------------- DATE FBL/
1     OSU  BIBLIOGRAPHIC ORGANIZATION                             1951
2     OSU  THE CLASSIFIED CATALOG* BASIC PRINCIPLES AND PRACTICES 1956
3      SL  The classified catalog:  basic principles and practices, 1956  3
4      SL  "The compleat librarian";  and other essays            1971  4
5     OSU  "The compleat librarian";  and other essays            197:  5
6     OSU  Dictionary of American library biography /             1978  6
7      SL  Dictionary of American library biography /             1978  7
For MORE titles: PG+                              To return to AUTHORS: PS1
                                                 For CATALOG RECORD: FBL/number
                                                     For LOCATION: DSL/number

tbl/2
```

Long format

```
S.Z665S418                                                        Page 1
Shera, Jesse Hauk, 1903-
   Documentation and the organization of knowledge / by Jesse H. Shera ; edited
and with an introduction by D.J. Foskett.  Hamden, Conn. :  Archon Books,
1966.  xxi, 185 p. ;  23 cm.
   Includes bibliographical references and index.
SUB: 1. Library science  2. Documentation  3. Libraries--Automation
LC CARD #: 66-6146  TITLE #: 2433985  OCLC #: 00574300     &co900419
                                                 To return to TITLES: PG1
                                                     For LOCATION: LOC


fbl/1
```

Short format

```
CALL NUMBER: S.Z665S418                                    Page    1
    AUTHOR: Shera, Jesse Hauk,  1903-
     TITLE: Documentation and the organization of knowledge /
      DATE: 1966  TN: 2433985

LINE LOCATION COPY LOAN    STATUS
 1   OHI        1          available
                                            For CATALOG RECORD: CAT



loc
             .




4B*                                              SON2
```

4. Dynix (University of Dayton)

Index format

```
12 JUN 93                    UNIVERSITY OF DAYTON                    10:40AM
                             PUBLIC ACCESS CATALOG
     Your search:  Shera, Jesse Hauk, 1903-
        AUTHOR/TITLE (truncated)                  CALL #
     1. Shera, Jesse Hauk, 1903-      [c1956]        Z695 .S55
           The classified catalog: basic principles and practices.

     2. Shera, Jesse Hauk, 1903-      1966.          Z699 .S49
           Documentation and the organization of knowledge,

     3. Conference on the Practic     1956.          Z1008 .C74
           Documentation in action/

     4. Shera, Jesse Hauk, 1903-      1965 [c]94     Z731 .S551
           Foundations of the public library; the origins of the public library m

     5. Shera, Jesse Hauk, 1903-      1953.          D16 .S52
           Historians, books and libraries; a survey of historical scholarship in

                        - - - - 9 titles, More on next screen - - - -
     Enter a title number for more detail :
     Commands:  SO = Start Over, B = Back, <Return> = Next Screen, ? = Help
```

Bibliographic format

```
12 JUN 93                    UNIVERSITY OF DAYTON                    10:41AM
                             PUBLIC ACCESS CATALOG

Call Number    Circulating -- 6th Floor              Status : checked In
               Z 699 .S49                            1 other copy

    AUTHOR     1) Shera, Jesse Hauk, 1903-

     TITLE        Documentation and the organization of knowledge,

                  by Jesse H. Shera. Edited and with an introduction by D. J.
                  Foskett.

PUBLISHER        London, Lockwood, 1966.
  # PAGES        xxi, 185 p. 2 diagrs. 23 cm.

  SUBJECTS    1) Library science -- Addresses, essays, lectures.
              2) Documentation -- Addresses, essays, lectures.

Call Number    Circulating -- 6th Floor              Status : checked In
               Z 699 .S49                            1 other copy
  Continued...
              3) Libraries -- Automation

    NOTES     1) Bibliographical footnotes.

                                       - - - - End of Title Info - - - -




     Press <Return> to see Copy status :
     Commands:  SO = Start Over, B = Back, RW = Related Works,
       PH = Place a Hold, F = First page, ? = Help
```

5. VTLS (University of Akron)

Index format

Bibliographic format

MARC format

```
THE UNIVERSITY OF AKRON - - - - - -  VTLS-89 - - - - MARC BIBLIOGRAPHIC SCREEN
 Local lvl: 5        Analyzed: 0 Operator: 00        Edit:
 CNTL:      320057   Rec stat: p Entrd: 841113       Used: 911204
 Type: a Bib lvl: m Govt pub: | Lang: eng  Source:   Illus:
 Repr:    Enc lvl:   Conf pub: 0 Ctry: nyu  Dat tp: s M/F/B: 10
 Indx: 0 Mod rec:   Festschr: 0 Cont: b
 Desc:    Int lvl:   Dates: 1972,
 1. 010    72-3851
 2. 020    0471785202
 3. 035    0078-09560
 4. 050 0| Z668 \b .S5
 5. 100 10 Shera, Jesse Hauk, \d 1903-
 6. 245 14 The foundations of education for librarianship \c [by] Jesse
           H. Shera.
 7. 260 0  New York, \b Becker and Hayes \c [1972]
 8. 300    xiv, 511 p. \c 24 cm.
 9. 490 0  Information sciences series
10. 504    Includes bibliographical references.
 1. 650  0 Library education.

Enter 'C' for CIRCULATION INFORMATION
```

APPENDIX B

EXAMPLES OF HELP SCREENS

1. INNOPAC (Case Western Reserve University)

Introductory screen

```
        Welcome to EuclidPLUS, the Online Catalog of      EuclidPLUS
   Case Western Reserve University and Associated Libraries:
                     An OhioLINK Member


              A > AUTHOR
              T > TITLE
              S > SUBJECT
              W > WORDS (in Title/Contents Notes)

              C > CALL Numbers
              O > OTHER Numbers

              U > Search OhioLINK Central Catalog
              I > Library INFORMATION

              X > EXIT
               Choose one (A,T,S,W,C,O,U,I,X)


      Select I > for Participating Libraries and other information.
                 Need additional help?  Ask a Librarian!
```

Library information screen

```
                         LIBRARY INFORMATION
01 > About EuclidPLUS
02 > Case Western Reserve University & Associated Libraries
03 > Responses to SUGGESTIONS
04 > University Library - Freiberger Library
05 > University Library - Sears Library
06 > MSASS - Harris Library
07 > CWRU Kulas Music Library
08 > CWRU Law Library
09 > The Cleveland Institute of Music Library
10 > Health Center Library - CHSL
11 > Allen Memorial Medical Library - CHSL
12 > Circulation Policy Overview
13 > Government Documents
14 > Search Strategies - EuclidPLUS Features & Guidelines
15 > Search Strategies - Using the WORDS Search Option
16 > Search Strategies - Searching by Word Roots (Truncate)
17 > Search Strategies - Limiting a Search
18 > Search Strategies - Subject Heading Searches
19 > Downloading (Exporting) Records to Personal Disk
```

```
Key a number or
F > FORWARD                                           N > New Search
A > Additional items the library should acquire
S > SUGGESTIONS
P > PRINT
Choose one (1-19,F,A,S,P,N)
```

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Help for author searching

AUTHOR :   EuclidPLUS

Type some or all of the author's name, LAST NAME first,

    for example ---> Dickens, Charles

        or ---> Dickens Ch

For names of corporations or other groups, type some or all of the name,

    for example ---> American Bar Association

        or ---> United Nations

                [Press the ESC key to begin a different search.]

   .... then press the RETURN key

Help for subject searching

SUBJECT :   EuclidPLUS

Type all or part of the subject heading, ignoring punctuation:

    for example ---> Dancing

        or ---> Dancing history

        or ---> Mozart Wolfgang

To search for words in titles or contents notes, use the WORDS option.

             [Press the ESC key to begin a different search.]

   .... then press the RETURN key

2. NOTIS (Kent State University)

Introductory screen

```
                                                              CATALYST
                                                            Introduction
-------------------------------------------------------------------5E80
                        CATALYST

CATALYST can be used to find  BIBLIOGRAPHIC,  CALL NUMBER,  and  LOCATION
information  for materials  held by  Kent State University Libraries  and
Media Services  on the Kent and regional campuses.

Use the following command:     To search by:
                        a=     author
                        t=     title
                        s=     subject
                        k=     keyword(s)
                        c=     call number (Library of Congress)
                        cs=    government documents call number (SuDocs)
                        co=    other call number (In-house)

You may begin a new search on any screen.  You may type help on most screens.
Press <ENTER> for more information on searching in CATALYST.

OFFSITE USERS: Type stop and press <ENTER> to exit CATALYST.

NEXT COMMAND:
```

Help for author searching

```
                                                              CATALYST
                                                           Explain Author
---------------------------- + Screen 1 of 2 ---------------------------5E80
                        EXPLAIN Author Searching

 To search by author, type a= followed by the author's last name or a
 portion of the last name.  If the last name is common, type the complete
 last name followed by the author's first initial.  For example:

 To search for William Shakespeare, you might enter either of the following:
      a=shakespeare    or     a=shakesp

 For Henry James, you might want to include at least some of the first name:
      a=james hen      or     a=james h

 Because of pseudonyms and other variations in names, you may be presented
 with a *Search Under... or *Search Also Under... cross-reference.  You may
 redirect your search to these alternative forms by typing the line number.

           Press <ENTER> for more information on SEARCHING BY AUTHOR.
 ---------------------------------------------------- Continued on next screen  --
 O Other Options     F  Forward
```

```
                                                              CATALYST
                                                           Explain Author
---------------------------- + Screen 2 of 2 ---------------------------5E80
                        Hints for Author Searching


 1.  An author may be an organization or institution (for example, UNESCO).
 2.  If you aren't sure of spelling and a search results in no matches:
     --Try shortening the name
     --Try searching by title, subject, or keyword.  (Help is available for
       for each by typing exp followed by t, s, or k.)


 Remember: You may begin a new search at any time and from any screen.




 Ask a Reference Librarian if you need further help with AUTHOR SEARCHING.
 ----------------------------------------------------------------------------
 O Other Options     B  Back
 NEXT COMMAND:
```

Help for subject searching

```
                                                               CATALYST
                                                         Explain Subject
---------------------------  + Screen 1 of 2  -----------------------5E80
                         EXPLAIN Subject Searching

The library uses the following two standards to ensure consistent use of
subject headings:  Library of Congress (LCSH) and a second "other"
standard, which uses a locally developed subject scheme.  In addition, some
items in CATALYST may have National Library of Medicine (MeSH) or Library of
Congress Children's subject headings which are not typically used by the
library.

Each has its own index, which may be individually searched based on command:
   sl=   searches for Library of Congress subject headings (LCSH)
   so=   searches for other subjects assigned using a locally defined system

Alternatively, you can search all subjects using the unified subject search:
   s=    searches all subject types in one combined index

            Press <ENTER> for more information on SUBJECT SEARCHING.
-------------------------------------------------- Continued on next screen  --
 O Other Options    F  Forward


                                                               CATALYST
                                                         Explain Subject
---------------------------  + Screen 2 of 2  -----------------------5E80
                    EXPLAIN Subject Searching -- continued

Subject headings may be divided into parts, called subdivisions.  To search
for a subject heading with subdivisions, separate each part of the heading
with two hyphens (--).  Example: s=france--history

When searching by subject, you will often find *Search Under... and
*Search Also Under... cross-references.  *Search Under means instead of
and *Search Also Under means in addition to.  You may redirect your search
to these alternative and related topics by typing the line number.

If a subject search results in no matches, verify that you have entered
the subject term correctly.  If it appears you have, it may be useful to
search the same term using a keyword search, k= .  For a detailed
explanation of keyword searching, type exp k and press <ENTER>.

Ask a Reference Librarian if you need further help with SUBJECT SEARCHING.
-------------------------------------------------------------------------
 O Other Options    B  Back

NEXT COMMAND:
```

3. LCS (Ohio State University)

Introductory screen

```
THE OHIO STATE UNIVERSITY LIBRARIES
    LL          CCCCCCCC  SSSSSSSS
    LL          CC        SS
    LL          CC        SSSSSSSS
    LL          CC              SS
    LLLLLLL    CCCCCCCC  SSSSSSSS
```
* In PAPER mode: use DEL key to correct typo; ignore the KEYBOARD LOCKED
  message; start typing at the 1: prompt.
* In other terminal modes: use left arrow to backspace; use CTRL <r>
  keys to unlock the keyboard.
* Begin searching or type help for LCS   commands.
* To exit LCS, press <ESC> <-> (tilde)   keys.

4B*   SON5

General help screen

Help is available online to explain some LCS commands, searching
concepts, and codes. To look at a specific HELP, type a request,
exactly as shown in the list below, then tap the enter key.

Help-Author   Help-FBR   Help-Save
Help-Author-Title   Help-Keyword   Help-Title
Help-Call-Number   Help-Periodicals   Help-Title-Change
Help-Corporate-Author Help-Periodicals-Current Help-Tutorial
Help-Checkout   Help-Renew

The explanation of a location code may be requested by typing "help"
followed by the code.   Example: help hea

help

4B*   SON2

Help for author searching

HELP-AUTHOR
HELP-AUTHOR.   TYPE AUT (FOR AUTHOR) FOLLOWED BY A SLASH (/).   THEN (NO SPACE)
TYPE THE AUTHOR'S FULL LAST NAME, SPACE, FIRST NAME, SPACE, AND MIDDLE INITIAL
IF KNOWN.
PRESS THE ENTER KEY AND FOLLOW THE PROMPTS AT THE BOTTOM OF THE SCREEN DISPLAY.
THE NUMBER OF ITEMS CATALOGED UNDER THE AUTHOR APPEARS BEFORE THE AUTHOR'S
NAME. IF THERE IS NO NUMBER ASK A LIBRARY WORKER FOR ASSISTANCE.
IF THE AUTHOR IS AN ORGANIZATION, BUSINESS, AGENCY ETC. OBTAIN SEARCH INSTRUC-
TIONS BY TYPING HELP-CORPORATE-AUTHOR AND BY PRESSING THE ENTER KEY.

help-author

4B*   SON2

4. Dynix (University of Dayton)

Introductory screen

```
12 JUN 93                    UNIVERSITY OF DAYTON                10:36AM
                             PUBLIC ACCESS CATALOG

                             Welcome to DOC
                   University of Dayton Online Catalog
                   Choose  ne of the searc'es below:

                   1.   SUBJECT
                   2.   TITLE
                   3.   KEY WORD(S) in Title
                   4.   AUTHOR
                   5.   Library of Congress SUBJECT Headings
                   6.   Reserve Room Materials
                   7.   GREAT BOOKS Database
                   8.   Additional Searches
                   9.   Review Patron Record
                   10.  Print Saved Bibliography
                   11.  Logoff
                               /  '


     Enter your selection (1-11) and press <Return> :
     Commands:  ? = Help, BB = Bulletin Board
```

Help for author searching

```
   Lev 3 HELP for:           AUTHOR AUTHORITY SEARCHING          SCREEN 1 OF 1


        An AUTHOR AUTHORITY SEARCH displays an alphabetical listing
        of authors whose names START WITH the word (or partial word)
        you specify.
        Each word in the search request can be truncated to one
        letter or more.


        To see the command that are available at this screen, enter "CS"
        to view the "Command Summary" options.

        To review your search path, select the "Review Search" option.


            Remember to press <Return> after each option.


     Press "Q" and <Return> to Quit help :
     Commands:  SO = Start Over, A = Addt'l Topics, RS = Review Search,
                CS = Command Summary, Q = Quit Help
```

Help for subject searching

To begin your search, enter a keyword to search for.

Each of the following help screens explains a different
kind of KEYWORD search, as shown:

Search Type	Screen #
One-word searches	2
Truncation searches	3
Multiple-word searches	4
Helpful hints	5

To see what commands you can use at this screen, enter "CS"
to view the "Command Summary" options.

To review your search path, select the "Review Search"
option.

********** ONE-WORD SEARCHES **********

When you specify a keyword to search for, the keyword program

looks for it in any location. For example, in a TITLE KEYWORD search,

it will find titles that have that word anywhere in their titles,

whether it is the first word, the fifth word, or the thirtieth word.

********** TRUNCATION SEARCHES **********

In a truncated keyword search, the program looks for any

words STARTING WITH the letters entered. To indicate truncation,

add a question mark to the end of your shortened word, as in

"COWBOY?".

Remember that truncated keyword searches are slower than

exact-word searches.

********** MULTIPLE-WORD SEARCHES **********

More than one keyword can be entered in a search. Items

will be listed if all keywords are found, even if they are not

adjacent.

If a stop word is searched for by mistake, the message

"NOT INDEXED" will be displayed.

********** HELPFUL HINTS **********

DO's
====
Search for the least common words.
Use as few words as possible to narrow the search.
Use only "signiticant" words.
To speed up a search, enter the the first letter of the author's
     surname at the AUTHOR: prompt.

DON'T's
=======
Don't use common words.
Don't truncate it you can help it.

Press "Q" and ·Return· to Quit help :
Commands: SO = Start Over, A = Addt'l Topics, P = Previous Screen,
             RS - Review Search, CS = Command Summary, Q = Quit Help

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5. VTLS (University of Akron)

Introductory screen

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                   *
*                    Welcome to VTLS-89                             *
*                      (Release 1.7.5)                              *
*                                                                   *
*       VTLS-89 is a proprietary library software product          *
*          of VTLS, Inc., Blacksburg, Virginia  24060              *
*                                                                   *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

Welcome to the online catalog.
If you need help at any time, please
ask at a Reference Desk.

 LOCATION is BIERCE
Enter NEW COMMAND; or 'HELP'; or '?' for the NOVICE USERS MENU.
```

Novice user menu

```
THE UNIVERSITY OF AKRON - - - - - - - - - - VTLS-89  - - - - NOVICE USERS MENU


   Welcome to the VTLS Novice User Search System! To search on-line
   simply type the number that appears in front of the kind of search
   you wish to perform and press the <RETURN> key.

        1. Author Search              7. ISBN Search
        2. Subject Search             8. Keyword Search
        3. Title Search               9. Boolean Search
        4. Call Number Search        10. Reserve Instructor Name Search
        5. ISSN Search               11. Reserve Course-Id Search
        6. LCCN Search               12. Subject Category Search

   To learn how to use the VTLS Advanced User Search System to
   perform a particular search tye its number, then a space, then
   then a question mark (e.g., 9 ?) and press the <RETURN> key. If
   you wish to perform an advanced search, you may do so at any time
   simply by entering a valid search command.

Enter your SELECTION:
```

General help

The system may be approached using the following commands:

1. Author Search   Enter A/ and the author's name (last name first)
                EXAMPLE: A/Hemingway, Ernest

2. Title Search   Enter T/ and the title.
        (omit any leading articles: THE,A,AN,LA,L',DER...)
                EXAMPLE: T/Sun also rises

3. Call Number Search Enter C/ and the call.number.
                EXAMPLE: C/TL725.3 T7 J6

4. Subject Search   Enter S/ and the subject term(s).
                EXAMPLE: S/Metals

5. Keyword Search   Enter W/ and the keyword.
                EXAMPLE: W/LIBRARY

   For more detailed information about any of the above searches,
   enter the corresponding number.

To use the Novice User Search System, enter ?

Help for author searching

THE UNIVERSITY OF AKRON - - - - - - - - - VTLS-89 - - - - ADVANCED AUTHOR SEARCH

     Using the ADVANCED USER SEARCH SYSTEM to Search an AUTHOR

To perform an author search without using the Novice User Search
system, simply enter the following command, inserting the author's
names in the order shown:

                A/LAST FIRST MIDDLE

The last name (or first word of a corporate author) is a required
entry. First name or initial (or second word of a corporate
author) is optional, as is middle name or initial (or third word
of a corporate author). Thus, your entry may be any of the
following:

                A/LAST
                A/LAST FIRST
                A/LAST FIRST MIDDLE

To return to the NOVICE USERS' MENU enter ?
To perform an ADVANCED SEARCH, enter your COMMAND:

Help for subject searching

THE UNIVERSITY OF AKRON – – – – – – – VTLS-89 – – – – ADVANCED SUBJECT SEARCH

      Using the ADVANCED USER SEARCH SYSTEM to Search a SUBJECT

 To perform a subject search without using the Novice User Search
 System, simply enter the following command, inserting the subject
 heading as shown:

                        S/SUBJECT

 When a subject heading contains more than one word, simply press
 the space bar between words (S/SUBJECT HEADING).

 To return to the NOVICE USERS' MENU enter ?
 To perform an ADVANCED SEARCH, enter your COMMAND:

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