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The user interface in online catalogues: a study of user interaction

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The user interface in online catalogues:
a study of user interaction.

by

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partial fulfilment of the requirements
for the award of the Master of Arts
degree of the Loughborough University
of Technology.

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1.0 INTRODUCTION

The online public access catalogue (OPAC) is the new catchword in library automation. During the 1980s, the field has advanced from one-off research, based systems to the stage where OPACs are available from most of the leading system suppliers and many of the smaller firms. Advertising literature produced by such companies invariably uses the OPAC as a selling point for their products and an increasing number of libraries of all types are purchasing online catalogues. The systems available vary greatly both in terms of functional capability and the manner in which capabilities are presented to the user. This dissertation focuses on the latter issue.

OPACs offer great potential for expanded access to items in the library catalogue. They are essentially interactive IR systems and in theory can offer access to items by data in any field of the MARC record. They are also quite complex systems. As most catalogue users are untrained in IR techniques, it is essential that complexity should be concealed and that the systems capabilities be presented in such a way that the OPAC is usable at sight by all users. This "ease of use" should be achieved by the implementation of an unambiguous dialogue between system and user in the user interface. It is the design of the interface alone which can guide the user successfully through a search.

As mentioned above, OPACs available commercially are all very different as regards to interface characteristics, yet all suppliers claim their systems have complete "ease of use" and a "user-friendly interface". This dissertation examines three systems with different interface features with the aim of assessing the effect of certain features on use of the catalogue. The systems studied were: BLCMP OPAC at Birmingham Polytechnic, ALS Browser at Bromley Public Library (both of which are commercially available), and Okapi at PCL which was developed as part of a research project. Each system was subjected to a period of experimentation and evaluation. Users were observed at the terminal and were interviewed about the last search they conducted, their previous use of the OPAC and experience of other libraries, catalogues and computers.

Background information was also obtained. Much of the data gathered was qualitative in nature. The samples were too small

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for any of the quantitative results to be statistically significant so no such analysis was attempted. Results indicate that users find Okapi the easiest system to use. Users of this system enjoyed a higher rate of success than those of the other OPACs. More people expressed a positive opinion of the OPAC and fewer encountered problems. A more detailed level, conclusions and recommendations were made regarding specific features of the interface. These are listed in section 6.4.

2.0 THE USER INTERFACE

2.1 Ease of use and the user interface

An online public access catalogue is probably best defined in the words of Miter as an "interactive information retrieval system for end users" (1). This definition neatly encompasses the issues at the centre of OPAC design : interaction (and by implication, the user interface) and "ease of use". For the purposes of this dissertation end users are defined as library users who require the information offered by an online catalogue, but who have insufficient knowledge to use the interface common to an online system; most people view library use as a means to an end rather than an end in itself and so lack the motivation to learn the techniques of I.R. Thus an OPAC should facilitate rapid access to the stock but in particular should be easy to use. Ease of use is defined by Walker as "usable at sight" (2). Such ease of use is attainable by exploiting the interactive potential of online systems to guide the user through a catalogue search. The scene of all user-system interaction is the "user interface" defined by Hildreth as "the point at which system and user meet" (3). Any study of ease of use in online systems is, therefore, a study of the user interface. Clear presentation of the system's capabilities is essential, particularly in the earliest encounters between user and system. As Walker points out (4), if a user finds a system difficult to use, he will probably never use it again, whereas a pleasant, profitable experience will encourage him to return. This supports Eason's earlier work on online systems in general (5). Early experiences are also important in that they form habits which the user will continue to follow. Borgman (6) has written of the "Einstellung" effect in relation to online catalogues. This effect is characterised by the fact that the user of an online system tends to learn only a small set of skills and continues to apply these to solve problems rather than trouble to learn new skills, even though these may be more efficient. Observations of Okapi (an OPAC included in this project) in use led to the assertion that "users do not seem to learn very much" (7) and Eason states that a user must be unable to obtain a result in any of the familiar ways before he will trouble to learn the use of a new facility (8). Applied to OPAC design, such findings must surely indicate the need to present the system's capabilities clearly and simply.

Hildreth has defined the user interface in OPACs in some depth, breaking it down into physical (hardware) aspect, the organisational setting, the personal characteristics of the user, the communications element and the functional capabilities of the system (9). The following sections deal with various sets of features which correspond to Hildreth's headings, examining current trends in the approach to their design and implementation for maximum ease of use.

2.2 Physical factors and organisational setting

The objective of the project is to discuss OPAC software interfaces, hence the physical factors and organisational setting are not discussed in full, important though they are. First, it is important that the user should not be intimidated by the physical appearance of the equipment. Keyboards can be daunting enough to the uninitiated (OPAC users have been known to complain about having to type their input (10)) without having the proliferation of extra keys found on so many computer terminals. Dedicated OPAC terminals would perhaps be the ideal. Companies such as CLSI and ALS have developed OPACs which the user operates by touching options displayed on the screen rather than by typing on a keyboard (see section 4).

Interestingly however, CLSI second OPAC (PAC II) has a traditional keyboard and VDU structure, rather than the touch screen.

Libraries vary greatly in their approach to the structure of the workstation (the configuration of furniture and terminal). The CLR report recommends that ample space should be left on the table on either side of the terminal for the user to make notes comfortably and that there be room for personal belongings (11). Work by Borgman (12) demonstrated that users tend to spend longer using OPAC terminals when a chair is provided.

2.3 The user

The user is probably the most important component of the online catalogue interface. His personal knowledge, experience, preconceptions and opinions relating to all aspects of information retrieval, automated or manual, are factors which contribute to the nature of system use. His information needs provide the OPAC designer with the *raison d'etre* for his system and must be satisfied by it. Users are not a homogeneous group, however; Hildreth highlights the diversity of user populations (13). OPAC users are traditionally divided into "naive" and "expert" categories and this has resulted in the design of some systems with two interfaces, one for the "expert" and one for the "naive" user.

One example is the University of California MELVYL system (14). The "expert" or "command" mode uses a command language to perform sophisticated searches which use all the systems capabilities. Using this interface, the user can specify which fields of a record can be searched, use Boolean logic to extend or refine searches and can request use of several formats for the display of his results. The "look-up" mode is a simpler menu driven interface aimed at the less experienced user and offering all the necessary basic facilities but without the flexibility or depth of command mode. It was discovered however, that very few people chose to exploit the more sophisticated features, remaining regular users of the "look-up" mode. This may well indicate that the simpler mode is ample for most enquiries but it also seems to show that this approach to the interface design is unlikely to produce the ideal online catalogue.

Hildreth takes the discussion of categorisation a step further than this simple polarisation; grouping users accordingly to proficiency in the system and frequency of use. He theorises that the infrequent user of an easy to use system could be quite proficient, occasional use of a complex system keeps the user in a "naive" state, and so-called "experienced" users may use the system with differing levels of frequency and varying their levels of proficiency (15).

Mention has already been made of Eason's assertion that in order to make the effort to learn a new skill on a system, the answer desired must have been found to be obtainable by all familiar means. This applies to so-called "expert" users as much as any one else (16). What is needed, therefore, is an interface which can itself guide the user to facilities which are appropriate to his individual level of expertise, indicating clearly how these facilities enhance the basic search function. This is embodied in the concept of the "adaptive" interface. Hildreth describes an interface which would require the user to give the system a profile of his level of expertise and adapt to fit it by means of giving him a set of choices:

"Verbose/terse system messages; instructional/service emphasis; interpreted/strict response to input; automatic/assisted action of machine in decision making; hidden/expository approach to processes being performed by the machine" (17).

To a certain extent, such an interface represents a move closer to the ideal providing differing levels of interaction and a certain amount of flexibility. However, it is difficult to see how it could be implemented without causing confusion communicating effectively to the existence and purpose of available options to OPAC users is not easy.

To include a further range of choices which would have to be entered by the start of each session would make certain online catalogues unnecessarily tedious and complicated, and may well have the effect of deterring people from using the system altogether. A less complicated alternative from the user's point of view, proposed by Trenner and Buxton (18) is a system which employs various levels of sophistication in the interface. When a user makes an error, the system automatically switches to a simpler level of interaction without involving the user in any dialogue. However, it is possible that this apparent lack of consistency in the system responses, could be confusing to the user.

Another characteristic of OPAC users which must have implications for interface design is the fact that users develop individual "mental models" of the system. Borgman discusses how such mental models can either enhance or hamper effective exploitation of an online catalogue. For example, experience of a card catalogue may well make it easier for a user to grasp the principle of separate indexes but could create problems in the use of keyword and Boolean facilities:

"If a system isn't what people expect, they may fail to use it correctly (out of lack of understanding of it's capabilities) and may be disappointed in it, even if the system is functioning optionally with respect to the capabilities for which it was designed." (19)

Such misunderstandings of systems are only one factor which can lead to failure with an online catalogue. OPAC users are not necessarily familiar with computers and may be nervous of them. The appearance of an OPAC terminal, therefore, in the place previously occupied by the card catalogue could possibly form a barrier to catalogue use. If the user can cross the barrier it is essential that the system communicates with the user in such a way to ensure that the experience does not become stressful. An easily understood structure of instructions, messages and prompts can deal effectively both with misconceptions and apprehensions.

2.4 Communication

The demands made on the user of an online catalogue are far greater than those on the user of a traditional form of catalogue. Instead of feeling his way round a static bibliographic tool, taking his time with mistakes unobserved, the OPAC user is compelled to interact with a complex system which works with him to solve his information problem. To use a traditional catalogue, the user had to be able to describe what he wanted and have some idea of the filing order. To use an online catalogue, he must be able to

tell the system which access point he wishes to use, type in the search term(s) and understand the computers varying responses. "It is unquestionably a dialogue" (20). Hildreth (21) quoting Borgman, says that this dialogue must take the form of an unbroken exchange of "meaningful information". It is imperative that system and user should understand each other completely. If, for any reason, communication breaks down then it is quite simply the fault of the system. This obviously places heavy demands on the designers of online catalogues. If a catalogue is to be usable at sight then the user must be made instantaneously aware of what he is expected to do. There seems to be a school of thought which considers that the goal of every OPAC user should be to become proficient in a command language, and which views any other method of man - computer communication as an interim measure preparing the user for more "advanced" use of the system. Hildreth argues that command languages are becoming increasingly logical and easy to learn and they give users the power to form complex queries clearly and concisely. (22). This attitude has found expression in such systems as MELVYL where the more powerful features of the system are concentrated in the advanced command mode (23). Such practices do not improve access to materials for the majority of users. They encourage designers to continue to develop systems along these lines rather than seeking new ways to bring the full power of an online catalogue within reach of all. There must, therefore, be other ways of structuring user - system communications. The OKAPI research team stipulate in their report that "it ought to be possible to do without a command language altogether without diminishing retrieval power" (24). A menu-driven system is seen as the natural alternative to a command system. Traditionally, however, menus are regarded as rigid and unaccommodating. In a menu driven system, the computer is felt to be in control, whereas it is psychologically more encouraging for the user to feel that he is in command of the situation. An imaginative and creative approach however, using a combination of techniques can produce a menu driven system which offers powerful searching together with a strong element of user guidance and a good deal of flexibility. OKAPI makes use of the traditional menu feature of lists of choices but also employs a "prompted form filling" format for the user input screen and allows the user to enter search terms in natural language (25).

This approach represents an attempt to make communication between user and system a more natural process and Hildreth, despite his obvious feeling for the retrieval power of a good command language does acknowledge it's potential (26).

2.5 Access points

In theory, the online catalogue can provide it's users with access to bibliographic records through any entry point which is a field in the MARC record (27). This has strong implications for the opening up of library holdings to the user. Literature produced by OPAC suppliers however, reveals that there is no true consensus of opinion about the number of access points which should be offered or the way in which they should be presented. Something which is indicated by the systems installed in both the U.S.A. and Great Britain is that an "access point" should be presented to the user as a form of search. Systems which adopt this approach run the risk of confronting their users with a large and possibly uncomprehensible range of options. E.g. OCLC's LS2000 OPAC offers in addition to the 3 basic searches an extra seventeen search options which have to be displayed on two separate menu screens (28). As it is impossible in such a situation to explain the aims of each search to the user, such an approach could make searching difficult and bewildering. A solution to the problem of expanded access has been developed by the Okapi team. Okapi presents it's searches in terms of their objectives rather than of the information required. The user is therefore, asked if he wishes to search for "specific book" or "a book about something" (29). Index entries from several different fields are searched according to the type of search chosen and the data entered (30). This increases the retrieval power of the catalogue without making the search process any more complicated for the user. The advantages of the "known item" search on OPACs over traditional catalogues are slight. Retrieval is very often no quicker and may even be slower. The fact that users have to type in their search terms as opposed to merely recognising the desired item in print may also cause problems as misspellings and entry of insufficient data could make a search take longer or even lead to failure. Possibly in an attempt to prevent such mishaps, OPAC suppliers have developed truncation facilities including derived author/title, such as those used by OCLC and BLCMP. The difficulties of explaining the principles involved to the user are such that function is usually implemented implicitly.

There is one area of potential strength in specific item searching, however. Traditional catalogues frequently file official publications under "Great Britain". OPACs should enable the user to retrieve such items using any author information (personal or corporate) or any title information. Many users expect to be able to retrieve official publications using the serial number. OPACs could make this possible making traditionally "difficult" items readily available. In terms of searching facilities it is in subject searching that OPACs have the advantage over traditional catalogues. (31). The use of Library of Congress Subject Headings (LCSH) for searching has been fraught with problems. Focus group interviews conducted as part of the massive CLR study gathered user opinion on this point. Criticisms reflect the main weaknesses of controlled term indexing particularly clearly. Users became irritated by having to think of "five different ways to say the same thing", or found that terms listed in the printed index did not apply to the holdings of the library. There were demands for online access to lists of LCSH and for "see" and "see also" references (32). This indicates clearly that a fresh approach to online subject access was required and the tone of some of the criticisms shows that users of OPACsⁱⁿ the U.S.A. who took part in the CLR study were clearly frustrated by some of their experiences. As stated earlier, online catalogues offer the opportunity to search using any field in the MARC record. Many fields, such as title and corporate author fields contain subject information relating specifically to the item if this information can be used to generate index entries rather than relying purely on formalised subject headings to the advantages of the user are considerable. First of all, this ensures that subject terminology is up to date and correct in context. Users are likely to have fewer problems retrieving relevant items if a search can be conducted using terms with which they are familiar. Second, it avoids many of the problems of presentation such as the need to provide a list of subject headings online and explanations as to how to conduct an effective subject search. Third, the system thus becomes tolerant of so-called "natural language" and the user is free to express his request in his own words. Keywords, phrases and subject headings are indexed from subject and title fields and certain Boolean functions such as AND and hyper-OR (a function by which the system can retrieve and display items similar to terms input in descending order of relevance) are performed automatically in certain circumstances, the user can perform a subject search which will retrieve a good spread of relevant materials and expend no more effort than it takes to type a word or short phrase. This, however, raises fresh problems.

If users are searching for items using natural language rather than a carefully ~~structured~~ controlled vocabulary, it is inevitable that many relevant items can be missed. It is, therefore, essential that the system is able to guide the user to other records which are also likely to satisfy his request. This means that designers must ensure natural language access is easy and that a sound structure of controlled terms is used to link the records. The Okapi team advocate the "sledge-hammer" approach to expanded subject access. That is, to provide as many access points as possible to each record, including terms from contents pages, book indexes and Dewey schedules (33). This ensures easy access to records in the database. Once the user has accessed a record, the system can exploit the control^{led} index terms assigned to each record to lead the user to other useful items by offering to display items described by the same subject headings. It is also possible to allow the user himself to browse through a thesaurus online which would list controlled terms together with a broader/narrower relationships and related terms. However, this raises considerable difficulties in the field of interface design. It would be extremely difficult to present a thesaurus in such a way that the meaning of the relationships between terms was clear to the user. Section 2.0 defined the OPAC user as someone "who lacked the motivation to learn the techniques of I.R." Actual displays of thesauri therefore, would be of little use. A system which incorporated a thesaural facility however, could be designed to display a list of terms related to those entered and "suggest" that the user might conduct a further set of searches to retrieve more relevant information. This facility could also be used to suggest alternative search terms when a search on the users original input is unsuccessful.

2.6 Search refinement

Boolean logic and other methods of refining and expanding ~~researches~~ online are areas of contention in online catalogue design. The similarities between the use of an online catalogue and use of other information retrieval systems are such that it is easy to lose sight of the point at issue, which must be whether Boolean and other I.R. techniques are appropriate in OPACS. There is no doubt that it is impossible to explain Boolean logic ~~per~~ to a user with no I.R. experience during the course of a search. So far, explicit Boolean searching has been reserved for "expert" users in such systems as MELVYL.

The LIBERTAS OPAC has only a single interface but provides Boolean searching for the "expert" (34). It has been suggested that problems with explaining Boolean may to some extent be lessened by replacing the terms AND, OR, NOT with more familiar terms such as SELECT, INCLUDE, AND EXCLUDE (35) but it is doubtful whether this would make the concepts any easier to grasp. More systems make more use of the implicit Boolean ANDs on the input phrase or ask user to enter a second word to a one word input. This is useful to some degree, but can lead to false drops. OKAPI and LIBERTAS employ a hyper-OR facility to retrieve "similar" items when a subject search finds direct matches (36). False drops which occur frequently in OKAPI are reduced in LIBERTAS by use of techniques which enable the system to take into account the positions of several terms in relation to each other in a record preventing the display of records which are not likely to bear much relation to the query (37). Such facilities are a great enhancement in that they can provide useful references and do at least avoid confronting the user with a simple "no hits" message.

2.7 Display of results

Most online catalogues tend to offer at least two different levels of display of bibliographic information. In many cases, the amount of information the user will receive in response to a particular search is determined by the number of records in the retrieved set. If the set contains more than a certain number of records, brief details will be given automatically, if there are fewer records, full records will be displayed one at a time. This cut-off point varies from system to system, but usually seems to be at four or five records. The designers' intentions in making the level of display a default function are based on two assumptions. First, that the user wants to scan the retrieved records as quickly as possible, hence the short displays for large sets. Second, that full bibliographic data is the most desirable result of a search hence the default display of full records for small sets. It is quite probable that the first of these assumptions is fairly sound. However, research into catalogue use by, among others, Lipetz at Yale University has shown that users aims in searching the catalogue do vary. Surveys revealed four types of search - to see whether the library held a specific item and to find its location, to find items on a subject, to find works by an author or publishing body, and to obtain bibliographic details from the catalogue card (38).

Online catalogues have the ability to exploit these aspects of user behaviour by attempting to provide ^{user} them with the opportunity to consult the kind of record most suited to their information need. The MELVYL systems' COMMAND MODE which gives the user the opportunity to select the type of record he desires from the four following formats: Review (main entry, title, date); Brief (main entry, title, edition, imprint, classmarks - data for identifying and locating items); Log (main entry, uniform title, title, series, notes, subjects, added entries, classmarks - data arranged in labelled paragraphs); MARC (full MARC record) (39). Such facilities increase the complexity of the interface. It would be difficult to explain to the user the context and uses of each format and would be particularly difficult to implement effectively in a menu driven system. It does, however, give the user an important element of control over the search and avoids the confusion which could result from the systems apparently arbitrary decisions regarding the amount of information displayed. The importance of user control over displays of search results is emphasized by Hildreth who goes a step further, asserting that users should be able to specify specific fields to be displayed. This, however, would seem unrealistic, bearing in mind the fact that most catalogue users know nothing of the structure of catalogue records. The feeling of control, however, must be an important factor in the general sense of being at ease which should arise from use of a good online catalogue.

A further issue which affects the number of display levels provided is the realisation that "browsing" among catalogue records is an important aspect of catalogue use (40). Browsing facilities are often provided almost accidentally by OPACs which tend to respond to any unsuccessful search by displaying the index and allowing the user to page back and forth. This assumes, however, that browsing is an activity which only follows an unsuccessful search and not an end in itself. ALS has made a special feature of the browsing facility in the ALS Browser OPAC. All searches result first of all in a simple list of authors or titles or classmarks, which can be scrolled backwards and forwards by touching an arrow on the control panel. This facility works well, but has the drawback of adding an extra stage to the search whether the user wishes to browse or not. However, many levels of display are provided in an online catalogue, one feature which is critical to "ease of use" of that system, is the physical appearance of the bibliographic records and other displays.

Miter asserts that the "aesthetics" of all displays make a contribution to overall "ease of interaction" which is just as important as the clarity and comprehensibility of the language of communication (41). A system which is easy to use in every other respect is virtually useless if the user has difficulty obtaining the information he needs, once the search has been performed. This is an important area which has, perhaps, been paid more attention by British than American designers.

Work by Tullis has shown that people who work with online systems in general, find it easier to use information presented in a tabulated format rather than in a narrative block. This involves displaying "key" information in a box at the top of the screen, and dividing the rest of the data into "logical categories" clearly separated from one another. Each category should always appear on the same position on the screen allowing the user to develop spatial expectations and access the desired information immediately. Data should be kept as concise as possible (42). This almost graphic approach to screen design is being adopted, albeit slowly, by OPAC designers. When Hildreth wrote his monograph on the user interface, the predominant format for full record screen design was that of the traditional catalogue card (43). Writing a few years later, he comments that more systems are employing a bibliographic record with labelled data elements reflecting Tullis' recommendation that information be divided into "logical" chunks (44). Walker is clearly aware of the importance of screen design. His list of practical hints includes such points as: "judicious use of boxes, upper and lower case, underlining or inverse video to separate data types" and that record displays should "bear no resemblance" to a catalogue card. Data elements should be labelled avoiding jargon and if it is not possible to find a label which most people will understand, the information should probably not be displayed at all (45).

It is important to remember that there are other items which must be displayed on the screen in addition to bibliographic data. These include lists of options, system messages, and details of the search history including the record number. Economical and effective use of space is the essence of good screen design. The user should immediately be able to locate the information he desires. There should be no need to study the screen at length nor to "underline" data elements with the finger to ensure that the details being noted down are correct.

2.8 User assistance and support

The Okapi report states that:

"The only suitable way in which users can be assisted is while they are actually using the system, that is, by the system itself (help messages, suggestive prompts, error messages), and by instructional material in the form of leaflets or brief instructions sheets on display near the terminals". (46).

It is the designers' responsibility to ensure that the system will guide the user through the search process. Borgman has emphasized the need not to overload the user's memory by requiring him to remember commands or elements of data from one screen to the next (47). It is, therefore, imperative that the catalogue supplies thorough signposting indicating clearly what options the user has at each stage and reminding him of what he has already done. Relevant choices should be displayed all the time, even those (like start again) which may seem obvious to the designer. Such basic functions should always occupy the same position in the list of options, preferably last.

Building memory joggers and signposting messages into the online catalogue interface should in theory enable users to move around the system without further assistance. Most systems however, do provide a specific "help" facility. Walker expresses the opinion that:

"If it is not possible for most people to use the system without help, or training, then the system is no good". (49).

In some systems, it almost seems as if the user is expected to rely on the help facility. The more "advanced" a system is in terms of retrieval power, the more complicated its help facility seems to be. Hildreth recommends three levels of help; general systems/tutorial help, specific help relating to the context of the search and unrequested help given by the system in response to persistent errors by the user (50). Of these, general retrievable "help screens" have tended to prevail in OPACs to date. There is, however, evidence that such facilities are rarely helpful and are seldom used (51). This must be mainly due to the fact that general help screens involve the user in considerable time and effort. Screens have to be paged through and read carefully. The search itself is lost so the problem has to be remembered and a mass of general information has to be applied to a half-forgotten situation.

Cohill and Williges, have demonstrated that if help is to be effective, the user must be able to view it alongside the situation which caused the problem. In their experience, a printed manual which could be held on the user's lap proved to be more effective than help screens which required the user to remember the details of the problem. Their suggestion is that help should be displayed on the same screen as the problem (52). Online catalogue designers are beginning to incorporate such features in their systems. Help given in such a way not only improves the user's chances of solving any difficulties he may encounter, but may also, by virtue of the juxtaposition of the problem and solution, make it easier for the user to remember what to do in the future should he ever find himself in a similar position. Provision of automatic help messages is an extension of context specific help. The development of this facility reflects the increasingly supportive nature of online catalogues. One of the main problems with retrievable help is that the user has first of all to recognise that he has a problem which the system can solve. Receiving assistance without effort in cases of desperate need (MELVYL for example, displays such messages only when the same error has been made three times in succession)(53) does not remove control from the user completely and in all probability this intervention occurs at the point when the user is becoming frustrated enough to give up completely. However, it is worth bearing in mind that users already have high expectations of online catalogues. In the light of this, Borgman has pointed out the necessity of not allowing systems to appear to be more sophisticated than they are (54). If a user receives help unsolicited under certain circumstances, he may come to expect it at other times and even develop false conceptions of the system's ability to "understand" his input.

2.9

The preceding discussion has attempted to outline current opinions about the approach which should be adopted in user interface design for online catalogues. As many of the factors which influence interface characteristics vary according to the nature of the user group and the library concerned, there can be no single "ideal" interface. However, research in pursuit of the ideal has helped the growth of ideals of approach in interface design which are no longer borrowed from the computer industry in general, but which are specifically relevant to the library catalogue.

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3.0 METHODOLOGY

3.1 Overall aims of the study

The aims of this study were:

1. to evaluate three OPACS which were distinctly different in terms of the characteristics of their respective interfaces
2. to assess the reaction of users to each system
3. to draw comparisons between the systems themselves and their users' reactions to them
4. to identify areas of the interface in each, which may affect variations in user response

3.2 The systems

Three OPACs were chosen which have differing interface characteristics. To some extent, the choice was limited by the small number of systems at present operational in the U.K. Details of systems were obtained from systems suppliers and from the relevant journal literature and three systems with contrasting interfaces selected as suitable for the project. These systems were:

3.2.1 BLCMP OPAC

This was chosen because it is a commercially available OPAC produced by a co-operative, long established as a leader in the field of library automation. As other BLCMP systems are extremely popular among academic libraries in the U.K., it seemed logical to include an OPAC which might become equally popular in the near future. The system was also considered a good candidate because it offers loans information through a connection with the CIRCO circulation system.

3.2.2 Okapi

Okapi was chosen to compliment and contrast BLCMP. Like BLCMP, this is installed in a Polytechnic library, so although the user groups are not identical, they are similar. Okapi seemed interesting because it was not produced commercially but resulted from a research project which aimed to produce a specifically "user-friendly" online catalogue. Features such as the presentation of search options by objective rather than access point, the subject search by keyword, and the use of implicit Boolean logic, made it a good system to contrast with BLCMP against a similar environment.

3.2.3. ALS Browser

ALS Browser provides a direct contrast to both the systems described above. It is a commercially available system produced by a firm specialising in the automation of public libraries. The Browser's distinguishing interface feature is its use of a touch-sensitive screen rather than the conventional keyboard employed by BLCMP and Okapi for user input. It was largely because of this feature that the Browser was included in this project. Unlike the other two systems studied, ALS Browser is installed in a public library. This factor obviously introduces complications, as use pattern of public and polytechnic libraries tend to be very different. However, a touch screen OPAC was not available in an academic library at this time.

3.3 Type of information sought

Two kinds of information were desired. The first was data about each system's capabilities and the way in which they were presented to the user and was gained through experimentation with each system. This information was necessary to produce accurate assessments of each OPAC. Secondly, information was required from the users themselves regarding their experiences with, and opinions of the OPACs.

3.4 Fieldwork

Visits were arranged to four libraries where the chosen OPACs were installed. These libraries were:

1. Perry Barr Library,
City of Birmingham Polytechnic - BLCMP
2. Riding House Street Library
Polytechnic of Central London - Okapi
3. Petts Wood and Chislehurst
Branch Libraries
London Borough of Bromley - ALS Browser

A period of five days was spent at each of the Polytechnic libraries and two days each were spent in the Bromley branch libraries. Ideally, a longer period should have been spent gathering data, but a week in each location was the most that could be managed given the time and financial resources available.

Fieldwork fell into three categories:

1. system evaluation
2. observations
3. interviews

3.4.1 Systems evaluation

Despite the different interfaces, it was necessary to ensure that each system was approached in the same way. A list of interface features and searching capabilities commonly found or recommended for inclusion in OPACs, was drawn up from the literature to act as a guideline. Two or three hours has been devoted to an examination of each system, conducting searches and noting the systems responses. The features which were looked at are outlined below:

OPAC interface features guidelines

Database features

Size of database

No. indexes

Type of indexes

Length of records

No. Fields indexed

Dialogue

User controlled

System controlled

Menu driven

Command driven

Question-answer

Form-filling

Function Keys

Input

Keyboard: layout

ease of erasure

use of function keys

redundant keys

highlighting keys

dangerous keys

Touchscreen: number touches per search

response time

Searching

Options available : order in which listed

For each type of search note :

How to select search option

Truncation: explicit

implicit

not available

rh/lh

explanations/help

Exact match searching

Near match/sounds like

Fields searched

Indexes searched

Cross references in indexes

Display of cross references to user

Response times/time taken for each search

Diagram every screen: layout

language

display of options available

no. hits displayed

search history

filing order

prompts

explanatory messages, etc.

Subject search : Subject headings - index online

Keyword search - over full record

in title

over LCSH

Boolean logic: explicit

implicit

with search terms

on previously retrieved sets

explanations/help

Other ways of refining results - date

language

format

other

Classmark searches: entry to classmark file via subject index

browsing without need to enter new search

truncation

Response of system if no hits/too many hits

Help and support

Prompts - directive - instructions

suggestive - options

silent

Error messages - informative

suggestive

consistent

language

position on screen

```
Retrieval help - general system help
                  specific help
```

For both: coverage
layout
quantity
linguistic style
level of explanation
means/ease of access

- retention of context of search
- ease of return to search
- does help appear on same screen to search
- independent scrolling

Feedback about state of search

- Offline aids - Leaflets
- notices
- official staff support
- training sessions
- introductory lecture

Output

Display of retrieved set

- no. items displayed?
- how many items will system allow before asking user to narrow search?
- when is display of record automatic?
- Nearest record displayed if no hits?
- Order in which items displayed?
- No. levels of display
 - content
 - layout
 - labelling
 - sequence of data

Browsing between records at all levels - sequence of records.

3.4.2 Observations

As a major part of the study was to be based on subjective data gathered from interviews with users, it was decided to gather information of a more objective nature about user behaviour at the terminal which could supplement the information gained in interviews. Logs of search sessions would have provided more accurate data and would have allowed search patterns and errors

to be analysed in relation to interface features but logs were only available for one system. It was felt that observation techniques could provide data on:

- the length of time spent at the terminal
- types of search used
- level of display consulted
- consultations of help facilities, loan data, offline aids
- external sign of frustration
- comments made to friends and staff

There are obvious limitations to this technique. Its success depends on the vigilance of the observer, the physical structure of the workstation and layout of the library, and it is undoubtedly subjective. Despite these limitations, however, the technique was felt to be one which could provide information which could at least indicate trends in use.

The approach adopted varied according to the arrangement of furniture in the individual libraries. Probably the best arrangement was at the Polytechnic of Central London where it was possible to observe users at the terminal while seated at a desk normally occupied by a member of staff. Users of Okapi are accustomed to searching the OPAC with one or two members of staff close by so the observer's presence did not disturb them at all. At Birmingham and Bromley however, it was necessary to stand behind the user and it is possible that the presence of a stranger influenced user behaviour.

Users were observed from the time they sat down at the terminal until they got up to leave. Notes were made on the aspects of the search session mentioned above and the session was timed. As the user rose to leave the catalogue, he was invited to take part in the interview.

3.4.3 Interviews

Interviews were designed to obtain information on the following areas:

- the last search conducted
- general experience/opinions of the OPAC
- problems encountered/improvements desired
- user background information
- library/OPAC use patterns
- experience of other libraries and computers

Twenty questions were drawn up to elicit this information (see below), the same set of questions being used in each library. This was in order to introduce a consistent element into the methodology, following the technique used by experimenters such as Moore (1) when attempting to compare systems

at different stages of development, with different features or in different environments. Interviews were chosen in preference to self administered questionnaires as the aim was to obtain information chiefly of a qualitative nature and it was felt that a spoken interview might encourage people to give more detailed responses. It was also hoped that a higher response rate would be achieved.

The questions used in the interview are given below. Objectives for each question are given in brackets:

1. What were you looking for in your last search? e.g.
a book about something, a specific book (orientation of last search conducted)
2. What sort of search did you choose? (search option used in last search)
3. What information did you have about this book? What was the source of this information? e.g. reading list (completeness of bibliographic details/specificity of subject information brought to the catalogue for the last search; sources from which this information was obtained)
4. What words did you enter? Exact terms if possible. (Terms entered for last search according to user. This enabled unsuccessful searches to be checked)
5. What did you find? (Success of last search and users' reactions to the system's response)
6. Do you think it will be relevant? (Users' assessment of relevance of item from information given by the catalogue; a further measure of success of the last search conducted)
7. What do you intend to use it for? (Reason for conducting the last search and indication of level of motivation to use the catalogue)
8. Have you ever used any other options offered by the computer catalogue? Are there any which you have used particularly frequently? (extent to which users exploit the OPAC's capabilities and indication of habitual patterns of use)
9. Did you have any problems while you were using the computer catalogue just now? What kind of problems? What did you do? (Proportion of users who experience problems using OPAC, the features which cause these problems and how users react when problems arise)

10. Are there any ways in which you would like to see the computer catalogue improved? (Areas in which users feel the OPAC is not performing sufficiently well)
11. In general, how do you like using the computer catalogue? (User opinion of the OPAC)
12. How do you think using the computer catalogue has changed the way in which you use the library. (users' perceptions of the effect of the OPAC on library use and assessment of advantages/disadvantages of OPAC in practical terms)
13. What is your occupation? How long have you been associated with this institution? (Profile of user group and degree of familiarity of users with the library before the introduction of the OPAC)
14. What is your subject? (Profile of user group)
15. What form does your work usually take? (Whether OPAC use is dictated by the habitual form of the user's work)
16. How often do you use the library? (Frequency of library use; familiarity with the library)
17. Do you use the computer catalogue every time you use the library? (Frequency of OPAC use, related to the frequency of library use)
18. Why do you use the library? (Reasons for library use and levels of motivation for use of OPAC)
19. Do you use any other libraries? What do you use them for? e.g. recreation or work. Do you use their catalogues? What kind of catalogues are they? (Familiarity of users with libraries in general and experience of other catalogues)
20. How much experience do you have of computers apart from using the computer catalogue? (Level of computing experience among OPAC users)

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4.0 OPACs CHOSEN FOR EVALUATION

This chapter describes and evaluates each of the systems selected for the study -both in terms of their functional capabilities and their interface characteristics. A separate account will be given for each system, followed by a comparison of the interface characteristics in tabular form.

4.1 BLCMP OPAC

4.1.1 Background

BLCMP OPAC can be implemented either as an integrated unit of the BLCMP library system or independently (1). The system searches a database of records downloaded from the central BLCMP database and in libraries where the BLCMP CIRCO circulation system is in operation, a link between this and OPAC provides access to the loans status of each item (2)..

The system observed for this project was installed at the Perry Barr Library of the City of Birmingham Polytechnic in April, 1985. It had, therefore, been available to users for just over a year when the survey was carried out in May, 1986. Although fully operational, OPAC was still awaiting the addition of subject keyword and author only search facilities at this time.

4.1.2 Description of BLCMP OPAC

i. Hardware

CIFER 2605 terminals are used for public access to OPAC.

These were chosen rather than the dedicated BLCMP hardware as the keyboard was felt to be less daunting. All keys are black, labelled in white. The function keys are separated from the main body of the keys by a space of about an inch and the rest of the keys form a single solid block. The layout is QWERTY.

ii. Search capabilities

The system offers three types of search : Title, Quick author/ title and subject search by classmark. There is a separate index for each search type. Indexes are composed of acronyms formed from a certain number of letters from a specified number of words in the input.

Title search acronym	- 1st word - 1st 9 letters	} plus date of publication
	2nd word - 1st 2 letters	
	3rd word - 1st 2 letters	
	4th word - 1st letter	

Quick author/title	- author name	- 1st 4 letters	} plus date of publication
search acronym	1st word of	- 1st 4 letters	
	title		
Subject acronym	- 16 figures of classmark)	plus date of publication

The user is not required to know anything of this and is instructed to enter a certain number of words or a classmark. The system generates an acronym from the search terms and searches the relevant index for an exact match. The matching record(s) are displayed to the user. If there is no exact match the user is shown the records which most nearly match the acronym generated from his search terms.

iii. Title Search

This search allows users to retrieve records when only the title of the work is known. It is selected from the menu by typing either T or t (return) (BLCMP OPAC is not sensitive to case). The input screen of title search instructs the user to "enter the first four words of the title". Once search terms have been entered, the user must press RETURN to start the search. A reminder to this effect is displayed in block capitals above the search terms. Title search retrieves records using information from the title, subtitle and series field of the record.

iv. Quick author/title search

Quick author/title search is selected by typing Q or q (CR). Users are instructed to enter the surname of the author followed by the first word of the title separating the two by a comma. As with title search, the user is given an example to guide him in inputting his search term and is warned not to enter articles. However, in this case a list of articles is given which reinforces the point - "a, an, the, ie, der, etc.". Quick author/title search allows the user to retrieve items where both author and title information are known. By combining these two pieces of information in a single acronym, the system is able to retrieve the record more quickly and is less likely to retrieve irrelevant information.

Quick author/title search retrieves records using information from all main and added author fields, editor and corporate name information.

v. Subject search by classmark

Subject search is selected by typing S(CR). Users are instructed to "enter the classmark for the subject you want". Classmarks must be obtained from the printed subject index which is available in the catalogue area on all levels of the library. This is an alphabetical subject list with classmarks. There is, as yet, no online access to such a list although it is planned and no keyword search facility so this classmark search represents the only way in which items can be accessed by subject content.

- vi. OPAC will make one of three responses to a search term. If an exact match is found the full bibliographic record will be displayed to the user immediately. When more than one match is found, the computer displays the corresponding number of index entries. If no exact match is found, the user is shown the portion of the index which most closely matches the acronym of the term entered.

vii. Full bibliographic record

This is displayed automatically when a search results in a single hit. It may also be accessed by selecting an entry from an index display. The data displayed in the record represents the contents of a selection of fields from the MARC record. Basically, the user has access to all relevant author, title, series, edition, collation and classification information plus notes. Search terms appear in the top left hand corner and provide a heading for the record also a reminder for the user as records may not always include the data element by which they were retrieved. Bibliographic details are given in a small, left justified block of data situated centrally in the top half of the screen.

viii. Index entries

A display of index entries is provided under two sets of circumstances:

1. If a search results in more than one hit
2. If a search results in no hits

In the former case, the computer will display the corresponding number of index entries and give the user the opportunity to select a full record. In the latter instance, the computer will display the portion of the index which most nearly matches the search term, nine entries at a time, again giving the user the option of viewing

the full records. Index entries are displayed in acronym order.

ix. Loans Information

A link with the circulation system enables OPAC to inform the user which copies of a particular item are on loan and the date on which they are due for return. This information is accessed from the full record, by typing L. The exact details listed are: Book number(s); site library at which each copy is held; whether it is "reference" copy or "normal" loan at present; date due for return; status of borrower. This information is given for each copy of the item.

x. Help

The system provides two distinct help facilities. Typing the option H from the main menu will give the user access to the "How to use the catalogue" screens. There are seven screens in all:

- How to use the catalogue
- Looking for a book
- Looking for a subject
- Looking for audio-visual materials
- Finding the material in the library
- What if it's not in the catalogue?

and finally

Search specific help is accessible from the initial screen of each search by typing H. This help facility takes the form of a single screen of instructions which highlights points to be remembered when searching, giving clear examples.

4.1.3 The user interface

1. The Library

Three of the floors of Birmingham Polytechnic, Perry Barr Library, are open to readers. Each floor (or level) is dedicated to a particular range of subjects : Level 2 - Humanities and Built Environment; Level 3 - Social sciences; Level 4 - Science, Technology and Management. The levels house all the books, journals and material and quick reference works pertaining to their subject area and are staffed by subject teams who provide an information desk service as part of their duties.

Library users have access to BCLMP OPAC from terminals on each level and therefore tend to use the systems in their own subject environment. Levels 2 and 3 both have 4 terminals. These are positioned side by side on a long table directly opposite the doors by which users must enter the floor, from the main staircase. Level 4 is smaller than the other two levels and has a correspondingly smaller user population. Only 3 OPAC terminals are provided here. Two occupy a similar position to those on the lower levels, and the third is situated on the other side of the table behind the hessian screen which forms a backdrop to the VDUs. OPAC is therefore visible to library users as soon as they enter the floor. Apart from this however, the library has opted not to make a great issue out of OPAC. Modest A4 yellow notices are pinned to the screen behind the VDUs on all levels to introduce the library users to OPAC and emphasize it's ease of use, and it is mentioned very briefly in the official "Library Guide". The notice and the guide, together with a brief introductory lecture delivered to new students at the start of the academic year, constitute all the offline printed aids available. Library philosophy regarding the OPAC is very much based on the idea that it is, as it ought to be, self explanatory. A year after it's installation, it is already accepted as an integral part of the library by staff and users alike.

Staff assistance is available when necessary. The information desks are always manned. There is a considerable distance between these desks and the OPAC terminals on each level. The distance between the information desk and the terminals does actually limit the availability of staff aid and throw the user more onto the system itself and to facts for support. It is extremely difficult for staff to notice when a terminal develops a fault (it is not uncommon for terminals to type double characters or display indexes one entry to a screen) and with users sitting with their backs to the information desk, the only way for them to get assistance is by leaving their seat and crossing the floor to speak to a member of staff. It is arguable that the embarrassment of this could deter some people from seeking help. Several members of staff, when interviewed, commented that since the introduction of OPAC, information desks have received fewer enquiries about the catalogue. It is just possible that this trend is not purely a function of an "easy to use" OPAC providing the ultimate solution to all catalogue problems.

	PRINT MODE	RESET	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	HOME	TXL	TXP	COPY	CLEAR SCRN	CLEAR LINE	BREAK
--	---------------	-------	----	----	----	----	----	----	----	----	----	-----	------	-----	-----	------	---------------	---------------	-------

ESC	1	2	£	\$	%	&	'	()	Ø	=	~	\	BACKSPACE	←	↓	↑	→	
TAB	Q	W	E	R	T	Y	U	I	O	P	ç	{	-	RETURN	7	8	9	?	
CTRL	SHIFT LOCK	A	S	D	F	G	H	J	K	L	+	*	3	LINE FEED		4	5	6	+
CAPS LOCK	SHIFT	Z	X	C	V	B	N	M	<	>	?	/	SHIFT	REPT	DEL	1	2	3	=
															Ø		.	enter	

Figure 1. BLCMP OPAC keyboard.

As regards the set up of the terminals, the library has provided a quite congenial environment for catalogue use. Each terminal is provided with a chair which, according to Borgman's findings (3) encourages users to spend longer at the OPAC probably enhancing the impression of the catalogue as a tool to be worked with. There is ample desk space either side of the terminal as recommended by the CLR Report (4) for books and files and although the terminals are set side by side, there is enough room for the user not to feel hemmed in.

ii. Hardware

As described above, access to OPAC is through non-dedicated terminals using the standard QWERTY keyboard layout (see figure 1). Although undoubtedly less confusing than the BLCMP keyboard, the CIPHER keyboard is far from ideal for OPAC users. Function keys are separate from the main keypad. This is fortunate as although more of these keys can crash or damage the system, the effects of pressing one by mistake could be quite disconcerting:

- the blank key at the far left of the row of function keys disconnects the terminal from CIRCO and immobilises it.
- Keys F1-F9 cause the OPAC to search on the letter of the alphabet which corresponds to the number of key.
- TXL and TXP display index screens containing entries for a work entitled "Licenced mass murder", the selected works of Byron and several blank entries.
- BREAK merely redisplayes the same screen although after pressing this key, RETURN developed the capacity to display all kinds of miscellaneous index entries.
- in the main body of keys, LINE FEED and], send the cursor all over the screen.

OPAC requires the user to press RETURN after every command. Unfortunately, the RETURN key is enclosed on all sides by other keys making it difficult to locate and making it easy to hit the wrong key by mistake. It is interesting to note that the LINE FEED key described above is immediately adjacent to the RETURN key.

Online Library Catalogue

T	Title Search	H	How to use the catalogue
Q	Quick author/title search	S	Subject search by classmark
L	Library news		

Please select an option : -

PRESS RETURN

Figure 2. BLCMP OPAC Menu screen

Erasure of characters on the screen is deceptively simple. Above the return key is a large key labelled BACK SPACE which allows the user to back space along input and type over mistakes. However, the computer fails to recognise the altered string and searches on the first term entered. If the back space key is used repeatedly, the system will send the user to the end of the index at which point the system requires the entry of a completely new search. Mistakes in input can in fact be erased but this must be done by the use of the small key immediately below the RETURN key, labelled DELT. It seems fair to assume that the BACK SPACE key is a far more obvious choice in view of it's label and prominent position and that it would be of great help to the user if the system itself could give some guidance on the matter.

As the figure 1 shows, the keyboard is somewhat overcrowded with many irrelevant characters which can do little to encourage the user who is unfamiliar with computer keyboards.

iii. The menu

Searches are selected from the main menu (see figure 2) by typing in the code letter listed (the initial letter of the option). The menu also provides access to additional facilities such as Help and Library News which are selected in the same way as searches.

Options are displayed in two columns which give the appropriate code followed by the facility which it represents. The order in which options are presented is at the discretion of the individual library. In this case the order chosen represents the state of development of each search and hence reflects the effectiveness of the option. Title search is the only search which is truly complete so far and thus is first on the menu. Database problems have meant that the quick author/title search acronyms are not quite up to date so this is offered in second place. The subject search facility is as yet a search by classmate only and is regarded as difficult to use and so is the final option on the menu.

Beneath the list of options, is the message "please select an option". Just to the right of this and slightly below it is a colon followed by the system's flashing short line prompt. Although it is not difficult to work out what is meant here, it might be a friendly touch to tell the user how to select his option. The prompt is followed by the message "PRESS RETURN" in block capitals. Once again, most people should be able to work this out but the use of the phrase "RETURN KEY" would make the meaning clearer although it would be preferable to set the system up so that it is necessary only

to press one key to select an option, which might make it's use slightly easier.

iv. Search Options

One feature which is immediately apparent is rather negative, being a lack of an ordinary author search. This capability ^sif under development but it's absence must place severe limitations on the effectiveness of OPAC as a retrieval tool as the user must know either the correct title and the author of the work he/she is trying to trace, or the classmark in order to conduct a search at present. Entering author information only into the quick author/title search will produce the required information eventually but as the system searches using an acronym composed of the first four letters of each of the authors name and the first word of the title, the index entries displayed will be those which most closely matched the first four letters of the author's name. This means that the user may have to page through a large number of index displays before finding the entry he desires. This could be time consuming and frustrating, not to mention confusing, for the user as no explanation is given. As there is no author search, it is impossible to browse through works by one person. Even a successful search using only the author section of the quick author/title acronym will not produce a set of records for works by that author because the index is filed by order of author/title acronym and date of publication which has the effect of separating works by individuals. One persons work can sometimes be distributed over several screens of the index. However, it should be noted that quick author/title search was designed for rapid retrieval of records for specific items and does in fact perform very well in this respect.

The subject search by classmark also poses problems for the user. Classmarks must be obtained from the printed subject index. Although this is explained by the subject search help screen, it would perhaps be useful if users could be guided to the index from the input screen itself. Using the subject index is not easy as it is quite hard to read. The search thus involves quite a lot of time and effort. Subject acronyms consist of classmarks up to 16 figures long and the date of publication. Matching records are thus displayed in reverse order of publication in date which means once again that works by a single author and different editions of the same work are not displayed together. This could be particularly misleading as users are likely

to assume that a classmark index display reflects the arrangement of items on the shelf. In displays of items with a common classmark the frustration of paging through successive screens could cause the user to give up and miss vital material.

The acronym search procedure causes problems in the title search facility too. Users are instructed not to enter articles at the beginning of their input as the system does not have a stoplist of common words. If a search term commences with "the" or "a" the system will search for acronyms which begin "THE" or "A....." although initial articles are not included in the acronyms. The root of the problem is that articles cannot be ignored altogether as they often form part of the title acronym after the first word. To construct effective acronyms without articles would require lengthier input whereas at present users only have to enter four words of a title. In addition to this, the use of acronyms means that title words must be entered in the right order for a search to succeed. If the system could search using phrases and individual words and ignore stop words it would be far more effective.

v. Input

Input is fairly straightforward. Search options are selected by pressing a single key followed by return and search terms are typed in using the keyboard. However, the OPAC does make certain demands on the user. Input is required to follow certain formats according to the type of search being performed. The quick author/title search input should consist of the author's name plus the first word of the title, separated by a comma. Users are reminded of this by a message on the input screen but must be sure not to type a space after the comma as the computer treats spaces as characters and a space here would shorten the title element to 3 letters. Conversely, title input should consist of the first 4 words of the title separated by single spaces. Title words must be entered in the correct order as described above. In both cases the user is instructed to omit articles at the beginning of title information. The message displayed on the title input screen is different to that displayed on the quick author/title search input screen. The title search input screen merely tells users not to "enter articles at the beginning of the title" but the quick author/title search actually lists such articles to reinforce the point. This is a very necessary reminder as any title input commencing with "the" or "A" etc.

A tale of two cities:

Dickens, Charles, 1812-1870

A tale of two cities, introduction by G.K. Chesterton

London, Dent, 1906, 0460001027

Everyman's library

Location: 823.8/Dic

PERRY BARR

N Next book in index

L Display loans

P Previous book in order

X Display index

T Redisplay title

E End your search

PRESS RETURN

Figure 3. BLCMP OPAC Full bibliographic record

will retrieve entries in the index which begin "THE" or "A". This sensitivity to articles (see also section: 4.1.3(iv)) is one of the weaker features of BLCMP OPAC. Although the reminders are clear and it is perhaps not so difficult a thing to remember, it can be extremely irritating to enter an article by mistake and have to wait for the system to complete the search before the mistake can be rectified.

Each search has its own distinctive input screen with instructions specific to the input procedure for that search. However, the user does not receive much guidance at the point of input. The only indication that the computer is ready to receive input is the flashing cursor in the centre of the lower half of the screen for search selection and search term input and in the lower left part of the screen for all other commands. Whereas it is true that it is not too difficult to work out what is required, the use of situation-specific prompts, offering guidance as to the nature of the input required would improve its ease of use.

vi. System response

As mentioned above, the system will make one of three responses to a search request: a full record, two or more matching index entries, or nine index entries which are similar to the search terms entered. These responses are displayed automatically by the system without reference to the user. The user is not informed how many records have been retrieved or indeed if any of those in the display match his search terms. When the display consists of a single full record or a few index entries, this is not too important. However, when a screen of nine index entries is displayed it would be useful for the user to be informed whether these records are relevant to him or whether they have been selected as "the next best thing" and to be given some indication of how long it will take to page through them all. For example, entering "Macroeconomics" as a title search produces screen after screen of matching entries with no indication of how many more screens are yet to come. Thus the user has to spend valuable time waiting for the computer to display these entries, nine at a time at varying speeds.

vii. System response - full bibliographic record

The full bibliographic record in BLCMP OPAC closely resembles the entries found in traditional card catalogues (figure 3). Some of the larger records can be rather hard to decipher. There is no attempt made to guide the user through the individual data elements by

ENQUIRY : HILDONLI

1. Hildick/Word forward/1965	820.9
2. Hiles/Payre pastorel	784.2
3. Hiley/Frank Sutcliffe/1974	770.924
4. Hiler/From nudity to raiment/1929	391.009
5. Hiley/The Gordon Fraser photographic/.. /Frank Sutcliffe/1974	770.924
6. Hiler/Notes on the technique of painting/1954	751
7. Hiler/The painters' pocket book of methods and matters ../1962	751
8. Hiler/The painters' pocket book of methods and matters ../1937	702.8
9. Hiley/Victorians working women/1979	331.40941

Select a line number to display more information

N next screen in the index

E to end your enquiry

P previous screen in the index

PRESS RETURN

Figure 4. BLCMP OPAC index display, quick author/title search

breaking the data into small blocks or by labelling each category. As implemented by BLCMP, the bibliographic record retains its traditional mystique. A point in favour of the layout though, must be prominence given to certain important pieces of information. The fact that the search term is used as a heading has already been mentioned. Both classmark and the locations of copies are clearly stated, separated from the main body of the record. Unfortunately, the system does not state the number of copies held but lists the name of the library in which each is located. Thus, if Perry Barr Library has 15 copies of a certain work, the words PERRY BARR appear fifteen times in a single column and the bibliographic record disappears off the top of the screen. This can be remedied by executing the command to "redisplay" the record but a simple display of the number of copies held at a site against the name would save a lot of trouble and frustration especially at times when the system is slow in responding.

As mentioned above, records can be retrieved using data from fields which may not be displayed to the user. This applies mainly to added authors. It can be mildly disconcerting when the search HAIGHT, PRINCIPLES retrieves a book ostensibly written by Dickerson, R.E. Users might find it useful to have some way of checking retrieved items against more complete bibliographic data.

viii. System response - index

The design of the index screen (figure 4) is arguably one of BLCMP OPACs least impressive features. Each entry takes up a single line on the screen and is numbered at the left hand side. However, the entries are so close together that the line numbers are of little help in reading them. Data elements are separated from each other with a slash and lengthy data is truncated, this being indicated by a pair of dots. There is some attempt made to justify data elements into distinct columns but this is very often approximate and the mixture of dots and slashes slightly out of line with each other creates an overall impression of chaos. The entries contain author names, title, date of publication, and classmark in orders varying according to the type of index but these are not labelled and it is often hard to distinguish which is which. The situation would be greatly improved if more space was allowed between the entries.

At present, a full index display consists of nine lines set very close together at the top of the screen with a large area of empty space at the bottom.

As mentioned above, BLOMP OPAC uses indexes constructed of acronyms derived from title (9-2-2-1), author/title (4/4) and classmark information. Although indexes as displayed to the user contain full author, title and classmark information, the order in which entries are displayed is acronym order rather than strict alphabetical order. This means that the alphabetical order only stretches as far as the end of each element of the acronym. Although this is not too serious in the title index where the first element of the acronym is nine characters long, the quick author/title index often presents a somewhat confusing appearance to the user as the alphabetical filing only lasts for four characters in each part of the acronym. As the date of publication is treated as part of the acronym items are displayed within the alphabetical sequence, in reverse order of publication date. Works by a single author can be separated from each other by several index entries, or even screens of entries and users could easily become confused as to whether to page forwards or backwards in the index. Different editions of the same work can be some distance apart in the index. At no point in the search is any of this explained to the user. The user receives little support in remembering where he is in the system. Index screens are not labelled with the type of search being performed. The search term is displayed as an acronym i.e. DICKTALE for Dickens, Tale of two cities. It would perhaps be more helpful to display the user's input clearly and in full.

ix. Loans information

Information about the loans status of an item can only be assessed from the full bibliographic record display. Loans details scroll up from the bottom of the screen and provided there are not too many copies of a book, can be viewed in conjunction with the bibliographic data. If there are several copies then the bibliographic record disappears off the top of the screen. The record can be recalled easily enough but then the loans details are lost. It would be more useful to the user if the two were always visible together.

Details for each copy are displayed on a single line. Each element of information forms a column down the screen and is clearly labelled and each line has a number which does make the screen easier to read but as usual, the main problem here is that the lines are too close together to be clear

x. Help and support

Both the general help facility and the separate help screens for each search are concisely and clearly presented. Each screen deals with a separate issue which could cause the user problems and makes use of examples to illustrate its point. Examples are particularly powerfully used in the general help screen entitled "Looking for a subject" where the user is instructed "don't look up PHYSICS (530) if what you really want is THERMODYNAMICS(536-7)". The usefulness of the general help facility is perhaps limited by the fact that it is necessary to view the screens sequentially rather than accessing the one desired, directly by typing in the page number which is given in a contents list on screen one almost as if this were the intention.

Search specific help gives the user brief instructions about how to enter a search. These too are supported by examples which both save space on the screen and are far easier to remember than narrative text. The subject search help screen explains, as the input screen does not, how to obtain a classmark. The title and quick author/title search help screens deal with the form of input and the need to ignore initial articles.

xi. Moving around the system

BLCMP allows fairly free movement around the system. The user can browse forwards and backwards in sequences of retrieved items at both index and full record level and can move between levels with ease. Commands by which such moves can be made are always displayed at the foot of the screen and always take the form of a single letter to be followed by pressing the return key. It should be noted that having to press the return key after every command could become tedious especially when paging through a sequence of index screens. Commands are always displayed in the same position in the list i.e. "E to end enquiry" is always last. The way in which the commands are described is concise and businesslike.

There is only one point at which the user is not given sufficient directions as to how to proceed. This is when moving out of the general help facility. Because the help facility consists of screens full of text, there is not enough room to display commands so that they stand out clearly. When leaving the help facility, the command which is necessary is "E to end enquiry" but this is

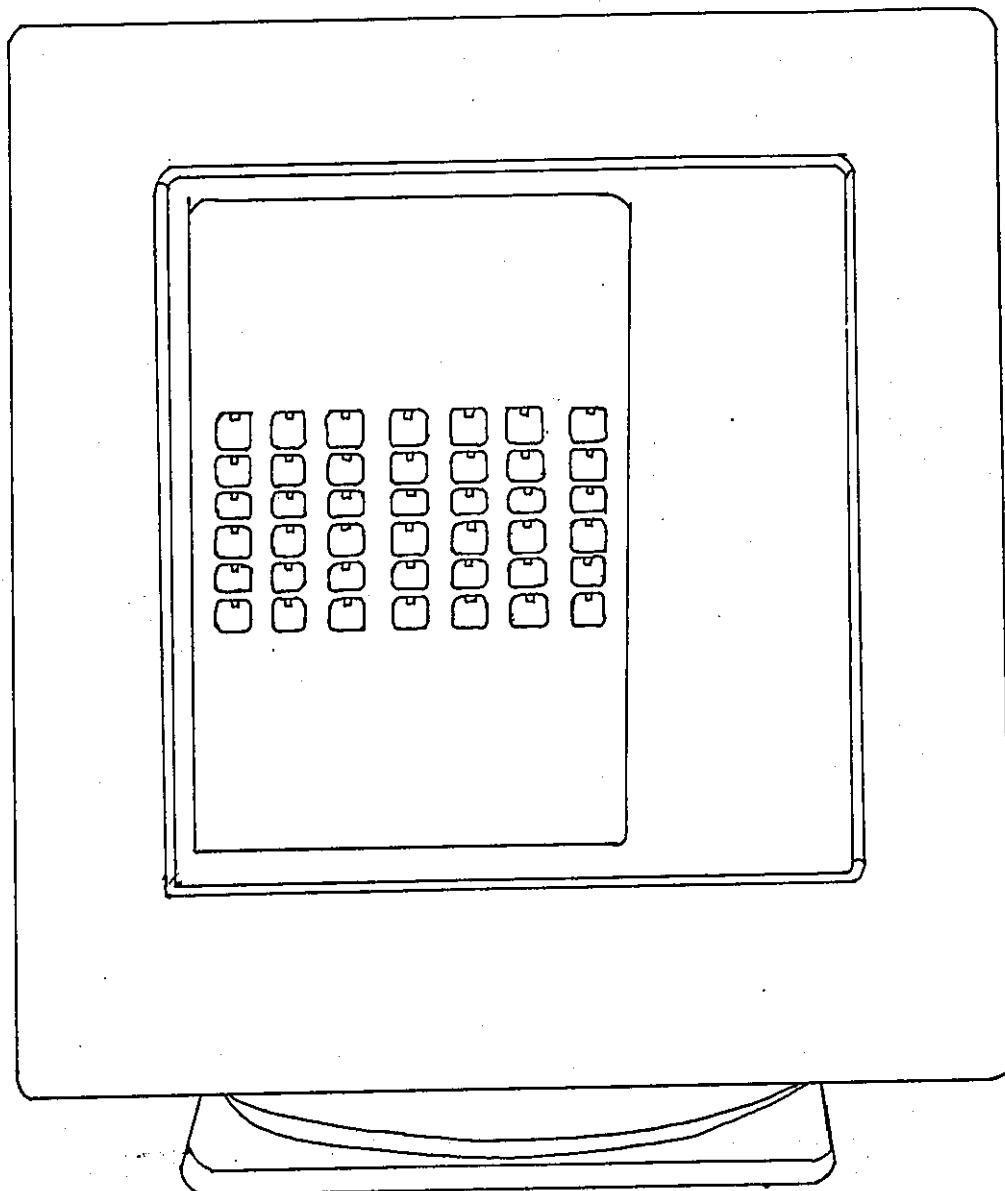


Figure 5. ALS Browser Terminal

not immediately obvious, partly because of the space problem and partly because the command does not stand out as being especially relevant to the situation. Whatever the reason, it is not immediately obvious that it is necessary to leave the help facility before entering a search term.

4.2 ALS Browser

4.2.1 Background

ALS Browser is an OPAC which was designed to be added to the ALS (Automated Library Systems) library management system popular chiefly with public libraries. The system was observed in operation in two branch libraries in the London Borough of Bromley. Browsers were installed here in September, 1985 and so had been available to the public for eight months when this survey was carried out in May, 1986.

Browsers give the user access to bibliographic details for all the 300,000 items held by the Bromley Borough Library. Although the system uses the same database as the rest of the library management system it is not linked to the circulation system and therefore cannot provide loans information.

At the time of this survey, the OPAC was not fully developed. The subject search facility was limited to a classmark search but the introduction of a keyword search complete with cross reference structure was anticipated shortly. It was also hoped that location markers would presently be added to indexes and records to indicate whether or not items are held in the library from which a search is being conducted.

4.2.2. Description of ALS Browser

i. Hardware

ALS Browser is a touch screen OPAC. The user communicates with the system by touching the screen to indicate a choice or to spell out search terms. This means that the physical appearance of the hardware differs radically from both that used in the BLCMP and Okapi systems and from the popular image of computer equipment. In place of the usual VDU and keyboard, Browser users are confronted with a VDU alone (Figure 5). The screen is divided into two sections. On the left is the display screen which is rectangular in shape measuring 15 inches by 10 inches (6), which is roughly the same size as a sheet of A4 paper. This is the area in which most of the user-system dialogue takes place, in which

search options, indexes, bibliographic records and help screens are displayed. A narrow "control panel" on the right hand side of the display screen provides permanent access to heavily used functions such as "start again", "help" and the browsing facility. Options displayed here appear in red or yellow as opposed to the green of the main display. This control panel serves the purpose of saving space on the main display by removing options which have to be more or less always available and of providing the user with an easily remembered location for basic functions.

ii. Communication with the system

The user communicates with the Browser not through a keyboard as with most OPACs but by touching options displayed on the screen. When the option touched lights up, the user knows the computer is ready to receive his request which is "sent" as soon as contact with the screen is broken. Users are required either to touch the option itself (when selecting search types, entering search terms, asking for more information about a book) or to touch a separate area marked "touch here" (when starting a search, correcting input, starting a new search).

iii. Search capabilities

Browser offers searches by title, classmark and author. The system holds a separate index for each search type and these indexes are subdivided into two or three catalogues:-

Title	-	Adult Books
		Junior Books
		Audio visual including scores
Subject	-	Adult class number
		Junior class number
Author	-	Surname
		Organisation name
		Audio visual including scores

These are all displayed as options on the menu screen (see diagram and the user selects the type of search he wishes to conduct by touching the appropriate catalogue name.

Users are informed that the system requires input of only about six characters in order to perform a successful search. The computer performs a nearest match search on the terms entered. Thus, the resulting index display will contain either the exact match of the terms entered or the closest match the computer can find. The system ignores articles such as "the", "a", "an", at the beginning of input.

iv. Entering a Search term

Unlike the other touch screen OPAC, CLSI PAC I, the Browser requires the user to spell out his search terms (7). This is done using a "keyboard" display of letters, figures and basic punctuation marks which the user touches to build up words (see figure 6). Letters are arranged alphabetically rather than in the QWERTY layout common to the computer and typewriter keyboards and found in most OPACs. Each letter is surrounded by a square box which represents a "key" and which delineates the area of sensitivity on the screen belonging to each letter. Users receive brief instructions on how to use the keyboard and the prompt "your search term is" is displayed between the instructions and the "keyboard" itself. Below the letters and figures is a space bar and two options which allow the user to erase the entire search term and start again or to back space erasing one character at a time. There is also an option which allows the user to select a different catalogue altogether. When a search term is complete, the user instructs the computer to start searching by touching a specially designated area.

v. System response - Index displays

The Browser always responds to a search by displaying a portion of the relevant index. If the search terms are matched by entries in the index, the first matching entry will be displayed in the second position on the screen. Index displays are simply lists of authors, titles or class marks in alphabetical or Dewey classmark order. Entries are displayed nine at a time and no additional information is given so that each author, title or classmark need appear only once in the index display regardless of how many items the entry represents. Entries are displayed in either alphabetical or classmark order as appropriate.

vi. Short records

Further information about a book is obtained by touching the desired entry in the index display. Highlighted instructions at the top of the index screen inform the user of this procedure. The system responds by displaying short records for all the items represented by the selected index entry (see figure). Up to six records are displayed at a time and the browsing arrow appears on the control panel prompting the user to browse forwards when there are more than six records in the set.

"Short" records are distinguished from "full" bibliographic records

by their content. They contain all the information necessary to find an item in the library : author, title, date of publication and classmark. They also give the local control number for each book which would be needed to reserve an item or for library staff to check availability details on the circulation system.

Each record occupies only two lines on the display and is well separated from neighbouring entries. Classmarks are displayed at some distance from the main body of data, in a column down the right hand side of the screen. The original search terms are displayed at the top of the screen.

vii. Full bibliographic records

If a user follows the instructions at the head of the short record screen and touches one of the short entries, the Browser will display single full bibliographic record. The search term again forms a heading for the record displayed. The record itself consists of author, title, editors, full publication data, collation, notes and price. Each element of data is displayed on a separate line which is prefixed by a dash to indicate the beginning of a new field of information.

At present, short and full bibliographic records are displayed in input order. Eventually, this will be reorganised into alphabetical or classmark sequences as appropriate.

viii. Help and support

Online help facilities are available at every stage of the search and are accessed by touching "Help?" on the control panel to the right of the display screen. The help facility takes the form of a narrative introduction to the Browser, the technique of touch selecting, browsing and fast skip, followed by instructions on how to use the system.

ix. Special features

AIS Browser has three features which set it apart from many OPACs:

Browsing - This is the feature which gave the Browser its name.

Index entries can be scrolled backwards and forwards at a variety of speeds by holding the finger on either the upward or downward arrow on the control panel. The speed increases as the touch gets closer to the point of the arrow. The facility is also used for moving back and forth in sets of retrieved records.

Fast skip - Fast skip is an extension of the browsing facility described above. When the point of the arrow is touched the index display changes to display only every thirtieth entry. This enables the user to browse easily through large sets of records such as the works of a prolific author, and functions for sets of short records as well as index displays.

Note Entry - This facility is available only from the full bibliographic record for an item. It enables the user to "save" certain entries to look at in more detail when the searches are completed.

4.2.3 The User interface

i. The Libraries

Browser terminals are installed in two of Bromley's medium sized branch libraries each with annual issues figures ranging from 212,000 to 305,000 (8). The libraries both provide a broad coverage of fiction, non fiction, reference, junior and audio visual materials. According to the staff, users are generally middle class, well educated and need minimal assistance.

Petts Wood Library

Users of Petts Wood library have access to only one Browser terminal. This is installed in the position formerly occupied by the card catalogue which was removed from the public area of the library to encourage the use of the OPAC. The terminal is positioned on a table at standing height opposite the issues desk. It is, therefore, quite easy for staff to notice if a user is having difficulties and for a user to catch the eye of a staff member when needing help. There are no printed aids. A printed version of the help screens was available originally, but was withdrawn from circulation because it was found that users did not seem interested. The subject indexes for use in the classmark searches are kept on the issues desk a short way from the terminal. There is no notice to guide the user to them from the Browser and the Browser itself displays no such direction.

Chislehurst

The installation of Browsers at Chislehurst provides something of a contrast (intentionally) to Petts Wood. Users at Chislehurst have access to two terminals. These are at low tables, each with a chair and ample writing space each side of the terminal. These too occupy the position formerly filled by the card catalogue.

The distance between these terminals and the issues desk is considerably greater than at Petts Wood so staff assistance is less easily available. Offline aids are proliferate here. A large yellow notice proclaims that the Browsers replace the card catalogue and are for public use. It tells users to read the instructions and ask if they need help and also makes it clear that they cover the entire stock of Bromley Libraries unlike the card catalogue. Two further notices outline the procedure for tracing the classmark for use in subject searching in one of these is stuck to the desk by the terminal and the other is positioned among the pile of subject indexes between the two terminals. Scrap paper is also provided for users wishing to make notes.

The organisational interfaces of the two branch libraries are, therefore, quite different. That at Chislehurst is altogether more congenial than that of Petts Wood and it might be supposed that this would affect OPAC use in a positive use, encouraging longer search sessions and searches of an experimental nature. However, the sample obtained is not large enough to make any generalisations of this nature.

ii. Hardware

The unusual hardware (see figure 5) employed in the ALS Browser represents an attempt to overcome the keyboarding problems observed among users of online catalogues (10). By not employing a keyboard, ALS have attempted to focus the users' attention firmly on the screen which is the only point of contact between the user and system. To a certain extent this is successful. The user is not distracted from activity on the screen by the need to feel his way round an unfamiliar keyboard in a public place. As choices are communicated to the system by touching the screen at the relevant place, the user does perhaps, feel more involved and perhaps takes more notice of what is happening on the screen. There are problems however. Difficulties with the touch selection technique will be discussed below (see section 4.2.3 (iii)). Further problems are created by the size of the screen which is considerably larger than the average computer VDU. This undoubtedly has positive implications for the design of screen layouts but it does also mean that a certain amount of information is displayed either above or below the users line of vision.

Specifically, instructions about input which are displayed right at the top of the screen, and options allowing the user to change his search option, correct input, or return to the index which are always displayed at the bottom of the screen, could be all too easily overlooked. Furthermore, the slightly curved shape of the screen causes the print to distort somewhat towards the very top and bottom of the display.

iii. Communicating with system - the touchselection technique

Although typing problems are neatly avoided by use of a touch-sensitive screen, the touch selection technique itself poses difficulties which are largely, though not entirely, hardware based. Choosing an option involves touching the relevant place on the screen (either the option itself or a small panel marked "touch here") at which the option lights up and the computer acts on the message once the contact with the screen is broken. The main difficulty is that the screens level of sensitivity is highly variable. At times it is enough merely to place a finger or pencil near the screen for the system to respond. Sometimes the system will react if the user moves his head too close to the screen. On other occasions, however, it is necessary to spend several seconds prodding and stroking to get the option to highlight. This problem is compounded by the fact that the area of sensitivity related to a particular option is often not centred squarely on the part of the screen on which the option is printed which means that the user has to touch the screen above, below or to one side of the desired option to elicit a reaction from the computer and it is all too easy to select the options displayed close to the one desired. The distortion becomes more exaggerated towards the top and bottom of the screen where it is necessary to touch the screen about an inch above or below the print.

The erratic nature of the screens sensitivity becomes particularly frustrating when trying to enter search terms. Terms have to be "typed" in by touching the letters on a keyboard display. Thus, every letter represents an individual touch selection and the process can be very long winded. The "keys" are set quite close together and the displacement on the touch screen of the areas of sensitivity means that it is extremely easy to enter the wrong letter.

Welcome to the AIS Browser touchscreen terminal

IMPORTANT:

If you have not used the Browser terminal before, please
touch HELP? on the control panel to the right of the
display

You may search the library catalogues for books and other .
other items by choosing one of the options listed below:

Title catalogue:

ADULT	JUNIOR	AUDIO-VISUAL
BOOKS	BOOKS	incl.SCORES

Subject catalogues:

ADULT	JUNIOR
CLASS NUMBER	CLASS NUMBER

Adult and Junior Author catalogues: works listed under

SURNAME	ORGANISATION
	NAME
AUDIO-VISUAL	
incl.SCORES	

Figure 6. AIS Browser menu screen

One further difficulty with the touch selection is that it is virtually impossible to build up any speed when entering a search term. Although some people have problems using a typewriter-style keyboard, there are others who have a little skill at least. A touch screen reduces all users to the same, slow rate of input.

iv. Search options and main menu

As mentioned above, search options are categorised first by the index name (Title, Subject, Author) and each index is divided into two or three catalogues. All these divisions are represented on the main menu as options (see figure 6). The user is thus required to categorise his information need, not once but twice. It is not enough to know that he wishes to search by title or author, he must also be able to specify whether the item he desires is likely to be classified as "adult" or "junior" or "audio visual". The time and effort taken to make such decisions might conceivably deter some people from using the OPAC.

Communicating the existence and purpose of such a large number of options is no easy task but the large screen is an advantage here. All the options are shown on one screen which minimises the number of stages in a search. This enables the user to gain some idea of the structure of the catalogue but the problems which arise from displaying so many choices at one time are numerous. Index names e.g. title, subject and adult and junior author are printed in ordinary type and underlined. Catalogue names appear beneath these headings in block capitals and tend to overshadow the index names. As the latter also represent the type of search, this could lead to users selecting the wrong type of search. For example, title search is the first index on the menu and the first catalogue name is "ADULT BOOKS". The prominence given to this option by its position on the screen and the fact that it appears in upper case could easily mislead the user to thinking that this represents a general search for all adult books. The heading containing the vital word "title" is completely overshadowed. Although the screen is large and the layout spacious, somehow the user is not led to make the necessary connection between the options and the headings which denote the type of information necessary.

Searching Adult Catalogue - Class Numbers

Use the 'keyboard' the make up your search term. You don't need to spell the entire search term, just enough to distinguish it from most other terms (normally six characters is sufficient).

Your search term is:

On completion of your search term:

Touch here

A	B	C	D	E	F	G
H	I	J	K	L	M	N
O	P	Q	R	S	T	U
V	W	X	Y	Z	.	/
Ø	1	2	3	4	,	-
5	6	7	8	9	:	'

SPACE

RUB OUT EN-
TIRE TERM

BACKSPACE ONE
CHARACTER

to change your
select term:

DIFFERENT CATALOGUE

Figure 7. ALS Browser input screen

The menu screen is also the "welcome" screen in the ALS Browser. As the menu takes up most of the available space, there is little room for messages of any kind so the highlighted rubric at the head of the screen simply instructs first time users to consult the help facility. This facility is discussed in full below. It should be noted, however, that as it is generally felt that OPACs should be "usable at sight" (11), it should not be necessary for the users to summon help in order to learn how to use the system. Furthermore, this immediately creates the impression that the system is difficult to use or that learning to use it could take time, which might deter some people from trying.

There are two aspects of ALS Browser with which the first time user might require help. These are the physical use of the system and the subject classmark search. However, the help facility offers little help on either of these issues. Instructions about how to use the system are not given until the page two of the help facility (although the user has to read through a whole screen of narrative to discover this), and no guidance at all is given about the use of the classmark search. The fact that library staff at Chislehurst have produced two notices about using the subject search, testifies to the inadequacy of the guidance offered by the system itself.

v. Entering a search term

Search terms are entered by spelling out words using the "keyboard" screen (figure 7). This input screen is identical for each type of search. The only search specific information in the input display is the screen heading which gives the name of the search being performed. As the heading is displayed at the very top of the screen in the same print as the instructions below, it is easily overlooked. This leaves the user with no search-specific guidance at all. The instructions are very general being the same for each search. Vital information about input requirements such as the order of entry of authors names or where to find the relevant class number simply is not given. Even the input prompt has no relevance to the search in hand but reads simply: "your search term is: ". Search terms are displayed above the "keyboard" just beneath the instructions. It is undoubtedly less trouble to glance from the keyboard on the screen to the search term than from a conventional keyboard to the screen. It is still not easy, however, when preoccupied with getting the correct letter to highlight, to see

Searching Adult Catalogue - Title

Please choose a heading, browsing as required.

The jewel in the crown

Jewel in the crown; main theme from TV serial

The jewel in the crown: The first book of the Raj
quartet

The jewel in the skull

The jewel maker

The jewel of seven stars

Jewel of the Grays

The jewel of the seven stars

The jewellers dictionary

To change your search select: Different catalogue
 Different title

Figure 8. ALS Browser index display

Searching Adult Catalogue - Titles

The catalogue entries shown below are for the title you have chosen. Touch any entry if you require more information about it.

The jewel in the crown

The jewel in the crown, a novel/Scott, P., - 1966 FIC
CONN B66 14916

The jewel in the crown/Scott, Paul - 1977 FIC
CONN O 56603877 9

The jewel in the crown/Scott, Paul - 1962 FIC
CONN O 434681)5 9

Resume search from The jewel in the crown
in the list of - title

Touch here

To change your search select:

Different catalogue

Different title

Figure 9. AIS Browser short record display

whether or not the computer has printed one of the neighbouring letters by mistake. One advantage of this "keyboard" is that it has none of the superfluous keys commonly found on computer keyboards and which can cause confusion is not disabled. An article by Cowley reports that users (especially library staff) who are familiar with the QWERTY layout find the A-Z arrangement on the screen confusing (12). However, the similarities between entering a search term on the Browser and typing at an ordinary keyboard are so slight that it could be ascertained that either layout would do equally as well.

vi. System response in indexes

An index display is the system's automatic response to every search (figure 8). If there is no exact match for the search terms the system will display the nearest match. This ensures that searches never result in a blank "no hits" message although a display of entries similar to, but not quite matching, the search term could be equally confusing. No indication is given as to how many index entries match the search terms nor of how many records are attached to each entry. If this could be incorporated it would be a useful guide to the user as to when to use the Fast Skip browsing facility.

vii. Bibliographic records - short records

Short records are designed to provide all the information necessary to find a book in the library (figure 9) (13). Title, author, classmark, date and control number is all the information displayed about each item and is in fact, all that is needed. Users are reminded of the type of search being performed by the screen heading which remains the same as for the index display. A brief highlighted message explains that the records displayed are those for the index entry selected and tells the user how to obtain more information.

The index entry selected is displayed as a heading immediately above the set of records although being printed in the same type as the instruction and records it does not stand out as perhaps it should. The records themselves are brief and clear. As the screen is larger than normal and only six records are displayed at a time, enough space can be left between records to ensure that each is easily distinguished from its neighbours. Title and author information are separated using a slash but again there is enough space for this not to cause overcrowding. Classmarks are displayed separately from the other data in a column down the right hand

Searching Adult Catalogue - Titles

Please select the option you require:

NOTE

ENTRY?

A room with a view

A room with a view/E.M. Forster

- Abinger ed.

- London: Ernest Arnold, 1977

- xix, 237p.: ill.(on lining papers): 23 cm.

- A room with a view originally published: 1908

- £7.95 x

Resume searching title list for:

A room with a view

touch here

Resume searching from A room with

a view in the list of - title

touch here

To change your search select : Different catalogue

Different title

Figure 10. ALS Browser full bibliographic record

side of the screen which means that they are easily noted. One drawback is perhaps that there is no labelling of the data elements on the screen. Author and title information displayed in this fashion could be said to be self-evident but it would perhaps help if information such as publication date, classmark and local control number were labelled clearly. At present the latter is presented thus: CONN 0434681059 which is of little use to anyone except a member of staff, yet a brief label which somehow conveys the information that the number is needed to reserve an item would greatly enhance the usefulness of the display.

viii. Bibliographic records - full record

By touch selecting an item on the short record display, the user can access a full record (figure 10). The display opens with the highlighted instruction to "select the option you require". This seemed confusing to the user as only one option is presented at this point, the "note entry?" option which is displayed in block capitals. No explanation is given about the purpose of this option and its presence at this point on the screen does seem to detract from the main purpose of the display which is the presentation of bibliographic data. Once again the record is headed by the original index entry which is highlighted. Each piece of information is displayed on a separate line, preceded by a dash. This is easier to read than the traditional catalogue card layout but the addition of labels describing the contents of each line would be useful especially as the records tend to contain such data as "xix, 237p.: ill (onlining papers); 23cms" which might be helpful to staff identifying items but which means little to most library users. It is unfortunate that the full record does not include the classmark. The "note entry" facility which allows records to be saved for close examination at the end of a string of searches would be greatly enhanced if it was possible to obtain this vital piece of information from the records saved rather than having to return to the short record display.

ix. Moving around the system

Movement backwards and forwards in sequences of records is easy and is controlled by the Browsing arrows. The Browser is similarly good at allowing free movement between the various levels of display.

Forward movement is controlled by the use of touching the option he wishes to select. Movement backwards along the path of a search is made possible by the provision of a selection of options at the foot of every screen. The user always has the opportunity to return to the previous stage in the search and the options given on the full record screen allow him to return to the last stage but one. The selection of backward moves given on the full record includes "Resume searching title list for x; resume searching from x in the list of titles; to change your search select; different catalogue, different title" (see figure 10). Unfortunately, title terminology is not clear. The first two options seem to be identical but in fact the first returns the user to the short record screen, displaying records subsequent to the one just viewed in full and the second returns him to the corresponding position in the index. If the user is uncertain which option to choose the "start again" option is always available on the control panel for instant return to the main menu. The one weakness is that it is not possible to return to the input screen to amend the original input. Although this is not too serious at the moment, it would be a useful feature to have once the keyword search facility has been added.

A strong point in favour of the system is that it is not necessary to wait until it has finished displaying an index or a selection of records in order to select an item and move onto the next stage.

x. Help and Support

Although help is always available on the control panel, its usefulness is somewhat undermined by the fact that the system does not retain the context of the search while the user consults the help facility so that the search terms have to be re-entered. There is only one type of help available - a general all embracing narrative account of what the Browser is for and how to use it. The order in which instructions are presented is not, perhaps, ideal. Basic instructions on how to use the system are not given until the user has read through a whole screen of text about the system and its special features. The narrative text makes the help facility intimidating in appearance, difficult to read and impossible to remember once

the user has returned to the main menu. The large screen could be used to great advantage here, in displaying helpful hints on system use under clear headings without the worry of overcrowding. In the event, the help facility even omits to give the user such vital information as how to go about finding a classmark to conduct a subject search.

xi. Special features - Browsing and fast skip

The browsing facility is the OPACs main selling point and it does actually work quite well. Index entries scroll gracefully across the screen as the user touches the upwards or downwards arrow displayed on the control panel and remain clear and easy to read. Each entry is displayed once only so the user does not have to page through screens of identical entries. At present, the terminals tend to jam if browsing is continued for too long at a stretch and the smoothness of the scrolling action can be affected by use of the central computer but though irritating, these problems are not serious. The main point at issue is that this facility adds an extra stage to all searches as the index display is the systems automatic response to all input no matter how many records will ultimately be retrieved. Observations of users at the terminal suggest that Fast Skip is known to most users of the system as a facility they discover by mistake when they move their finger too close to the lip of the browsing arrow. The index display changes to show nine entries separated by two rows of dots. A message at the head of the screen explains what the Fast Skip facility is and how to return to the ordinary index. At present it seems rather redundant as its main value will undoubtedly be in browsing through subject headings and cross references which have yet to be implemented. However, it is useful for large sets of short records such as the works of Shakespeare, Barbara Cartland or Beethoven; and all books classified at common classmarks such as 940.

4.3 Okapi

4.3.1 Background

Okapi is a prototype online catalogue. It has been under development at the Polytechnic of Central London since 1982 as part of a research project funded by the British Library Research and Development Department. The original aim of the project was to assess the suitability

of microcomputer local area networks for libraries and the OPAC was chosen as a suitable application of this technology (14). The emphasis soon shifted however to the OPAC itself as the research team came to understand that "learning how to make good OPACs is probably the most important aspect in the application of computers to libraries"(15). The OPAC is installed in the Riding House Street Library of the Polytechnic of Central London where it has been operational since November, 1984. Records are held for the Polytechnics union catalogue as it stood in April, 1984. Items added to stock after this date cannot be retrieved using Okapi but current microfiche catalogues are also provided on every floor of the library.

4.3.2 Description of Okapi

i. Hardware

Okapi is an OPAC on a local area network and is accessed via Apple IIe microcomputers configured to act as terminals. The user communicates with the system through the keyboard which, although it has a few extra keys, is fairly straightforward compared with many computer keyboards. Certain keys which represent basic functions in Okapi have been brightly painted so that they stand out clearly from the others. The layout is standard QWERTY.

ii. Search capabilities

Okapi actually offers four types of search - by author, title, title/author and subject keyword. However, these capabilities are presented to the user in terms of objectives of the search rather than in the customary library terminology for catalogue access points. Thus the Okapi user is not called upon to decide which of four access points he should use to search for an item. Instead, he is asked "Do you want to look for (1) specific book(s) (2) book(s) about something." He replies by typing 1 or 2 to select the search he requires.

Okapi employs a single index. This contains personal authors, added names, words and phrases from corporate and conference authors and added entries, words and phrases from all title like fields, words and phrases from subject headings and verbal feature headings, personal names from name subject headings,

date of publication, Dewey numbers and the following derived keys: surnames from personal keys, 4/4 title/author keys for main title and every corporate or personal author and added name, Dewey numbers (16).

Each index entry is labelled according to data type and the system searches automatically for certain specified data types according to the type of search selected. These data type labels distinguish between "words" "phrases" in the index. This is the basis of one of Okapi's most important features, namely the systems ability to adopt a fresh approach to user input when the first attempt at retrieval has failed. Okapi searches first for a match for the search phrase as input by the user. If that is unsuccessful the system searches for the component of words of that phrase without further involving the user. A phrase can be a subject phrase or simply an author's surname and initials. An unsuccessful phrase search on an author's name will prompt the system to discard the initials and search for the surname only. If the user enters more than one word in the title field and there is no match, Okapi automatically employs the Boolean AND (17). A subject search which fails and for which more than two words are entered will prompt the system to implement a Boolean Hyper-OR. In the words of the Okapi report, a Hyper-OR is when:

".. the postings for several terms are merged, i.e. they are OR-ed, and a weight is calculated for each posting. The value of this weight is the sum of weights assigned to the terms to which the posting relates. Records can then be displayed to the user in weight order, which it is hoped will have some correspondence with their degree of relevance to the user's request". (18)

This facility is designed to retrieve items relevant to the user's need but not identical to the terms entered.

iii. Input

Okapi uses a form-filling in approach to the user input. In specific book search, the user is presented with a screen of labelled fields. The first field is for title input. Beneath it is the author field and an initial field appears after author information has been entered. Although this "form" provides space for both title and author information the system will search on either or both.

The subject search input screen is simpler. Here, the user is presented with a single field and is asked to enter "word(s) or a short phrase which describe your subject".

iv. System response

Okapi has three levels of display. A successful search will be followed by a display of either brief or full records. If a search is unsuccessful, the user is offered the opportunity to view index displays.

v. Brief Record Display

If a search results in more than four hits, Okapi displays the records in a short form. Up to six records are displayed at a time. Each record occupies a single line on the screen. The content of the record varies according to the type of search conducted. In a specific book search author and title information are given. Brief records resulting from a subject search, however, contain a classmark as well (19). Information such as the type of search with the search terms entered and the position of the items in the retrieved set (i.e. Nos. 7-12 of 15) appears at the top of the screen.

vi. Full record display

Full bibliographic records are displayed if a search results in not more than four hits, after a Hyper-OR and when a user opts to see more information about a book in a short display(20). The records contain details of author(s), title(s), publication data and, in subject searches, any subject headings by which the item can be retrieved. Beneath the bibliographic information is information relating to the number of copies held at the Riding House Street libraries and other PCL libraries, and the classmark.

vii. Index Displays

When the system is not able to match the users search terms, it offers the user the opportunity to view part of either an author or a title index generated specifically for this purpose from Okapi's single index (21). If the user opts to view the index the system will display that portion which is most similar to the terms entered. Entries are displayed six at a time. The author index ^{gives} ~~with~~ authors names (personal and corporate) and the number of books in the catalogue by each.

Title index gives a list of titles and, again, the number of books held. Both index displays show the search type and original search term. The user can move from an index display into a display of bibliographic information about a given item by typing the relevant line number.

viii. Help screens

Okapi provides help screens of varying levels to answer general problems about the system and more specific difficulties with both search types. Help is summoned by pressing the yellow key which is reserved for this purpose. If it is pressed in the middle of a search the system will return the user to his search at the end of the consultation.

Help is available first of all from the menu screen. The first set of directions are displayed beneath the menu on the same screen and explain what the two searches are designed to do and how to select them. On pressing the yellow key again, the user receives a full screen explaining the keyboard.

Specific book search help and subject search also occupy two screens each. As above, the first set of instructions appears beneath the input screen, the second on a separate full screen. In each case, the first instructions give a brief account of how to enter terms and move forwards and backwards through the screen. The second gives examples of suitable input formats, explains briefly how the computer searches and offers the chance to view the keyboard help screen.

4.3.3. The user interface

i. The library

The Riding House Street Library of the Polytechnic of Central London is predominantly a social sciences library. It holds material mainly related to the studies of students on the business studies, social science, and media study courses. Users have access to five floors of the library. Stock is distributed between floors according to classmark sequence rather than each floor being dedicated to the use of students from a specific group of courses. Students thus have to use more than one floor of the library when looking for books.

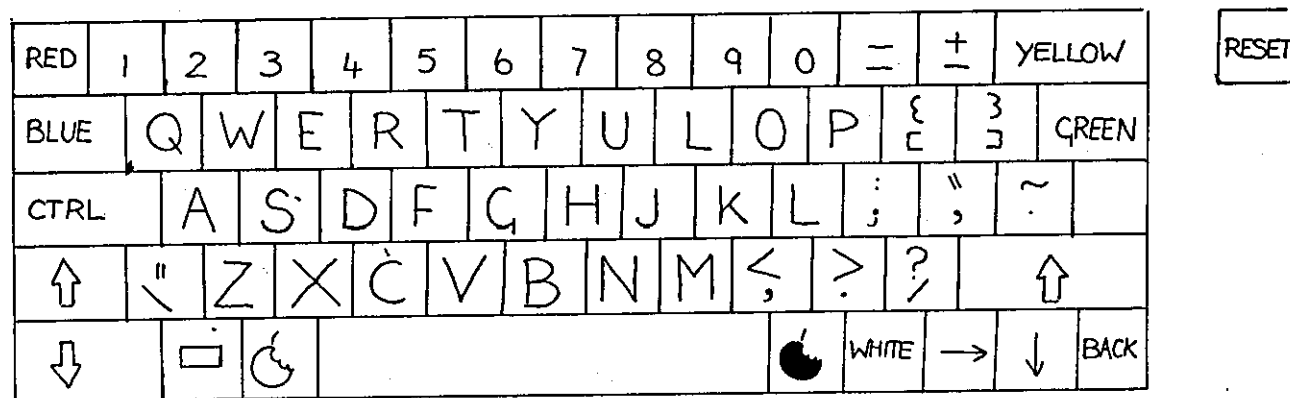


Figure 11. Okapi Keyboard.

Okapi is accessed through a single terminal on four floors of the library. Most of the interviews were conducted on the first floor as this was felt to have the heaviest use (21). Okapi terminals are positioned close to the door giving access onto each floor. On the first floor, the terminal is situated at right angles to the enquiries desk which is permanently staffed by either of two individuals who have a reputation for thorough knowledge of the library stock. It is thought that the availability of ready help may influence the heavy use of the system on this floor. Users here are accustomed to having people close to them while they search but piles of documents on the staff desk prevent them feeling overlooked. The Okapi terminal is placed on a low table and chairs provided. However, the work station is very cramped due to the lack of space which is a major problem for the library. There is writing space to the left of the terminal but to the right the user encounters the table on which the circulation system terminal is placed, which is somewhat higher than his own table. The only form of printed aid available is a notice balanced on top of each Okapi terminal, proclaiming that the terminal provides "online access to the library catalogue". Apart from this, the only guidance the user receives is from the system itself.

As the Okapi database is not updated, users have to gain information about items added to stock since April, 1984, from the Polytechnics microfiche catalogue. This is available on every floor and provides access by author and classmark. Information about the loans status of items may be gained by consulting the library circulation system via a terminal positioned next to the Okapi terminal. This however, was not designed for public access and is extremely difficult to use.

ii. Communicating with the system

Users communicate with Okapi via the keyboard. This is a standard Apple IIe keyboard - QWERTY layout, plus a few function keys (see figure 11). Although there are more keys than needed for OPAC users the keyboard is, in fact, relatively uncluttered by computer standards.

P.C.L. ON-LINE CATALOGUE

X X OKAPI
X X

Do you want to look for:

1. SPECIFIC BOOK(S):
(if you know the author and/or title)
2. BOOK(S) ABOUT SOMETHING
(any topic(s) you have in mind)

Indicate your choice by typing 1 or 2 :

IF YOU HAVE A PROBLEM DURING YOUR SEARCH, PRESS THE YELLOW KEY FOR EXPLANATIONS
OR ASK A MEMBER OF STAFF

Figure 12. Okapi menu screen

In Okapi all choices are communicated by means of pressing a single key. The key may be a number (to select a search from the main menu), a letter (to view index displays), or one of the six brightly painted function keys (for functions while searching). Single key stroke commands make communication with the system quick and easy. The use of colour on the keyboard is a simple but highly effective device which makes the function keys easy to locate. The Okapi report describes their functions as "subliminally mnemonic" (23). Although their roles change according to the situation, they do retain the same general type of function:

"GREEN	=	go (continue, proceed, browse forwards)
BLUE	=	go back (reenter search terms, browse backwards)
RED	=	stop (interrupt, enable a choice of different option)
YELLOW	=	Help
WHITE	=	erase one character
BLACK	=	finish session" (24)

Relevant keys and their roles are always listed at the foot of the screen so users are not required to remember anything. These keys give the user the all important feeling of control over the system. The green key in particular contributes to this as its use is very often in the nature of giving the system permission to proceed. Searches are never executed without reference to the user who must respond by pressing green to continue. Also of great significance is the provision of keys allowing interruption of a search and deletion of input for re-entry.

The only "real" typing the user has to do is when entering search terms. Although people unfamiliar with keyboards may find this awkward, the white function key is dedicated to back spacing for correction of input and the user is clearly informed of this at the bottom of every input screen.

iii. Menu screen

Okapi offers the usual choice between two types of search. These searches are offered not as searches by traditional catalogue access point but in terms of the objective of the search rather than simply presenting the user with a list of options to choose from therefore, the menu screen (see figure 12) is constructed in such a way that all the user has to do is

SPECIFIC BOOK SEARCH

To find a book, the computer needs the TITLE (one or two words are often enough),
or the AUTHOR (you need not know the entire name) or BOTH

TITLE(if known):

AUTHOR(if known): INITIALS(if known):
(surname ONLY if a person)

GREEN KEY	When you have finished entering the title, or if you don't know the title
WHITE KEY	If you want to correct what you have typed
BLUE KEY	To enter again and delete your word(s)
YELLOW KEY	If you need explanations
RED KEY	To choose a subject search instead

Figure 13. Okapi specific book search input screen

to answer the simple question: "Do you want to look for 1. specific books, 2. books about something?". This takes much of the weight of decision making off the user as he does not have to try to define his information in library-oriented terminology. Brief explanations of the information needed for each search are given beneath each option and the user is expressly told how to select an option rather than being left to work it out for himself. In fact, the whole menu is structured so as to guide the user to make the decision which is correct in the context of the information which he has brought to the catalogue. A message at the foot of the screen draws the user's attention to the help facility but does so in simple language speaking directly to the user "If you have a problem during your search, press the yellow key for explanations".

iv. Entering a search term - specific book search

Okapi's strengths are perhaps best revealed in the flexibility of specific book search input requirements and in the design of the input screen for this search (see figure 13). The system seeks to make the best use out of whatever information the user can provide. The input screen provides fields for title, author and initials, but the message at the top of the screen makes it clear that it is not necessary to supply all this information. This means that Okapi users are never placed in a position where the information brought to the catalogue is deemed insufficient for a successful search.

Okapi gives the user a considerable amount of guidance in entering search terms in the correct way. As mentioned above (see section 4.3.2(iii)) the specific book search input screen is designed along form-filling lines. The user is presented with "fields" labelled "title", "author" and "initials". Each label is followed by a dotted line for the user's input. The first field is the title field as people tend to remember title information more easily, (25). The users attention is drawn to the title field by the fact that the label is highlighted and the system prompt, (a rectangular cursor) is positioned at the beginning of the empty field informing him that the system is expecting title input first.

A message is displayed in brackets immediately after the title label reminds the user that a title need only be entered "if known". At the foot of the screen the first of a list of instructions explains that the green key will move the cursor onto the next field once the title input is complete or is to be omitted.

The author field is positioned directly below the title field. Once the cursor is moved down to the author field, the author label is highlighted and a message appears beneath the label stating that the input required in this field is "surname ONLY, if a person". This is a neat, clear way of reminding the user of the OPACs requirements regarding form of input and reminding him that an author is not necessarily a person (26). This field is also accompanied by the "if known" message reiterating the fact that it is not necessary to complete all the fields.

Initials are entered in a separate field which is not displayed to the user until the green key is pressed after completion or omission of author input. The "if known" message is displayed here too. By providing separate fields for surname and initials Okapi frees the user from doubts about the order of input of his pieces of information and is able to search effectively with or without initials. Incidentally, Okapi will accept initials without spaces or full stops. A further reason for providing a separate field for initials is that the field need not be displayed at all in cases where it is likely to be irrelevant. If a user enters more than two words in the author field it is quite likely that he has entered the name of an organisation and the initials prompt does not appear (27).

This neatly avoids the confusion which could arise from the system prompting the user for initials after such input as "Department of Health and Social Security" and avoids the need to send the cursor through an extra field. Entering search terms in a manner acceptable to the system can be extremely difficult. Okapi demonstrates that it is possible to guide the user through this process.

SUBJECT SEARCH

The computer will look for book(s) described by as many as possible of the word(s) you type. Please enter word(s) or a short phrase which describe your subject:

.....

GREEN KEY	To start searching
WHITE KEY	If you want to correct what you have typed
BLUE KEY	To delete your words
YELLOW KEY	If you used explanations
RED KEY	To choose SPECIFIC BOOK search instead

Figure 14. Okapi subject search input screen

The form-filling screen design is a format familiar with everyone and is far more reassuring than a silent system prompt. Although instructions are given at the head of the screen, the messages which appear at the point of input mean that users are not required to remember directions or apply static text to a practical situation.

Instructions are displayed beneath the input form. These list the functions of the coloured keys in this context. Keys are listed in order of their probable usefulness. Green is first. On first viewing the screen, the message says that it's function is to move from one field to the next. However, this changes once the title field is passed and the message then reads that green will start the search. The next most important key is felt to be white which allows the user to back space to alter input, followed by blue which will completely clear the screen. Yellow is for explanations and red will allow the user to select a subject search instead. These instructions are displayed in a simple column. Key names are in capitals, their roles in ordinary type. One particularly pleasant feature is that the messages explaining the roles of the keys are phrased as to speak directly to the user e.g. "WHITE KEY if you want to correct what you have typed". This gives the catalogue a far more relaxed and congenial image than the terse messages which often appear in online systems. There is also a complete lack of jargon. It would have saved effort and space to use such words as "input" or "search terms" and "help" but "what you have typed" and "explanations" and far clearer to the user and are less intimidating.

v. Entering a search term - subject search

A similar form-filling format is used with subject input but the screen is somewhat simpler (see figure 14). An introductory message explains how the computer searches and asks the user to enter "word(s) or a short phrase which describe your subject". This message occupies only two lines on the screen but gives the user ample information for conducting a search. Beneath it, a single dotted line stretches across the screen with the cursor positioned at the start of it, indicating that the system is ready to receive the search term.

There are some aspects of the search which might possibly cause confusion. The first stems from the fact that it is a word search only. As the system can make no allowance for the adjacency of terms in records or search on phrases, some false drops are inevitable. The introductory message does in fact state that Okapi will search for "books described by as many as possible of the words you type" so it would be unfair to say that the facility is misleading. It would be impossible to explain the situation adequately in the space available.

Another aspect of the facility which might confuse some users is that although no constraints are put upon subject input, neither is any guidance offered as to how to construct a successful search term or what to do if a search is unsuccessful. This problem is discussed also in section 2. The Hyper-OR facility which is implemented at the users discretion after a failed search does retrieve relevant material and is valuable in that it means a search need not fail completely but false drops are fairly common. Furthermore, it is possible that the true problem lies with searches which succeed rather than those which fail as the user receives no reminder that other relevant material might be retrieved by entering different terms. The second level of subject search help does in fact, suggest that the user by searching on synonyms and grammatical variants (such as plural/singular forms) of terms. It would be a nice touch if the active prompting used in a specific book search input screen could be employed here to remind the user that another search or two using related terms might provide further useful references. Subject headings which are included in some bibliographic record displays might be exploited to allow users access to records indexed under the same heading.

vi. System response - search feed-back

One of the aims of the Okapi team was to design an OPAC which was not "completely invisible" to its users. As mentioned above, the system uses different search procedures according to the nature of input and the number of words entered.

The user is informed of each different procedure and its results as it is performed. Short messages are displayed which tell the user which terms are being searched on and how many books have been retrieved which match those terms. For example, a specific book search for which both title and author information was given would produce as its first feed-back message to the user; "searching for title"x" and author "y"" as the first search implemented in this situation is a search on the derived key made up of the first four letters of each of the title and author input. Other search procedures produce similar messages. The user is thus reassured of the system's activity on his behalf during the period between input and display which can often be spent idly waiting. It was intended that users should be able to understand how the system searches from these messages. Whether or not this aim has been fulfilled is doubtful (29).

The user is always informed of the final outcome of each search. If the search has been successful this is done by displaying the number of books retrieved opposite the message describing the search. If one hundred or more books are retrieved, the system also displays a warning that it may take a long time to view all the records. These figures are valuable to the user in gauging how long he can expect to spend at the terminal and (in subject search) in estimating the success of his search term. Unsuccessful searches prompt the message NO BOOK FOUND, but as described below, the system never leaves this message as the last word on a search. Okapi always makes some suggestion for further action.

Messages are displayed at the bottom of the input screen in place of the list of instructions. This allows the user to view the searches implemented in relation to his original input. If the search is unsuccessful or produces too many postings, the user can clear his first input and enter a new search simply by pressing the blue key which clears the screen.

SUBJECT SEARCH		SHORT DISPLAY	BOOKS 1-6 of 8
"Slump"			
No.	Author	Title	Shelved at
1.	SKIDELSKY, R.	The Politicians and the slump: the labour..	941.083SK1
2.	MANDEL, E.	The second slump: a Marxist analysis..	330.9047MAN
3.	STEVENSON, J.	The Slump..	941.083STE
4.	BANNOCK, G.	How to survive the slump: a guide to..	330.9410857BAN
5.	STEVENSON, J.	The Slump: society and politics dur..	941.083STE
6.	WALTERS, A.A.	Money in boom and slump: an empirica..	382.4942WAL
<p>RED KEY to search again or to finish</p> <p>GREEN KEY to see the NEXT books</p> <p>or type a NUMBER for fuller details of ONE book :</p>			

Figure 15. Okapi Short display

vii. System response - brief records

Brief records are displayed if a search results in more than four records (see figure 15). The screen is divided into three distinct bands using two horizontal broken lines. Details about the items retrieved are displayed in the central, widest, band and up to six entries are organised into left justified columns as follows: Line number, author (personal names in capitals, corporate names in ordinary type) title, shelved at (included only in subject search displays). The columns are clearly labelled and these labels appear above the first broken line which avoids confusion in the display itself and which gives emphasis to the headings themselves.

The narrow band at the top of the screen is used for headings. In addition to the headings of the columns in the records, the type of search being conducted is displayed in capitals in the top left hand corner of the screen. Immediately below it in inverted commas, is the users search term. The words "SHORT DISPLAY" form a heading for the whole screen in the centre of the top band and in the right hand corner, the system displays the size of the set of records and the position of those displayed in that set e.g. "Books 7-13 of 23".

The band at the bottom of the screen is reserved for the instructions to the user. Here the system displays which of the coloured keys may be used along with their roles in this context and instructs the user how to gain more information about any of the items in the display.

Dividing the screen into carefully designated zones give the display an organised appearance and enables the user to locate the information he wants with the minimum of difficulty, knowing that certain types of information are displayed in certain areas of the screen. Although the screen is physically quite small, the layout of the short display is far from crowded. Records are displayed some distance from one another so they can be read without confusing the information with that displayed immediately above and below. Ample space is allowed between the separate elements of data in the record which helps the user pick out individual items of information.

SUBJECT SEARCH	FULL DISPLAY	BOOK 1 of 2
"women and marriage"		
<hr/>		
AUTHOR(S)	CALDER, J.	
TITLE(S)	Women and marriage in Victorian fiction The World of literature	
PUBLICATION	Thames and Hudson, 1976	
SUBJECT(S)	Fiction in English, 1837-1900. Special subjects: Society, Role of women, Special subjects: Marriage, English fiction women in literature, marriage in literature.	
No. of copies in this library :	1	
No. of copies in other public libraries :	LAN (2)	
Shelved at :	823.809352 CAL	
<hr/>		
RED KEY to search again or to finish		
GREEN KEY to see the NEXT book		

Figure 16. Okapi full display

Where an item has had to be truncated this is shown by a pair of dots. One small drawback is that items are not displayed in any ostensibly logical order. In fact, the order used is reverse order of publication date but as dates are not given in the brief record the user cannot know this. Although it would be useful for users to be aware of the order of display when searching through large sets of records. This is an instance when the designers have had to weigh up the advantages of information content against ease of use of a screen layout. To include dates in the short display would result in loss of space and overcrowding which would considerably detract from the usability of the display as a whole.

viii. System response - full records

A full record (see figure 16) is displayed when a search results in four or fewer records, when a user selects an entry from the short display, or as the result of a Hyper-OR. The screen is divided into three bands described in relation to the short display, each retaining the same function. The bibliographic data are therefore displayed in the central band. Data elements are labelled clearly in block capitals at the left hand side of the screen. The bibliographic data itself is printed in normal type with the exception of authors name which appear in capitals. All similar types of data are displayed together against a single heading. For example, the field labelled "author(s)" contains not only "main entry" information but "added" names as well. This helps to clarify the bibliographic record, ensuring that vital information is not missed. Search terms are highlighted when they first appear in the record which helps the user perceive the connection between the display and the terms he entered. Okapi displays no information that cannot be used by library users. Thus such details as "xvii, 333p:ill" which so many catalogues persist in including in their full records are simply not given. This leaves more room on the screen for additional author and title information in an elegant screen design.

When a record is displayed as the result of a subject search the controlled subject headings assigned to the item are displayed at the foot of the record.

This is a valuable addition to the record as it enables users to trace other relevant items using terms which may not have occurred to them.

Information such as the number of copies of an item held at the Riding House Street Library and other PCL libraries, and the classmark, is given toward the bottom of the central band, set slightly apart from the main body of the record. Instead of the term "classmark" or "class number" the phrase "shelved at" to label the field in which the Dewey numbers appears. This is the last element of data to appear in the record and is thus easy to locate on the screen.

Headings and instructions are displayed in the bands at the top and bottom of the screen in the exact same way as for the short display.

ix. System response - index displays

Index display screens are very simple. The screen is divided into three bands as for the bibliographic displays with index entries displayed in the central band in alphabetical order. Index entries (author names or titles) are displayed down the left hand side of the screen. Each is prefixed with a line number to aid selection of appropriate entries. The number of books corresponding to each entry is displayed at the extreme right of the screen and the two columns are linked by a dotted line.

x. System response - unsuccessful searches

Rather than confront the user with the blank "no hits" response, Okapi attempts to guide the user towards a solution to his problem. In the specific book search when the standard search procedures fail, the user is given the opportunity to implement further searches on his input. Where input consists of more than one word the system will offer the user the option "press the letter t to search for title words" and will search for the individual words using the Boolean AND which may be successful where the user has entered words in the wrong order. Where title input consists of a single word, the user may be given the option to view the titles either "beginning with" or "containing" that word.

The final option is always to view the relevant portion of the author or title index which may be useful in identifying misspellings. That this is very much a last resort is reflected in the fact that this option is offered below instructions telling the user how to enter another search or choose the other search type. An unsuccessful subject search results in the offer to search for "similar books" employing the Hyper-Or search described above. Although users are not told how many books are retrieved in this search, they are informed that "the most similar books will appear first".

These alternative strategies are always presented as options. The user remains in control all the time, at liberty to abandon the search completely and start again if he wishes.

xi. Help facility

The Okapi help facility is easily accessible at all times by pressing the yellow key. Although it is not a "context specific" facility, it does aim to answer the more obvious problems which users may encounter and does this clearly and concisely. As mentioned before, the first set of help instructions displayed after pressing the yellow key are displayed beneath the screen which has caused the problem. This enables the user to apply the help given to his own situation and means that he does not have to remember anything. The menu help screen (see diagram) explains the searches in the context of the type of information the user is likely to be seeking, advising which is more appropriate. Having read this instruction the user is able to go ahead and select a search option without having first to leave the help facility. A second screen explains the keyboard in note form, reflecting the layout of the keyboard,

Instructions which appear beneath the two input screens commence by answering directly the problems most likely to have prompted the user to summon help. In specific book search the help facility opens thus: "If you don't know the TITLE just press the GREEN KEY to enter the author. If you have put a title, but don't know the author, press GREEN KEY to search". In subject search, the opening instruction is "If you need several words, use the space bar to separate them. When you have finished press GREEN KEY to search for your word(s)." In both

cases the rest of the screen explains how to correct errors and how to select the other search if the user does not have the right information. The second screen of search specific help is a "how to enter" screen. Each screen opens with a set of examples demonstrating various types of input. Explanations are given at the bottom of the screen so the user is not forced to read through prose instructions unless he wishes or needs to do so. Specific book search demonstrates how to enter hyphenated input and input with more than one word, when to enter initials and that authors can be organisations as well as people. Subject search help demonstrates input in the form of words and phrases. Each continues to explain how the computer searches and how many words are necessary. Subject search also advises the user to try entering synonyms and plurals. Okapi help is presented in the form of short sentences written in simple English and directed to the user using the second person. Important words are printed in capitals. Each point is made in a maximum of two sentences and is separated from its neighbours by a space. This makes the screens far easier on the eye and far easier to use than if the text had been presented in solid paragraphs.

xii. Moving around the system

Movement forwards and backwards in sets of records, between levels of display and back to input screens or the main menu is controlled by the coloured function keys described above. The relevant keys and their roles are listed at the foot of every screen and appear in a consistent order. From the input screens, users can view items retrieved, enter another search or choose the other kind of search. Screens displaying search results allow the user to end the search or return to the short display, view previous items or proceed to view the next item(s) in the set if there are any. One weak point is that it is impossible to return to the input screen or menu from the full record display without first returning to the short display.

xiii. Okapi: "Just a catalogue"

Okapi was designed as part of an experiment in the use of LANs in libraries. It was thus not conceived as part of a

larger library management system, and has no link with the Polytechnics circulation system. This means that it cannot provide access to loans information which is considered to be one of the more useful facilities which can be offered by OPACs. Criticism may be levelled at the system because of the absence of this feature and allegations have been made that Okapi is simply an "automated card catalogue". Loans information is undoubtedly heavily used (see results of BLCMP survey) when available. The addition of this facility to OKAPI would be a great bonus. However, it should be stressed that even without the ability to tell a user whether or not the book he desires is available. This particular online catalogue has made unparalleled strides in the field of self-presentation and this alone makes it worthy of attention.

4.4 Potential areas of difficulty in the use of the three OPACs

Experimentation with the OPACs led to identification of certain features/characteristics in each system which might cause problems in use. These are listed below:

- BLCMP:
- Subject search by classmark only
 - Lack of author search
 - Inadequate explanation of classmark search
 - System sensitivity to articles, spelling errors, etc.
 - Screen layout (i.e. crowded, confusing)
 - Filing order of index displays
 - Silent prompts
 - Response times
 - Lack of obvious and effective means of correcting input
 - Need to keep pressing. (return)
 - Dangerous keys and keyboard layout
 - Hardware malfunction
- ALS:
- Touch screen's failure to respond
 - Lack of guidance, instructions and helpful prompts
 - Subject search by classmark only
 - Lack of explanation of classmark only
 - Time taken to conclude a search
 - Lack of location information i.e. which branch holds a copy of an item
 - Order of records in retrieved sets

Okapi: Subject search - false drops, access to related records
 Database out of date
 Retrieval of matching records only - no access to
 index for browsing
 Hardware malfunction

4.5 A comparison of the interface features of three OPACs

The tables presented below offer a direct comparison between the interface characteristics of the three OPACs discussed in this chapter. The comparison is based on Hildreth's "OPAC Interface Adequacy Assessment Guide" (30) (see appendix 1). In its original form, the Guide clearly reflects the specifically American attitude to OPAC interface design, namely the emphasis laid on command languages and functional capability at the expense of menu-driven systems and clarity of presentation. It was, therefore, necessary to amend Hildreth's Guide somewhat to bring it into line with the latter features which are more characteristic of the British attitude to design.

It should be noted that this section is intended to provide a comparison at a very basic level. The checklist used may not be comprehensive and is subject to the usual limitations which govern checklists. Features listed have not been ranked according to importance and it should be remembered that a system can incorporate several features of minor importance but fail to offer a feature considered by experts to be fundamental. This section can offer no guidance in these matters. Furthermore, the checklist makes no allowance for other factors (such as user characteristics, and features of individual libraries) which play just as important a part in determining the success or failure of an OPAC as the system features.

Within these limitations, it will be noticed that all three systems rate poorly in relation to sophisticated features such as authority control, cross reference structures, searches on grammatical variants and context-specific help. However, Okapi appears to incorporate far more of the other features listed than either of the other two systems and from this it may be suggested that users will interact more effectively with this OPAC than with others included in this study.

	BLCMP	ALS	Okapi	Comments
<p>1. Is the OPAC self-explanatory? Can an untrained user begin to use the system and successfully complete some searches without assistance from another person or printed aid?</p>	Yes (see comments)	No (see comments)	Yes	<p>BLCMP - Vital instructions about how to use classmark search given only on help screen for subject search</p> <p>ALS - no directions about nature or form of input</p>
<p>2. In a menu-driven system</p> <p>a. are options expressed in familiar "natural language" words?</p> <p>b. is the objective of each option made clear to the user?</p> <p>c. Can the user see at a glance the range of searches he can perform using the OPAC?</p>	<p>No</p> <p>No</p> <p>Yes</p>	<p>No</p> <p>No</p> <p>No</p>	<p>Yes</p> <p>Yes</p> <p>Yes</p>	<p>BLCMP - menu uses traditional catalogue terms</p> <p>- offers no explanation of aims of searches</p> <p>- but menu is quite concise</p> <p>ALS - menu uses jargon i.e. classnumber and audio visual</p> <p>- offers no explanation of aims of searches</p> <p>- menu very long, takes time to read</p> <p>Okapi - searches described in plain English</p> <p>- describes options by objective</p> <p>- menu contains only two options</p>
<p>3. On input</p> <p>a. does each input screen explain exactly what is required?</p> <p>b. does the system actively guide the user through the input process using search specific prompts?</p> <p>c. is it easy to alter/erase input even after completion?</p>	<p>No (see comments)</p> <p>No</p> <p>No</p>	<p>No</p> <p>No</p> <p>No</p>	<p>Yes</p> <p>Yes</p> <p>Yes</p>	<p>search</p> <p>BLCMP - explanations good except for subject</p> <p>- prompt is silent flashing line</p> <p>- alteration of input possible but not explained</p> <p>ALS - input screens identical - no search specific instructions of any kind</p> <p>- options provided for alteration/erasure of input but touch screen causes problems</p> <p>Okapi - Clear explanations and active prompts through form-filling input screen</p> <p>- function key reserved for alteration/erasure of input</p>

	BLCMP	ALS	Okapi	Comments
4. Can the user cancel a search which has just begun?	No	Yes	Yes	<p>BLCMP - can only end search after results have been displayed</p> <p>ALS - "start again" option always available a separate control panel</p> <p>Okapi - can end search after processing but before display of results</p>
5. Is the current search request displayed through-out the search in a form the user can understand?	No	Yes	Yes	<p>BLCMP - displays acronym only in index display, terms in full on full record</p> <p>ALS - displays terms as entered as screen headings on short and full record screens</p> <p>Okapi - search term given in full with search type</p>
6. Will the system ignore stopwords (words not indexed) included in the user's search statement and process the search on significant words?	No		Yes	<p>BLCMP - system is sensitive to articles at the start of input</p> <p>ALS - ignores articles at beginning of input but implements characters by character search</p>
<p>7. If a search retrieves no hits</p> <p>a. will the system automatically invoke an alternative search technique (i.e. search on component words of input) to make the most of information entered by the user?</p> <p>b. will the system inform the user that his search has been unsuccessful and suggest action that the user might take?</p>	No	No	Yes	<p>BLCMP - displays portion of index which matches input most closely</p> <p>ALS - displays portion of index which matches input most closely</p> <p>Okapi - implements word searches, uses Boolean AND or Hyper-OR, offers index displays, suggests user tries other search options.</p>

	BLCMP	ALS	Okapi	Comments
8. Will the system automatically search on grammatical variants (e.g. spelling, singular/plural, noun/adjectiveal) forms of the search terms and retrieve the closest matches?	No	No.	No	
9. Does the system incorporate authority control (so that it can retrieve items when a variant form of the name is entered) and a structure of "see" and "see also" references?	No	No	No	ALS - cross references will be added to the system along with the keyword search.
10. In the bibliographic displays				BLCMP- records presented as solid text
a. are data consistently formatted with similar data elements grouped together?	Yes	Yes	Yes	ALS - No labels but each item of data displayed on separate lines prefixed by a dash
b. are the components clearly labelled, free of jargon and unfamiliar or unnecessary punctuation?	No	No	Yes	Okapi- data elements labelled, search terms highlighted in record, screens divided into zones
c. is maximum use made of the space available to ensure that important items of information are immediately accessible?	No	Yes	Yes	
d. are highlighting and other graphic devices used to enhance access to key information and to add structure to the record?	No	No	Yes	
11. If a single record results from a search does it display automatically?	Yes	No	Yes	ALS - system displays index entries as response to all searches Okapi- user must give system permission to proceed before any display is given

	BLCMP	ALS	Okapi	Comments
12. If multiple records result from a search				
a. does the system instruct how to display one or more	Yes		Yes	
b. does the system instruct the user how many records have been retrieved and number them in display	No	No	Yes	
c. if a set of records is very large, does the system warn the user/suggest refinement of the search	No	No	Yes	
13. Help facilities				
a. is situation-specific help available?	No	No	No	ALS - general help only, presented as narrative text
b. is search-specific help available?	Yes	No	Yes	
c. is help displayed on the same screen as the problem?	No	No	Yes	
d. is help presented in concise, easily remembered points, using examples?	Yes	No	Yes	

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5.0 RESULTS

This chapter describes the results of interviews with users of the three OPACs and of the observations of these systems in use.

5.1 BLCMP OPAC - results of interviews with 61 users

Interviews were conducted with 61 users of the BLCMP OPAC at the Perry Barr library of Birmingham Polytechnic.

5.1.1. Details of last search

i. Orientation of search

It was found that the majority of searches were for specific books (72.1%)

Orientation	No.	%
Specific Book	44	72.1
Subject	17	27.9

ii. Types of Search used

Almost half the people interviewed had used the title search (49.2%). 41% had used the Quick author/title search and 9.8% had used the subject search.

Type of search	No.	%
Title	30	49.2
Quick author/title	25	41
Subject	6	9.8

iii. Information brought to the catalogue - type and sources

44.3% of the people interviewed had brought both author and title information for their last search. Title information was the next most common type of information (24.6%), followed by general subject information (15.4%).

	No.	%
Author/title	27	44.3
Title	15	24.6
General subject	10	21.3
Author	4	6.6
Named persons, places, objects	3	4.9
Other	2	3.3

The main source for information used by people in their last searches was found to be reading lists (36.1%). 21.3% respondents said the book had been recommended to them, and 16.4% said it corresponded to an area of their coursework. A further 8.2% had just "heard about" the book

source of information	No.	%
Reading list	22	36.1
Recommended	13	21.3
Area of coursework	10	16.4
Heard about it	5	8.2
Other	6	9.8

Note: 4 people gave no source : 1 person wanted the Oxford English Dictionary.

iv. Information entered into the catalogue

Most people had entered either author/title information (36.1%) or title information (33.8%). 18% had entered subject phrases.

	No.	%
Author/title	22	36.1
Title	20	32.8
Subject phrase	11	18
Author	4	6.6
Classmark	4	6.6

v. Search Results

42 people obtained results which matched the terms entered (68.9%). Of these searches, 29 were completely successful, 4 items were on loan, 1 was reserved and 8 were of doubtful relevance. 3 people (4.9%) failed to find the item they wanted but retrieved other useful information and 16 (26.2%) were completely unsuccessful.

	No.	%
Successful	29	47.5
Unsuccessful	16	26.2
Relevance doubtful	8	13.1
Item on loan	4	6.6
Other relevant item found	3	4.9
Item reserved	1	1.6

vi. Use of retrieved items

The uses for which most of the items were intended were coursework - essays, seminars, projects, etc. (45.9%) and revision for exams (41%).

	No.	%
Coursework	28	45.9
Revision	25	41
Bibliographic references	3	4.9
General interest	2	3.3
Research	1	1.6
Other	3	4.9

5.1.2 Other experiences of using the OPACi. Use of other search options

BLCMP OPAC offers 3 search options. 83.6% respondents said they had used options other than that used in their last search.

	No.	%
Used other options	51	83.6
Have not used other options	10	16.4

40 people named searches which they used particularly frequently. More than half (52.5%) said they use the Quick author/title search most often. 17.5% make more use of the title search, and 2.5% use the subject search most frequently. 22.5% use Quick author/title and title search with equal frequency:

	No.	%
Quick author/title	21	52.5
Quick Author/title and title equal	9	22.5
Title	7	17.5
Subject	1	2.5
Title and subject equal	1	2.5
All 3 equal	1	2.5

ii. Problems encountered using BLCMP OPAC

Most of the respondents (70.5%) said they have no problems using the OPAC. 24.6% said they do encounter problems, and 4.9% were non-committal.

	No.	%
No problems	43	70.5
Problems	15	24.6
Unsure	3	4.9

Problems encountered by respondents fall into categories:

a. System response - 7 people said that they had problems with various aspects of the system's response to their requests.

- "Sometimes it doesn't go where it's supposed to - the alphabetical order isn't quite right - you have to keep going 'til you get what you want."

- "Sometimes title search gives you everything except what you want - then you give up!"

- "It didn't show what I wanted just now so I cancelled and did it again and found it."

- "I had to go through about ten pages of "applied" entries - I got fed up."

- "You have to wait too long to get from a to m in the index - I gave up."

- "Following the instructions is confusing .. it says put in first word of title so I put in 't' for 'the'. What is a line number? It says to enter a line number in the index for more information. It doesn't say not to put in articles."

- "The catalogue says there are copies in the library but they aren't on the shelf."

b. Performance - 4 users mentioned problems which they felt arose out of their own lack of experience with the OPAC.

- "I can't type."

- "I have to ask when something goes wrong - I don't have much experience."

"If you're not sure about the author it's slow and the fiche is more efficient."

"I wasn't very successful with title search so I opted for Quick author/title."

- c. Response time - 2 people commented that the system can be slow.

"It's slow."

"Sometimes it's slow .. I ~~won't~~ or can't use the fiche."

- d. Hardware problems - 2 people remarked on the tendency of the terminals to go wrong.

"Breakdowns are a problem."

"I pressed return and nothing happened so I moved to another terminal."

- e. Error correction - 1 user remarked that it is difficult to correct errors.

"I put in the wrong author and rubbed it out but the computer found the first author. I pressed return in mid-sequence and got rubbish - had to wait for cycle to finish. You can't alter mistakes until you've finished."

iii. Possible improvements to the system

Over half the respondents said there were ways in which they would like to see the system improved (59%). 36.1% could not think of any improvements, 3.3% were unsure and one user was a first-time user and felt unable to answer.

	No.	%
Improvements	36	59
No improvements	22	36.1
Unsure	2	3.3
First time users	1	1.6

Improvements which were suggested fall into five categories:

- a. Response time - 9 people said they would like to see the OPAC's response times made quicker. Their comments included the following:

- "Make it quicker. It's very annoying sometimes to press the button and nothing happens."

- "It's slow. You can't do much yourself."

- " this is quicker than Aston."

- b. Subject Search - 9 respondents described ways in which they felt the subject search could be improved.

- "Be able to enter subject words and get a list of relevant books."

- "It would be better if you could do a subject search without having to know the number .. enter a couple of relevant words."

- "Should be able to put in a subject word like at Aston University."

- "A subject search would be useful as sometimes you get pages of irrelevant titles."

- c. Search results - 6 people suggested aspects of the presentation of search results which they felt could be improved.

- "The books aren't always in alphabetical order. You don't know if you need the next screen or the previous screen."

- "The Quick author/title search doesn't always find what you type in."

- "Make it not keep jumping to anywhere. I used Quick author/title search and entered "Child". I got books about children."

- "Make it a bit more specific in what it gives back. It tends to be very general."

- "In Quick author/title search, if you type in Ingram you get the beginning of the Ingrams. The titles are in alphabetical order which is time consuming - you have to go through them all."

- "Sometimes it doesn't find what you want even if you know there are books on the subject."

- d. Additional features - 5 people suggested features which could be added to the system to improve it:

- "An ordinary author search."

- "An author search - in the Architecture we often just hear a name."

- "Include information about books' contents."

- "Include journal articles."

- "Include an easy way of finding all it's capabilities."

e. Reliability - 3 respondents suggested that the reliability of the system could be improved:

:- "The system is down a lot."

- "It often doesn't work."

iv. User Opinion of the BLCMP OPAC

The majority (90.2%) of users said they like the OPAC. 6.6% do not like it and 3.3% were non-committal.

	No.	%
Favourable	55	90.2
Unfavourable	4	6.6
Non-committal	2	3.3

v. User opinion of the effect of OPAC user on their use of the library.

34 people (55.7% user group) had been associated with the Polytechnic since before the introduction of the OPAC and were therefore able to comment on it's effect on their use of the library. 64.7% of these people said they felt the OPAC had affected their use of the library:

	No.	%
OPAC has affected use of library	22	64.7
OPAC has not affected use of library	12	35.3

Respondents described the influence of the OPAC in the library use in the following ways:

No.

Makes using library quicker	10
Don't waste time	4
Don't need to look along shelves	4
Makes using library esier	3
More likely to try to find books	1
Pester librarians less	1
Find more books	1
Use library more often	1
Use library more effectively	1

5.1.3 Background information about users of BLCMP OPAC

i. Occupations

The majority (93.4%) of people interviewed were students.

6.6% were professional people.

occupation	no.	%	occupation	no.	%
Students	57	93.4	Undergraduate full time	45	73.8
			Undergraduate part time	1	1.6
			Post graduate full time	2	3.3
			Post graduate part time	2	3.3
			Other courses	7	1.5
Professional	4	6.6			

The undergraduate user population was divided as follows

	No.	%total
First year	15	24.6
Second year	21	34.4
Third year	10	16.4

ii. Academic Orientation of users

Respondents came from a wide range of academic backgrounds. Most people interviewed were involved with subjects in the social sciences (78.7%).

	No.	%
Social sciences	48	78.7
Science and Technology	10	16.4
Arts	3	4.9

iii. Users habitual form of work

The majority of users (80.3%) said their work usually took the form of essays or seminars. 19.7% are required to produce longer projects and 18% said practical work took up a substantial proportion of their time.

	No.	%
Essays/seminars	49	80.3
Long Projects	12	19.7
Practicals	11	18
Exams	6	9.8
Reading	3	4.9
Case studies	3	4.9
Reports	2	3.3
Lecture preparation	1	1.6

5.1.4. Details of library and OPAC use

i. Frequency of library use

Almost half the people interviewed (49.2%) said they used the library every day. 29.5% use the library a few times a week, and 9.8% use it weekly.

	No.	%
Daily	30	49.2
Few times a week	18	29.5
Weekly	6	9.8
Fortnightly	1	1.6
Other	6	9.8

ii. Frequency of OPAC use

57.4% of the respondents said that they do not use the OPAC every time they use the library. 26.2% said they use the system frequently but probably not every time they visit the library and 14.8% said they do use the OPAC as often as they use the library. 1 person gave no answer.

Frequency of OPAC use No. %

Not every time use library	35	57.4
Frequently	16	26.2
Every time use library	9	14.8
No answer	1	1.6

iii. Reasons for library use

Study and obtaining specific readings were given as the main reasons for library use (72.1% each).

No. %

Study	44	72.1
Specific Readings	44	72.1
General reading	7	11.5

Note: figures add to more than 61 as users could give more than one answer.

5.1.5 Experience of others libraries, catalogues and computers

i. Use of other libraries

A large proportion of those interviewed (73.8%) said that they do use other libraries.

No. %

Use other libraries	45	73.8
Do not use other libraries	16	26.2

Three quarters of those who use other libraries (75.6%) use them for work purposes. 13.3% use them for recreation and 11.1% for both purposes.

No. %

Work	34	75.6
Recreation	6	13.3
Both	5	11.1

26 respondents use catalogues in other libraries. COM catalogues were the type most people had used elsewhere (18 respondents), followed by card catalogues (9 respondents) OPACs (4 respondents) and printed book catalogues (1 respondent).

	No.	% total
COM	18	29.5
Card	9	14.8
OPAC	4	6.6
Printed book	1	1.6
Other	2	3.3

ii. Experience of Computers

88.5% of respondents had some experience of computers apart from using the OPAC.

	No.	%
Experience	54	88.5
No experience	7	11.5

Just under half of the people who said they had some experience of computers said they had gained it on the course (48.1%) 11.1% had gained it at home and 7.4% at school. Some people described their experience in terms of quantity. 37% said they had a "little" experience, 20.4% a "lot" and 9.3% a "moderate" amount.

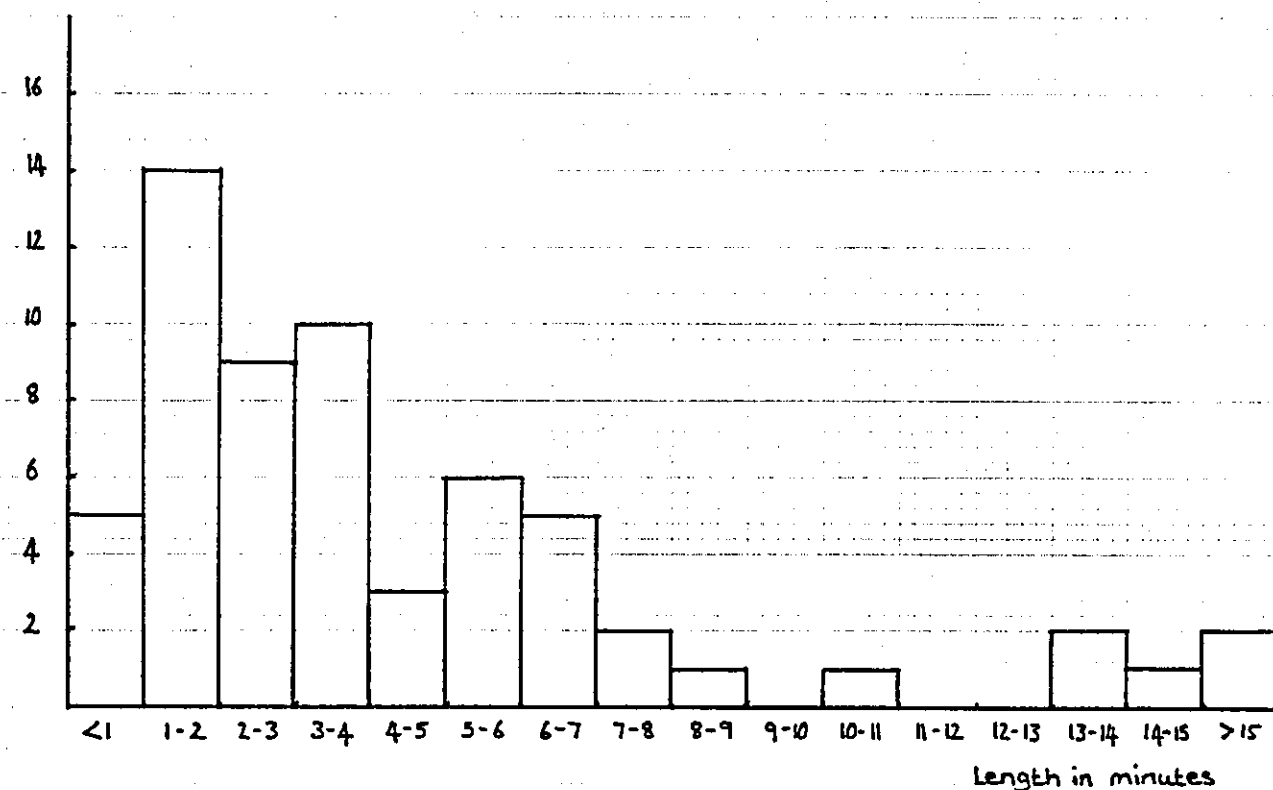
	No.	%
Course	26	48.1
Home	6	11.1
School	4	7.4
A little	20	37
A lot	11	20.4
A moderate amount	5	9.3

5.2 Results of observations of 61 sessions on BLCMP OPAC

5.2.1 Length of search sessions

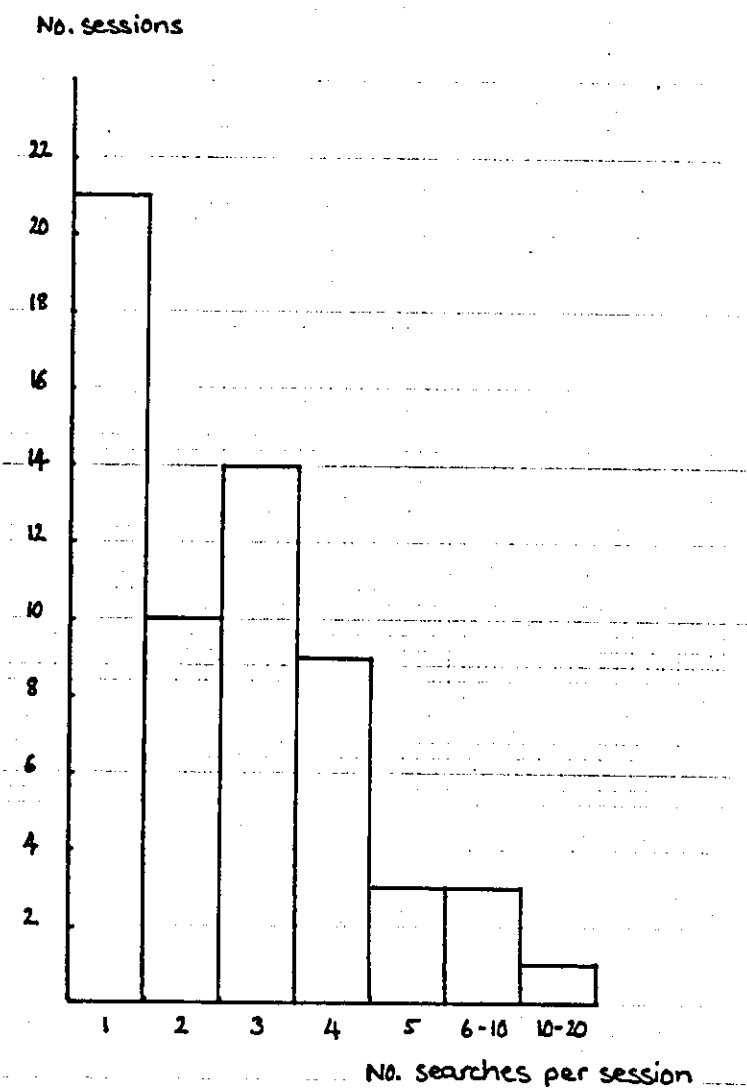
The mean average length of search sessions was 4 minutes and 6 seconds. This is probably somewhat lower than it should be as times for four sessions were lost. Search sessions ranged in length from 30 seconds to 16 minutes and 14 seconds. The ranging lengths of search sessions are shown in the bar chart below.

No. sessions



5.2.2. Number of searches per sessions

The mean average number of searches per session was 2.9. Sessions ranged from those containing just one search, to one containing 19 sessions. The variation in the number of searches per session is shown in the bar chart below.



5.2.3. Problems encountered in use

A certain number of people were observed encountering problems with the OPAC:

	No.	%
Entered a title at start of title input	6	9.8
"Underlined" entry on screen with finger	4	6.6
Attempted to correct input using wrong key	3	4.9
Entered input in wrong form in quick author/title search	1	1.6
Entered words in title search	1	1.6
Typed in page number for help screen	1	1.6

5.2.4 Consultations of loans information

24 people (39.3% user group) were observed consulting loans information during their search session.

5.2.5 Consultations of help screens

4 people (6.6%) were observed consulting either the general help screens or the search-specific help screens during their search sessions.

5.2.6 Overall use of search options

The title search was the option used most often during the search sessions observed. 89 title searches were conducted. The next most heavily used option was the quick author/title search (61 searches). Only 14 subject searches were conducted.

	No.	%
Title	89	54.3
Quick ^{a/t} author/tit.	61	37.2
Subject	14	8.5
total:	164	

5.3 ALS Browser - results of interviews with 20/21 users

Interviews were conducted with 21 users of the ALS Browser OPAC at two branch libraries in the London Borough of Bromley. One respondent only completed a small part of the interview so results are based on a sample of 20 unless otherwise stated.

5.3.1. Details of last search

1. Orientation of searches

It was found that searches were divided fairly evenly between specific item oriented searches and subject oriented searches. However, slightly more specific book oriented searches were conducted (52.4%).

	No.	%
Specific book	11	52.4
Book about something	10	47.6

ii. Types of search used

More than half the searches conducted were title searches (57.1%). The most popular single search option was the adult title search which accounted for 33.3% of searches.

search type	search option	No..	%	Total No.	%
Title	Adult	7	33.3	12	57.1
	Junior	4	19		
	Audio visual	1	4.8		
Subject	Adult	6	28.6	6	28.6
	Junior	0	-		
Author	Surname	3	14.3	3	14.3
	Organisation name	0	-		
	Audio visual	0	-		

sample of 21.

iii. Information brought to the catalogue - type and sources

The second part of the question about sources of bibliographic information proved irrelevant in this case and was dropped from the interview. The type of information used by most people in their last search was the name of person(s), place(s), object(s) etc.(38.1%).

Type of Information	No.	%
Name of person(s), place(s), object(s), etc.	8	38.1
Title	4	19
General subject	4	19
Author	3	15.8
Author/title	2	9.5

sample of 21.

iv. Information entered into the catalogue

It was found that rather than any of the conventional types of search term being the one used most often, more people had entered subject words into the title search in their last search (42.9%).

Type of information	No.	%
Subject words in title search	9	42.9
Author	4	19
Classmark	3	14.3
Title	3	14.3
Subject word in subject searches	2	9.5

sample of 21..

v. Search results

Ten people retrieved information which matched their search terms (47.6%). Of these, three were doubtful as to the relevance of the item (14.3%). 52.4% searches were completely unsuccessful:

	No.	%
Successful	7	33.3
Not sure about relevance	3	14.3
Unsuccessful	11	52.4

sample of 21.

vi. Use of retrieved items

Only 17 out of the twenty one users interviewed answered this question. Percentages are calculated on this smaller sample size. It was found that the majority of users were either looking for leisure reading or for material to help with school work (35.3% each).

Use of item	No.	%
Leisure reading	6	35.3
School work	6	35.3
Personal interest	4	23.5
Getting a book for someone else	1	4.8

sample of 21.

5.3.2. Other experiences of using ALS Browser

i. Use of other search options

ALS Browser offers three types of search (title, subject and author) which are subdivided into two or three search options. Users were asked if they had ever used any other search options than that used in their last search. Only five people (23.8%) said they had used other search options.

	No.	%
Tried other options	5	23.8
Never tried other options	16	76.2

Of the five people who said they had used other searches or options, three said that they used one option particularly frequently. Two of these said they used the junior title search, and one used the adult subject search.

ii. Problems encountered using ALS Browser

Over half (60%) the users interviewed said they had encountered problems using the browser.

	No.	%
Problems	12	60
No problems	8	40

The types of problems encountered fall into four broad categories. The areas which seem to cause most difficulty are input and the users' own lack of skill:

- a. Speed - Three people commented that the Browser was slow to accept commands:
- "my word processor at home is faster."
 - "...it takes a while for a touch to have an effect."
 - "...it's slow .. it doesn't react."
- b. Input - Four people described having difficulties using the touch screen to enter commands and search terms:
- "...it doesn't work when you touch it - you have to keep pushing until it work."
 - "...it doesn't work when you press it - you have to keep trying."
 - "...I have problems trying to type things in, I had to start again a few times."
 - "...it's easy to push the wrong button and get the help screen."
- c. System response - Two users said they had difficulties with the response of the system to their search requests:
- "...you can't double-check author against title .. I use the subject class books printed subject index and go straight to the shelves."
 - "...you type in a name and get a list of books but they're not what you want .. I use the junior guide to the library."
- d. Own performance - Four users reported problems arising from their own inaptitude:
- "I have problems trying to find books by author .. I just leave it."
 - "I can't ever find what I want .. I ask a librarian."
 - "It's difficult if you don't know what you want; you must know .. I look on the shelf if I know the section."
 - "I have problems through my own lack of usage of the machine .. I was unable to progress previously."

iii. Possible improvements to the system

Six people (30%) suggested ways in which they felt the system could be improved. 70% users were unable to suggest improvements:

	No.	%
Improvements suggested	6	30
No improvements suggested	14	70

Suggestions for improvements to ALS fell into two categories:

a. System response - three people suggested that certain areas of the system response to input could be improved:

- "You can't double check author against title."

- "It doesn't say if books are in this library and where they are."

- "You put in one thing and get another."

- "'Roman Army' finds 'Roland on the moon'."

b. Touch screen - 1 person felt the touch screen could be improved.

- "The touch system is quite good but other things light up rather than the thing you touched."

iv. Users' opinion of ALS

75% users said they liked ALS. One person said he would rather wait until the system was complete before giving an answer:

	No..	%
Favourable	15	75
Unfavourable	4	20

Those who expressed a positive opinion of the system made a variety of comments ranging from "I like it" and "It's alright" to "It's fun" and "It's good, it saves time from looking through the shelves". Of the four people who said they did not like the system, three commented that they preferred the card catalogue which ALS was intended to replace.

v. Users' opinion of the effect of ALS on their use of the library

55% users either felt the OPAC had had no effect on their use of the library or declined to answer the question:

	No.	%
OPAC has affected use of library	9	45
OPAC has not affected use of library/no answer	11	55

However, several were able to pinpoint aspects of their use of the library which they felt had changed:

	No.
Library is easier to use	7
Don't have to look along the shelves	3
Locating items is quicker	1
Don't have to bother staff	1

Users made a wide range of comments about the effects of the OPAC on their use of the library. These included:

- "You don't have to use your brain."
- "You can't find things very easily."
- "It helps find books - you don't have to look through the shelves."
- "I don't bother the staff now."

5.3.3. Background information about users of ALS

i. Occupations

50% OPAC users were found to be school children. Other occupations were represented in far smaller numbers:

Occupation	No.	%
School pupil	13	50
Professional	3	15
Non professional	2	10
Unemployed	1	5
Full time students	1	5

Note: questions 14-15 were judged irrelevant to this user group and were omitted from the interview.

5.3.4 Details of library and OPAC use

i. Frequency of library use

65% users said they visit the library once a week. Only one person visits the library more frequently, with the remainder being evenly divided between visits at fortnightly and other longer intervals.

Frequency of library use	No.	%
Weekly	13	65
Fortnightly	3	15
Other longer intervals	3	15
Few times a week	1	5

ii. Frequency of OPAC use

25% users said they use the OPAC every time they use the library. Three people gave no answer.

	No.	%
Use OPAC every time use the library	5	25
Do not use OPAC every time use the library	12	60

iii. Reasons for library use

The most commonly given reason for using the library was finding books for "general reading", followed by searching for material for school work:

	No.	%
General Reading	14	70
School work	9	45
Specific readings	2	10
Study	1	5
Other	5	25

5.3.5 Experience of other libraries, catalogues and computers

i. Experience of other libraries

Most of the people used (70%) had used other libraries:

	No.	%
Use other libraries	14	70
Don't use other libraries	6	30

The main reason given for the use of other libraries was recreation (57.1%). Two people gave no answer:

	No.	%
Recreation	8	57.1
Work	4	28.6

Of the 14 people who said they had used other libraries, only three said they had used catalogues in these libraries. One had used a COM catalogue, one a card catalogue and one had used both a card and a printed book catalogue.

ii. Experience of computers

85% users said they had some experience of computers apart from using the Browser:

	No.	%
Experience	17	85
No experience	3	15

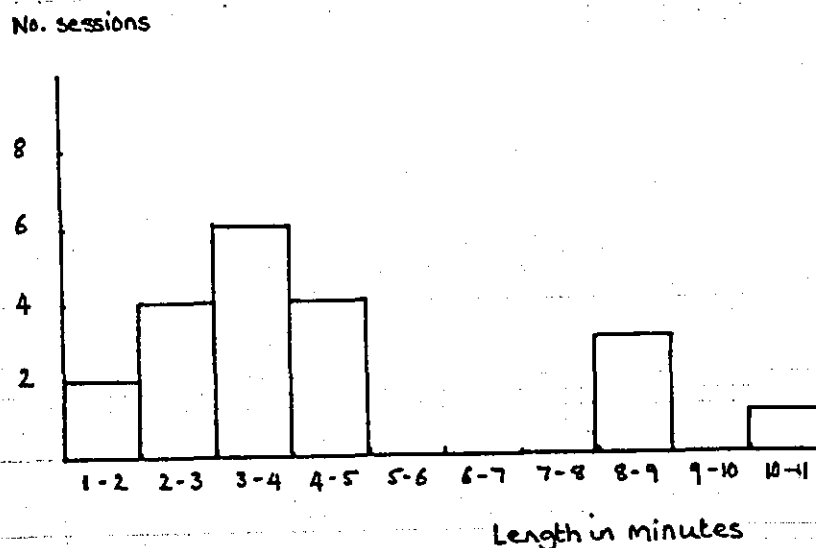
Eight people said they felt they had "a little" experience of computers (40% total). Home was the place where most people had gained their experience.

Amount/place of experience	No.	%total
A little	8	40
A lot	2	10
Home	7	35
School	5	25
Work	3	15

5.4 Results of observations of 20/21 search sessions on AIS Browser

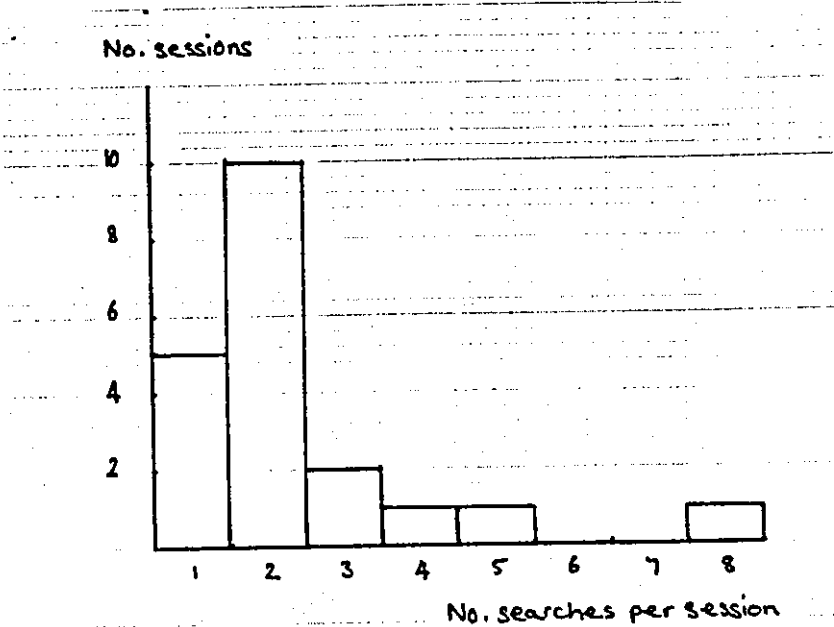
5.4.1 Length of search sessions

The mean average length of search sessions was 4 minutes and 18 seconds. Search sessions ranged in length from 1 minute and 19 seconds to 10 minutes. This is shown in the bar chart below.



5.4.2. Number of searches per session

The mean average number of searches per session is 2,4. The number of searches conducted per session ranges from 1 to 8:



5.4.3 Problems encountered in use

The most common problem which manifested itself to the observer was the unpredictability of the touch screen. Ten people (47.6%) had problems getting the screen to respond properly. Five people entered words rather than a classmark into the subject search (23.8%) a further two touched the "Help" option on the control panel very obviously by mistake (9.5%) and one had to ask for help.

5.4.4 Consultation of help facility

One person consulted the help facility.

5.4.5 Overall use of search options

The most heavily used options were the adult title search (20 searches), followed by the adult class number and the surname searches (8 searches each).

	No. searches	%
Title - adult books	20	43.5
Subject - adult class number	8	17.4
Author surname	8	17.4
Title - junior books	6	13
Title - Audio-visual	2	4.3
Subject - junior class no.	2	4.3

cont...	No. searches	%
Author - organisation name	1	2.2
Author - audio visual	0	-
total:	46	

5.5 Okapi - results of interviews with 47 users

Interviews were conducted with 47 users of the Okapi system at the Riding House Street Library of the Polytechnic of Central London.

5.5.1 Details of last search

i. Orientation of searches

It was found that the majority of searches were for specific books (72.3%).

	No. searches	%
Specific book	34	72.3
Book about something	13	27.7

ii. Types of search used

As one would expect from the above results, the majority of users used the specific book search (72.3%).

Type of search	No.	%
Specific book search	34	72.3
Subject search	13	27.7

iii. Information brought to the catalogue - type and sources

Over half the people interviewed had both title and author information for the item they had been looking for in their last search (57.4%). General information about a subject area was the next most common type of information (21.3%), followed by author information (12.8%).

type of information brought to the catalogue	no. searches	%
Author/title	27	57.4
General subject area	10	21.3
Author	6	12.8
Title	2	4.3
Named person, place, object, etc.	2	4.3

Reading lists were the most popular source of the bibliographic information brought to the catalogue (48.9% of users had a reading list). A further 25.5% had taken references from coursework and areas of work which they were revising for exams.

	No.	%
Reading list	23	48.9
Area of course/revision	12	25.5
Recommended	4	8.5
Personal interest	2	4.3
Other	5	10.6

iv. Information entered into catalogue

40.4% respondents said they had entered full title, author and initials. The next largest group was that which had entered a subject phrase (23.4%) followed by those who had entered title and author surname only (17%).

Information entered	No.	%
Title, surname & initial	19	40.4
Title, surname	8	17
Title	1	2.1
Surname & initials	1	2.1
Surname	2	4.3
Subject word	3	6.4
Subject phrase	11	23.4
Subject & 1st name	1	2.1

v. Search results

36 people retrieved information which matched their search terms (76.6%). Of these, 6 were doubtful as to the relevance of the item (12.7%). 23.4% of the searches were completely unsuccessful.

	No. searches	%
Successful	30	63.8
Unsure about relevance	6	12.7
Unsuccessful	11	23.4

vi. Use of retrieved items

Most of the searches (72.3%) were for material to help with revision for exams. Coursework (essays, seminars, projects, etc.) accounted for a further 25.5% of searches.

	No. searches	%
Revision	34	72.3
Coursework	12	25.5
Research	1	2.1
Other	3	6.4

5.5.2 Others experiences of using Okapii. Use of the other search option

Okapi offers two types of search. Users were asked if they had ever used the option which they had not used in their last search. Over three quarters of the people interviewed (76.6%) said they had used the other option.

	Search No.	%
Used the other option	36	76.6
Hadn't used the other option	11	23.4

Specific book search was the option named by most people as being the one they use most frequently (63.8%). A further 21.3% said they use subject search most often and 10.6% use both equally. Two people said this was the first time they had used the catalogue.

	No.	%
Use specific book search most often	30	63.8
Use subject search most often	10	21.3
Use both equally	5	10.6
First time users	2	4.3

ii. Problems encountered using Okapi

The majority of users said they had no problems at all using Okapi (80.9%). 17% said they had encountered problems and one person was unsure.

	Searches. No.	%
No problems	38	80.9
Problems	8	17
Unsure	1	2.1

Problems encountered by users fell into four main categories:

- a. Own performance - Three people felt that problems arose out of their own lack of skill:

- "I can't type so the fiche is quicker when using a book list."
 - "I had problems getting the hang of it when I started .. I had to ask someone."
 - "When it was first introduced it was difficult to understand the difference between specific book search and subject search."

- b. Subject search - Three people said they had difficulties using the subject search:

- "Some titles don't describe the subject of the book - you need to know what the book is about. The computer makes very logical connections, for example, the word 'industrial' will find engineering books as well as the history of the industrial revolution."
 - "The system just look for words. 'Civil society' finds 'civil service' and books about the American Society of Civil Engineers."
 - "Subject search results are too vast. You get books with only one word the same as what you put in and not relevant to what you asked for. I swear and go through them 'til I get fed up."

- c. System response - One user commented on problems involved with obtaining a large set of results:

- "The only problem is when you get loads of books to go through - you have to go through them all."

- d. Functioning of equipment - One user commented that the terminal had a tendency to go wrong from time to time:

- "It goes wrong and refuses to accept what you put in -

I just leave it and use the manual catalogue instead."

iii. Possible improvements to the system

Over half the respondents (53.2%) were unable to suggest any improvements to the system. The remaining 46.8% all suggested aspects which they felt could be improved or features which they would like to see added to the catalogue.

	No. searchers	%
No improvements	25	53.2
Improvements	22	46.8

Suggestions for improvements to Okapi fell into four main categories:

- a. Updating the database - 10 people suggested that the catalogue should be updated. Comments included:

- "It's out of date - the fiche is the only alternative which gives a lot of hassle."

- "Update it - make it more extensive."

- "Many books are not on the computer - I look on the shelf and don't bother with the fiche - update it."

- b. Subject search - Five people commented that the subject search needed improving:

- "Subject search isn't specific enough."

- "It's difficult to find a book of the topic isn't in the title."

- c. Additional features - Four people suggested features which could be added to improve the system:

- "A lightpen to write on the screen - it would save having to type."

- "Be able to tell if the books are out of the library."

- "When the computer says 'no book found' it should suggest alternatives."

- "It should say which floor of the library books are on"

- d. Specific book search - One user remarked on the specific book search:

- "It doesn't search by author, does it?"

iv. Users' opinions of Okapi

Almost all the respondents (97.9%) expressed a favourable opinion of Okapi

	No. searchers	%
Favourable	46	97.9
Unfavourable	1	2.1

Without prompting 12 users expressed their feelings towards Okapi by comparing the system to the microfiche catalogue. All of them remarked that they preferred using Okapi to using the fiche. Five said it was "better" than the fiche, four said it was easier and three said it was quicker. One person commented that he would "...rather wait half an hour for the computer than use the fiche."

Others did not explicitly relate Okapi to their experiences with the fiche but commented in general on certain qualities of the system. Seven people remarked that they find it easy to use. Five said they find it helpful/useful. Four said that the system is quick:

Easy	7
Helpful/useful	5
Quick	4
Simple	3
Fun	2
Efficient	1

Four people commented on specific features of Okapi which they particularly like:

- "It's simple because of the colour coding."
- "...better than fiche - especially the subject search."
- "Very easy to use .. instructions are given."
- "I didn't have to ask how to use it; it tells you."

v. User opinion of the effect of OPAC use on their use of the library

15 Okapi users (31.9%) had been connected with the Polytechnic since before the introduction of the OPAC and were unable to comment on its effect on their use of the library. Of these, 86.7% felt that Okapi had affected the way they used the library.

No. %

OPAC has affected use of library	13	86.7
OPAC not affected use of library	2	13.3

Those who felt that Okapi affected their use of the library described its influence in the following ways:

No.

Quicker finding books	4
Easier finding books	3
Helps	2
Have more time to work	1
Don't have to look at shelves	1
Don't spend hours on the fiche	1
Use library more efficiently	1
Find library more convenient to use	1

5.3.3 Background information about users of Okapii. Occupations

The majority of Okapi users were students (95.7%). Of these, most were full-time undergraduates. Academic staff accounted for only 4.3% user group.

No. %			No. %	
Students	45	95.7	Undergraduate full time	39 83
			Undergraduate part time	1 2.1
			Postgraduate full time	2 4.3
			Postgraduate part time	1 2.1
			Other courses	2 4.3
Academic staff	2	4.3		

The undergraduate portion of the user group was divided as follows:

First year	12	25.5
Second year	14	29.8
Third year	14	29.8

ii. Academic Orientation of users

Over half the people interviewed were working in subject areas described by them as "social studies" (59.6%). Media studies was next most common discipline (14.9%), followed by Business Studies (8.5%). Other subject areas represented were photography, psychology, administration, economics, food, textiles, accounting, social work, film studies, each of which was represented by one person (2.1%).

Social studies	28	59.6
Media studies	7	14.9
Business studies	4	8.5
Other various (see above)	8	16.8

iii. Users' habitual form of work

Essays and seminars were most frequently given as being the form which users' work tends to take (85.1%). Practicals were next (38.3%), followed by projects (8.5%).

No. %

Essays/seminars	40	85.1
Practicals	18	38.3
Projects	4	8.5
Setting and marking essays	2	4.3
Exams	6	12.8
Other	3	6.4

5.5.4 Details of library and OPAC use

i. Frequency of library use

Many users tend to use the library quite frequently. 65.2% use the library every day or a few times a week.

No. %

Few times a week	16	34.8
Daily	14	30.4
Weekly	8	17.4
Fortnightly	4	8.7
Other	4	8.7

Note: Figures add to 46 as 1 person was a first time user of the library.

ii. Frequency of OPAC use

Just over half of the people interviewed (53.2%) said they either use the Okapi every time they use the library or use it very frequently. 42.6% said they definitely do not use the OPAC every time they visit the library.

Frequency of use	No.	%
Every time use library	11	23.4
Frequently but not every time use library	14	29.8
Definitely not every time use library	20	42.6

iii. Reasons for library use

The most commonly given reasons for use of the library were study and obtaining specific readings (31 respondents each).

	No.	%
Study	31	66
Specific readings	31	66
General reading	2	4.3

5.5.5 Experience of other libraries, catalogues and computers

i. Use of other libraries

A considerable proportion of the people interviewed said they use other libraries (61.7%).

	No.	%
Use other libraries	29	61.7
Do not use other libraries	18	38.3

Of those who said they use other libraries, (29 people), 89.7% said they use them for work purposes and 24.1% for recreation.

Reason for use	No.	%
Work	26	89.7
Recreation	7	24.1

15 people said they use catalogues in other libraries. Nine people said they had used card catalogues elsewhere and five had used COM catalogues. Four had used OPACs in other libraries, and two had used printed book catalogues.

	No.	%
Card catalogue	9	60
COM	5	33.3
OPAC	4	26.7
Printed	2	13.3

ii. Experience of computers

70.2% of the people interviewed said they had had some experience of using computers other than Okapi.

	No.	%
Experience	33	70.2
No experience	14	29.8

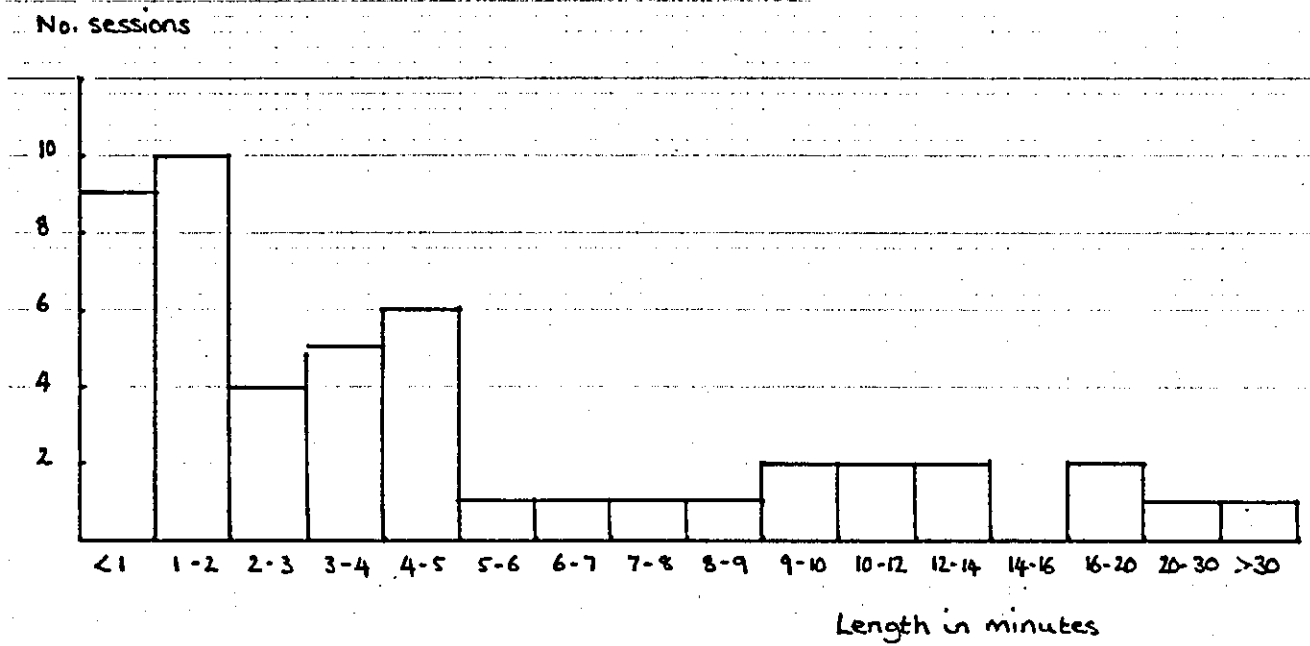
Just over half those who said they had some experience with computers said they had gained it as part of their course (51.5%). School and home were the next most common sources of experience (9.1% each). 39.4% said they felt they had only a "little" experience, 9.1% felt they had a "moderate amount" and 6.1% a "lot".

	No.	%
Course	17	51.5
School	3	9.1
Home	3	9.1
Work	1	3
A little	13	39.4
A moderate amount	3	9.1
A lot	2	6.1

5.6 Results of observations of 47 search sessions on Okapi

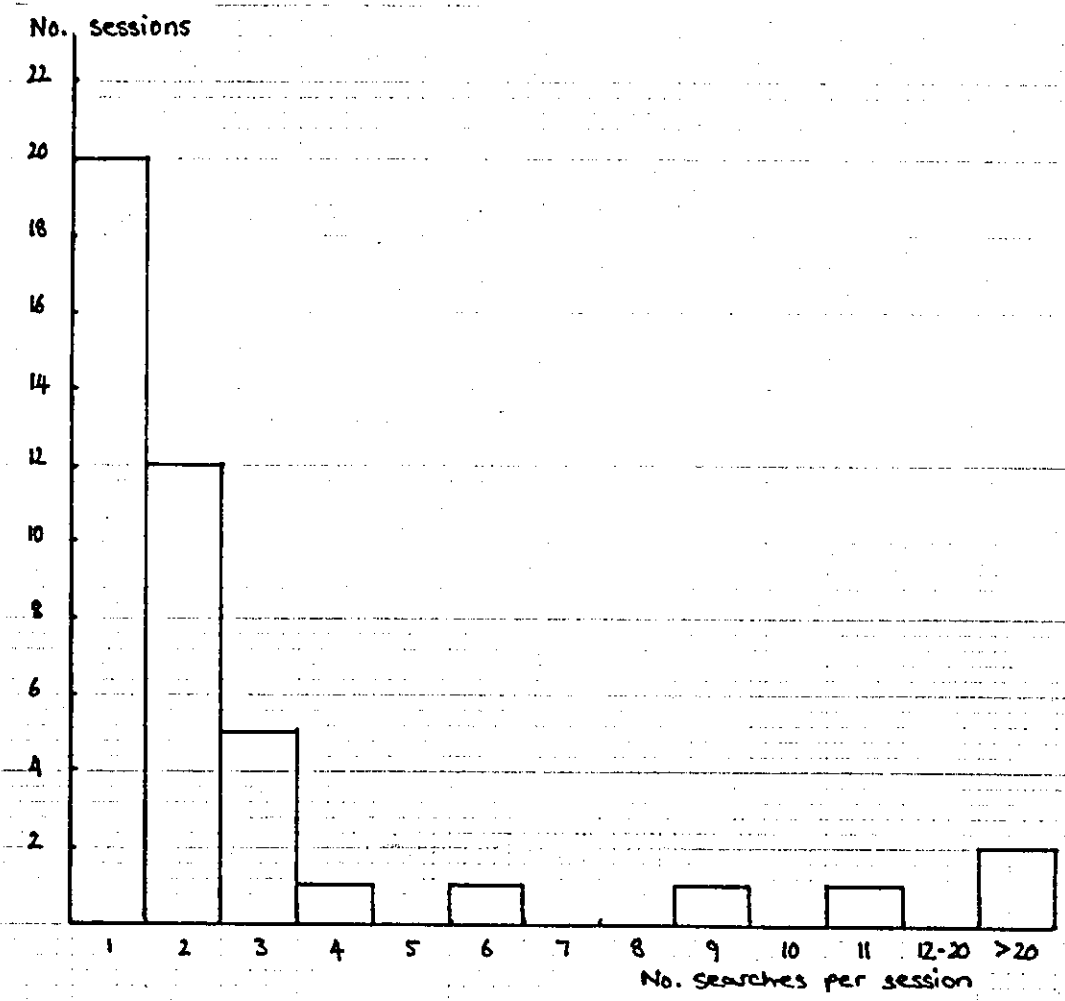
5.6.1 Length of search session

The mean average length of search sessions was 5 mins, and 36 secs. Search sessions ranged in length from 27 secs. to 32 mins. and 24 secs. This is shown in the bar chart below.



5.6.2 Number of searches per session

The mean average number of searches per session was four. Sessions ranged from one search in length to 24 searches. This is shown in the bar chart below.



5.6.3 Problems encountered in use

A certain number of people were observed encountering problems with the OPAC:

	NO.	%
Return to menu to reselect same option rather than clear input screen	8	17
Uses backspace key to clear screen rather than key dedicated to clearing screen	6	12.8
Asks staff for help	3	6.4
Marks place by touching screen	3	6.4
Enters input in wrong field	1	2.1

5.6.4 Consultations of help screens

Three people (6.4%) were observed consulting the online help facility.

5.6.5 Overall use of search options

The specific book search was the most heavily used option accounting for 117 searches. 44 subject searches were observed.

	No. searches	%
Specific book	117	72.7
Subject	44	27.3
Total	161	

5.6.6 Amending previous input

4 people (8.5%) were observed returning to the input screen to amend input after an unsuccessful search.

6.0 DISCUSSION

6.1 Methodology

6.1.1 Observation technique

As mentioned above, the observation technique used was subject to various limitations. Because of the way the workstations were set up in the Birmingham and Bromley libraries, it was almost impossible to observe search sessions without the subjects becoming aware of the fact. Keeping a satisfactory distance between the observer and the subject meant allowing traffic to flow freely through the intervening space obscuring the view of the user and terminal. All data gained through observations are therefore, approximate and are used only to suggest trends. They are in no way considered to be a substitute for an analysis of transaction logs.

6.1.2 Interview questions

Despite a brief pilot study which highlighted some problems with the interview questions, others emerged during the course of the survey. One problem arose from the fact that the survey encompassed OPACs installed in both public and academic libraries. The user groups interviewed therefore, had differing characteristics and information needs. The same set of questions was used for each user group in an attempt to retain consistency in the methodology. However, certain questions proved to be irrelevant to the users of ALS who were public library users. These questions were questions 3, 14 and 15 relating to the sources of information, academic orientation and the type of academic work performed by the user.

Other questions were phrased in such a way that users of ALS had problems answering accurately. Question 18 ("Why do you use the library?") supplied a list of options ("study/specific readings/general reading") which were intended to help the respondent but which made no allowance for "leisure reading". ALS users were also unable to answer the part of question 8 which asked which of the search options they had used particularly frequently. This was probably due to the fact that library and catalogue use is less frequent among users of a public library than among users of an academic library. Several questions were shown to have been poorly phrased, Questions five ("what did you find?") was intended to fulfil a dual role.

First, it was intended to discover whether or not a search had been successful. Second, it was hoped that it would encourage users to express their reactions to the system's response to a search. Question six ("will it be relevant?") was intended to supplement question five providing feedback on the relevance of items retrieved and thereby completing the assessment of search success. However, the two questions often provoked a somewhat amused response and a simple "Did you find what you wanted?" might have been better. Question nine (Did you have any problems while you were using the computer catalogue just now?") posed several problems. First, the scope of the question proved to be too narrow and after a succession of negative responses, it was changed to "Do you have any problems using the computer catalogue?". This produced a more varied response but answers were disappointing. It had been hoped that users would comment on features of the OPAC which they found irritating or hard to understand or difficult to use. However, the responses given seem to show that users interpreted the word "problem" as meaning aspects of the system which prevented them from achieving success in a search. This illustrates the need for precise phraseology in interviews and questionnaires. Many users in fact gave the answer which had been expected to come in response to question nine, in response to question ten ("Are there any ways in which you would like to see the computer catalogue improved?"). For this reason the responses to the two questions are treated below as a single set of data relating to shortcomings in the systems studied.

Users of all three systems found question twelve confusing (How do you think using the computer catalogue has changed the way in which you use the library?). It would have been more useful to have asked about catalogue use before the installation of the OPAC. This might have provided some indication as to whether the installation of an OPAC changes the composition of the catalogue user population at all.

The phrasing of question twenty ("How much experience do you have of computers apart from using the computer catalogue?") and sixteen and seventeen ("How often do you use the library? Daily/few times a week/ weekly/fortnightly/other", "Do you use the computer catalogue every time you use the library?") was governed by the need to keep the interview short but led ultimately to difficulties in analysing

the data gathered. No categories were given in question twenty so responses were given in varying measures of quantity of experience and many respondents merely said where they had gained that experience. In the case of questions sixteen and seventeen the original intention was to relate answers to the latter question to the categories named in responses to the former. However, no allowance was made for people who used the OPAC frequently but not every time they used the library. Many people volunteered this information unprompted but there must have been others who merely replied in the negative, as demanded by the question.

6.2 Sample size

In all, 129 OPAC users were observed and interviewed. However, the distribution of interviews between the libraries visited is rather uneven:

City of Birmingham Polytechnic (BLCMP)	- 61 interviews
Polytechnic of Central London (Okapi)	- 47 interviews
Borough of Bromley (ALS)	- 21 interviews

Various factors influenced the size of the samples. The approach adopted was simply to interview as many people as possible in the time available. Birmingham Polytechnic has three or four OPAC terminals on every floor of the library and the OPAC is the main form of catalogue. Thus, the rate of use of BLCMP was high.

Although the exam season was not far away at the time of the survey, a fair number of students still seemed to be completing coursework and others were seeking material for revision purpose so it was not difficult to find OPAC users who were willing to be interviewed. Polytechnic of London, however, provides only one terminal for Okapi on each floor of the library. As the OPAC database is somewhat over two years out of date, the microfiche catalogue is also heavily used. OPAC use was therefore not so high as at Birmingham. As the visit to the Polytechnic of Central London took place two weeks later than that to Birmingham, catalogue use was beginning to be affected by the imminence of exams. The extremely small number

of people interviewed at Bromley can perhaps be explained in part by the fact that the motivation to use any kind of catalogue is lower in a public library than in an academic environment. Two branch libraries were visited, one of which provided one OPAC terminal, the other providing two. Thus, the flow of users was bound to be slower than at Birmingham. It is, however, interesting to note that the sample of 21 users corresponds almost exactly to the figures obtained from an in-house study which aimed to measure use of the card catalogue prior to the installation of the OPAC. This study found that only twenty people consulted the card catalogue each week. As the samples of users interviewed are small and vary in size between libraries, the results obtained are not statistically significant. It is hoped, however, that they are sufficient to highlight general trends.

6.3 Discussion of survey results and observation data

Section 4.5 presented a comparison of the interface features of the three systems studied and suggested that the Okapi would emerge as the system which users interact with the best. Results of the surveys seem to support this statement. Responses to question eleven ("In general, how do you like using the computer catalogue?") reveal that a higher proportion of Okapi users (97.9% or 46 out of 47) have a favourable opinion of the catalogue than users of the BLCMP (90.2%) and ALS (75%). This result is further supported by the finding that 86.7% Okapi users felt using the OPAC had positively affected their use of the library as opposed to 64.7% BLCMP users and 45% ALS users. Users of the Okapi also enjoyed a higher rate of success in their searches.

Favourable opinions and high success rates are a function of a system which is easy and pleasant to use and must seem to be the result of a combination of well designed interface features which serve to guide the user to select a suitable search option and support him through the search to its successful conclusion. A comparison of results of the three surveys and data gained through observations will demonstrate the role which certain interface features play in determining the overall success of the system.

6.3.1 Selection of search options

i. User characteristics

Results of surveys and observations indicate that certain user characteristics have some effect on the choice and use of search options. BLCMP and Okapi were installed in polytechnic libraries. Therefore, 93.4% BLCMP users and 95.7% Okapi users were students. The structure of courses in higher education in general leads to a heavy reliance on departmental reading lists and recommendations for bibliographic references. This is reflected in the responses to question three ("What was the source of your information?"). 57.4% BLCMP users and 55.3% Okapi users said the information used in their last search was taken from either of these two sources. In accordance with this, use of specific item oriented searches in each system was higher than for subject searching. In Okapi 76.4% specific item oriented searches were conducted using specific information from these major sources and in BLCMP the figure was 75%.

It therefore seems that the nature of users' work in these environments dictates to some extent which search options offered by the OPACs in question will be most heavily used, and that effective specific item searching will be a major requirement.

Okapi offers a single specific book search which will search using author or title information or both. BLCMP however, offers a title search and a combined author/title search but no author only search. In the context of its user group's needs, this is a facility which ought to be available. As demonstrated below, the absence of the facility led to failure of four searches. Two users of the system suggested that the incorporation of an author search would be an improvement and one of them added the comment that quite often writers are referred to by name only but with the OPAC as it is at present there is no way of tracing works using this information.

The most striking feature of the AIS user group was that 50% users were school children. The interface accommodates this to a certain extent by presenting specific "junior" options in the title and subject searches, leader younger users to choose these particular options. However, apart from the contents of the files searched for these options, there is no difference between the junior and the adult searches. The input requirements, formats, screen designs, system responses etc., are identical. 75% junior searches conducted were unsuccessful and were all title searches for subject information.

It is likely that the choice of search was partly influenced by menu features described below but it must be stressed that in this case more than any other the interface has deliberately led a specific group of users to choose an option and failed to provide the support necessary to complete the search. Children or junior users are traditionally regarded as a "special needs" category in libraries and simplified printed "library guides" are provided almost as a matter of course. An OPAC which provides separate "junior" searches would seem an ideal opportunity to bring catalogue use within reach of young readers. Armstrong and Costa have demonstrated that 7-8 year olds can make effective use of an OPAC with a specially designed interface (1). The experiences of users of BLCMP and ALS seem to indicate that more work could be done to design interfaces to suit the particular needs of a user group. Section 2.3 emphasized the point that OPAC users are not a homogeneous group. There are, however, certain characteristics of each user population which can be easily identified and some attempt at least should be made to accommodate these in the interface of an online catalogue.

ii. Menu Design

Survey results show clearly the importance of clarity in the design of the menu. In order to select the right option, the user must be left in no doubt that a particular option matches his information used. The importance of this is illustrated by the experiences of two ALS users whose searches failed because they chose an unsuitable option. The ALS menu screen is shown in figure 6. The users concerned both wished to search by surname and by subject. However, both chose title searches. It seems that they were misled by the emphasis given by the position of the option on the screen and the terminology and typography used to the ADULT BOOKS and JUNIOR BOOKS options of the title search. The search heading which includes the vital word "title" is displayed immediately above these options but is printed in ordinary type and is thus rather overshadowed by the adult and junior options. It seems that the two users mentioned did not see the search heading.

The menus presented by BLCMP and Okapi are very different, both to that of ALS and one another (see figures 2 and 12; and sections 4.1.3 iii. and 4.3.3 iii.) but it is interesting to note that no such problems arose among the users of these systems. Options on both are presented as single entries with no subdivisions to cause the problems of screen design noticed in ALS.

If the design of the menu can cause the user to make a wrong decision about search options, it seems that it can also lead to underuse of certain facilities. Responses to question 2 ("Which option did you choose?") and question 8 ("Have you ever used any of the other options offered by the catalogue?") reveal that facilities offered by BLCMP and Okapi seem to be more thoroughly exploited than those offered by ALS. In the last searches of their most recent sessions users of BLCMP and Okapi had made use of all the facilities. ALS users on the other hand had not exploited the full range of options. Those which had not been used were the junior subject search, organisation name and audio visual author. These same searches were revealed to be unused in general in the responses to question 8 (except by one person who said he had used "everything"). It seems likely that users might be deterred by the terminology used to describe these options at the screen. Such words as "audio-visual" may not strike the user as answering his need in the same way as "records, tapes, video cassettes and compact discs". Some users may be unfamiliar with the concept of an organisation as an author and as the connection between the options in capitals and the name of the search has been shown to be weak the purpose of the option "organisation name" may not appear clear.

BLCMP's concise access point terminology and Okapi's more detailed explanations of search objectives must both appear clearer to the user than the complexities of the ALS menu. Options in these systems are far more fully exploited than those in ALS. BLCMP's quick author/title search had been used by 85.2% users, title search by 77% and subject search by 39.3%. The specific book search in Okapi had been used by 100% users and the subject search by 76.6%. It is, however, impossible to say to what extent this is or is not a function of the design of the menu screen and the terminology used as the environments were so different. ALS demonstrates that a complex screen design using unfamiliar words can lead to search failure and lack of use.

Survey results also indicate that the order of items in the menu seems to affect their usage. This is a well known phenomenon demonstrated by, among others, the University of Sussex library where

use of the combined author/title search in the OPAC rose considerably when the option was moved to the top of the menu (2). For both systems with longer menus (BLCMP and ALS) it is noticeable that the amount of use received by the options seems to be related to its position in the menu. The title search is the option displayed first in each case and is also the option which received the most use, representing 49.2% searches on BLCMP and 57.1% searches on ALS. In both systems the second option (quick author/title in BLCMP and subject in ALS) was used less than the first (41% and 28.6% respectively) and the last search type was used least of all (9.8% and 14.3%). In ALS it is interesting to note that two of the options within a search which were not used at all according to the responses for question 8 (namely, 'organisation name' and the audio-visual author option) are displayed right at the end of the menu. Further evidence of this tendency is gained from results of questions two ("Which option did you choose?") and question three ("What information did you have about this book?"). 23.3% title searches conducted on BLCMP and 8.3% those conducted on ALS were performed by people who knew both the author and the title of the item they wished to find. This would seem to indicate that users will choose the first option on a menu which seems to be relevant to their need in any way at all. In ALS this does not make too much difference in this case as the alternative would be a search on the author's name only. It does however, highlight a problem which is particularly difficult to overcome. That is, users tend not to read what is on the screen. Options which appear below eye level, at the foot of a list, are therefore likely to receive less use. The quick author/title search, in BLCMP, which is the next option on the menu offers a higher chance of direct access to the full bibliographic record than the title search. This is particularly important in this system as it avoids the index display, in which the onus is firmly on the user to extract the relevant information. It is in situations such as these, where the choice of an option represents more than the choice between which kind of information to enter, that designers of menus need to be careful. The user has to rely on the menu to lead him to the correct (i.e. most effective) choice of search. This is where the dictionary between the "access point" and the "objectives" approaches to menu design (discussed in section 2.4 and exemplified in BLCMP and Okapi) becomes significant. This study was not constructed in such a way that detailed analysis of the role of individual interface features in searching was possible.

However, users of a system such as Okapi where searches are presented as objectives (the menu thus consisting of only two options) are not exposed to the risk of choosing the first option which strikes them as relevant, nor are they forced to decide between an unmanageable number of options. This in turn reduces the amount of time and effort that the user is required to expend on a search. The contribution which this makes to the overall ease of use of the OPAC must encourage increased use of the system.

iii. Previous experience

That choice of search options is influenced by other factors than menu design is demonstrated by analysis of the responses made by BLCMP and ALS users to question one ("What were you looking for in your last search?") and two ("Which option did you choose?"). This reveals that whereas 90.2% searches conducted on BLCMP were specific item searches, only 72.1% users said they were looking for a specific book. Figures for ALS reflect a similar situation. 71.4% searches were specific item searches but only 52.4% people said they were looking for a specific book. In fact, eleven of the title searches were really searches for subject information (see Appendices 2 and 3). This means that 18% BLCMP users and 19% ALS users were, to all intents and purposes, using the "wrong" search option. This can possibly be explained by reference to menu design. In the case of BLCMP, the subject search is displayed at the end of the menu, after options such as Help and Library News. It is, therefore, likely that users might quite simply fail to notice it. The subject search in ALS is the second option on the menu and correspondingly receives more use than that in BLCMP. Both menus use the term "class number" or "class mark" to describe the subject search option. It is unlikely that many library users are familiar with the term and seeing it offered as a type of search with no definition or explanation may well feel that they do not possess the right information and decide not to bother. These factors undoubtedly play a part but analysis of survey results for BLCMP indicate that the choice of option may also be affected by users' previous experiences with a particular search. The subject search for both ALS and BLCMP is

described in section 4.1.2 v. and 4.2.2. iii. Tracing a classmark in a printed index is complicated and time consuming. Classmark searches in themselves are not the most effective way of subject searching (see section 2.5). 45.5% BLCMP users who used the title search as a subject keyword search said they had used the classmark search at some point. Two of these five people commented that improvements could be made to the subject search : one suggested a keyword facility (he had used the Geac OPAC at Aston University) and the other suggested that a classmarks be accessible online. This would appear to indicate that users experiences with a search which is not easy to use can prompt them to avoid using that option in future. This supports the statement made by Eason (see section 2.1) that users will not learn new skills on a system if they get by with those they already have. The implications for OPAC design are simple. Classmark searches are not liked by users and are underused. Their implementation merely leads to the misuse of other search options and either to inaccurate results or complete failure. Such facilities should, therefore, not be offered as the only means of conducting a subject search.

6.3.2 Success in searching

1. User characteristics

It was originally intended to attempt to demonstrate the effects of users' experiences on the successful completion of searches on each of the OPACs studied. For this purpose, data were collected relating to users' frequency of use of the library and OPAC, reasons for the library use, experience of other libraries and catalogues, and experience of computers apart from the OPAC (questions 16, 17, 18, 19 and 20). However, data collected in response to questions 5 and 6 ("What did you find?" and "Will it be relevant?") were not suitable for such an analysis for either ALS or Okapi. In the case of ALS, the whole sample was too small to make the analysis useful. As the main cause of search failure among Okapi users was the fact that the database was out of date (only two searches failed for other reasons, see section § 6.3.2.iv) the analysis was once again rejected on grounds of sample size. Results for BLCMP were, however, sufficient to permit user characteristics to be analysed against the success rate.

Analysis of responses to questions 5 and 6 and question 16 ("How often do you use this library?") showed that those people who use the Birmingham Polytechnic Library every day are more likely to be successful in their use of the OPAC than those who use it less frequently (63.3% daily users of the library were successful, 50% those who use it a few times a week and weekly were successful and only 16.7% those who use it less often than fortnightly). This would seem to imply that successful searching with BLCMPs is dependent on familiarity with the system but as no correlation was found between frequency of OPAC use relative to frequency of library use and search success, it must be suggested that a larger sample of users would be needed to draw any sound conclusions.

Other areas of user experience which might have some effect on the success of searches are experience with computers and use of other libraries and their catalogues. Results for question 20 ("How much experience do you have of computers apart from using the computer catalogue?") and questions 5 and 6 show that for BLCMP the success rate was higher among users who had no experience of computers (85.7% BLCMP users without experience were successful whereas only 72.2% those who had experience before performed a successful search). It is commendable that the system appears to require no specialist knowledge of computers in order to conduct a successful search. The fact that success seems to decline with experience though is serious for OPACs should be usable at sight by all end users. This finding would seem to support Borgman's theory regarding the detrimental effect of mental models on OPAC use cited in section 2.3. It is possible that the simplicity of the systems is actually confusing to people with a certain level of experience with computers. This serves to emphasize the need for absolute precision of expression in the interface.

Experience of other libraries and their catalogues appears to be an advantage to users of BLCMP. 52.1% those who said they use other catalogues conducted successful searches. For those who said they had no experience in this field, the figures were 46.2% and 43.8%. Although the difference is not great, it does perhaps suggest that

experience of traditional library and catalogue structures is useful when searching BLCMP. As the OPAC is similar in many ways to a traditional catalogue this discovery is not surprising but if the aim of OPAC designers is to achieve a catalogue which is "usable at sight" it must be suggested that there are features in the BLCMP interface which should be changed. It would be interesting to compare these results with similar figures in Okapi.

ii. Method of input

Problems relating to the AIS touch screen were outlined in section 4.2.3

iii. Five users commented that they had problems getting the computer to respond and ten were observed having difficulties. Only one user each of BLCMP and Okapi said they found typing their own input difficult. It would, therefore, seem that the use of function keys in these systems has reduced the amount of typing to an acceptable minimum and that there is no need to provide an alternative means of input.

iii. Input requirements

Results show that success in searching can be affected by the type of input required. Some searches place a greater demand on the user than others. For example, both BLCMP and AIS require the user to enter a classmark in the subject search. Users must therefore, first find the relevant classmark in a printed index. One AIS user and two BLCMP users failed because they were unable to find a relevant classmark. Three had defined their subject area clearly (i.e. hurricanes; nuclear magnetic resonance spectrometers; and copyright law relating to computer software). Redefinition of subject areas to suit a printed index is quite a demanding exercise which can take some time. Users of BLCMP are aware of the drawbacks. In response to question 10, nine people suggested improvements to the subject search, most of which hinged round the ability to "enter subject words".

The absence of a subject keyword facility contributed to a number of people using the title search of AIS and BLCMP as a keyword search. This inevitably affected the success of searching as title searches in both systems can only succeed where there is an exact letter by letter match with a title. A similar situation arose in BLCMP with the failure of four quick author/title searches. The users in each case had only author information but as the search which uses author input is the combined search, they were forced to use this and were unsuccessful.

The above examples illustrate the effects of limiting the type of input acceptable to the system. Although classmark and combined searches can be useful, the latter especially offering considerable accuracy and speed of retrieval, it is a mistake for a system to demand such complex information of the user in the only available options. User reactions to BLCMP indicate that classmarks are considered an unnatural way of expressing a subject, therefore a keyword search is required. A search for the works of one author was identified by Lipetz as one of the main four types of catalogue search (see section 2.6). It is, therefore, reasonable to suggest that it is a search which any catalogue should offer. Okapi incorporates author, title and author/title combined searches into a single "specific" book search. This approach, which while it encourages the entry of as much information as possible, leaves the decision about the type of input to the user and greatly increases the flexibility of the system.

iv. Instructions

Experiences of users of all three systems illustrate the importance of clear instructions on the screen. Three ALS subject searches failed because users entered words rather than classmarks and five people were observed doing the same during their search sessions. The main cause of this was undoubtedly the lack of search specific direction on the ALS input screen (see figure 7 and section 4.2.2. v). The paragraph of instructions displayed at the head of the input screen is identical for every type of search and is particularly misleading in the classmark search as it refers to "spelling out" the search term. This ambiguity is compounded by the fact that the same alphabetical keyboard is displayed for the subject search input as for the other searches and that the input prompt reads simply "your search term is: ". The only search specific information on the input screen is the screen heading which is easily overlooked. It therefore seems that the three searches studied and those of the five people observed failed quite simply because the users were not made aware of the system's input requirements. A further example which highlights the problem as regards the ALS is that of the user who entered as author's name in the title search.

It is essential that users comply with input requirements if a search is to be successful. It is, also, however essential that these requirements are communicated to them in such a way that is impossible not to be aware of them.

key and the blue (delete entire input) key. It was striking that six people regularly used the white key to clear the entire screen of input one character at a time, because they had not read down the list of function keys to the next option.

The examples given above, of errors made in input on Okapi emphasize the fact that while instructions at the point of input and use of prompts may be more effective than no instructions at all, or instructions in solid text, they are not the definitive solution to the problem of input guidance in online catalogues. It seems that there will be no problems of this nature in any system which requires the user to construct his input in a particular way. Instructions may be displayed in various forms but the user cannot be forced to read them. At present prompted input is probably the most effective method of ensuring success but the ideal must ultimately be a system which can process input in any form.

v. Help facilities

All three of the systems studied provide help facilities.

These are described in sections 4.1.2 ix., 4.1.2 x; 4.2.3 x, 4.2.2 viii, 4.3.2 viii, 4.3.3 xi. The differences are considerable; ALS provides a general facility consisting of two screens of narrative text; BLCMP and Okapi provide general and search specific help. The latter is BLCMP is displayed on a separate screen to the input, in Okapi it appears immediately beneath the input form. One thing these facilities have in common, is the fact that they are hardly used. Observation data record 4 consultations of BLCMP help facility, 3 for Okapi and one for ALS. It was demonstrated above that users often do not read instructions given on the input screen. It is therefore unlikely that a separate help facility would be of much use. Unfortunately, both BLCMP and ALS rely on their help facilities to provide supplementary, and important information. BLCMP uses the subject search help screen to describe how to obtain a classmark and ALS directs the new user to the help facility from the top of the menu screen and uses the facility to provide the only description of how to use the system. All information crucial to successful searching should therefore be displayed on the input screen and supplementary "help" should perhaps be supplied automatically at the point of need (see section 2.8).

BLCMP provides a specific input screen for each search option. Each screen contains a brief paragraph of instructions specific to that search and illustrates the points made with examples of correct input (see section 4). The prompt for input is displayed beneath these instructions. Requirements such as the necessity of omitting initial articles from title input in the combined and title searches, the special format for quick author/title search input and the need to enter classmarks in the subject search are all detailed on the screen, close to the point of input. Yet users still make mistakes which affect the success of their search. One quick author/title search failed because the user made an error in the format of the input. Six people were observed commencing title input with an article, one person typed words into the classmark search. This seems to suggest that a solid paragraph of instructions had little effect on user performance, that users often do not read text on the screen. Okapi attempts to solve this problem using a prompted input process (see section 4). The proportion of searches on Okapi which failed due to user error is lower than for the other two systems (9.5% searches failed for this reason on Okapi as opposed to 14.3% on ALS and 21.3% on BLCMP. It should be noted that the small size of the ALS sample may have affected this figure). However, the Okapi approach is not water tight. One search failed because the user entered the author's name in the wrong order i.e. christian name followed by surname in the author field rather than surname only followed by initials in a separate field. This happened despite the fact that the system prompts for "surname ONLY" immediately before the author input field. A second failure occurred because the user entered accurate author input but a made up title. The fact that the system will search on either the author or the title or both is explained at the head of the screen which serves to support the point made with reference to BLCMP, that users tend not to read paragraphs of instructions. A further illustration of this can be taken from observation data relating to the use of Okapi. The coloured function keys and their roles are listed at the foot of every screen. On the input screen, the green key is always listed first, followed by the white (backspace)

vi. System response and screen design

It was anticipated that difficulties would emerge as a result of the BLCMP screen designs. The survey and observation results reveal that this was the case. One search failed apparently because the user failed to see the entry for the book he wanted among the others in the index display. The title was a common one, commencing "quantitative methods for" so was displayed with eight other similar items. The closeness of entries to each other coupled with the fact that entry was heavily truncated made it difficult to see. Four other people were observed "underlining" index entries on the screen with a finger, to make them easy to read (see figure 4 for design of BLCMP index display). Users of Okapi and ALS had no problems of this nature probably because the design of the screens in these systems is more spacious (see figures 8, 9 and 15). Further problems seem to arise from the order of display in index entries in BLCMP. As described in section 4.1.3 vii, entries are displayed in acronym order and by reverse order of publication dates. A search failed because the item desired was published in 1970 and the user gave up paging through screens of entries before the desired entry was reached. The order of display also provokes some comments in response to question 9 and 10 (Do you have any problems using the computer catalogue?" and "Are there any improvements which you would like to see made?"). This included references to the "alphabetical order" being "incorrect", the fact that because of this it is not always obvious whether to browse forwards or backwards, and that it is frustrating having to page through screens and screens of similar entries. What is interesting however, is that Okapi employs the same tactic of displaying results in reverse order of publication date but the apparent lack of order in these displays prompted no comment at all. It is possible that this is partly because Okapi does not even give a semblance of alphabetical order. In addition to this, however, the results of a search in Okapi are displayed as ^afinite "set". The user is told how many records can be retrieved and the position of the records in the display within the set so he has some sense of "position" which seems to be lacking in BLCMP. The situation in ALS is akin to Okapi in that the brief record display represents a finite set of records.

Although database problems led to the order of display being input order rather than alphabetical order, no problems seem to ensue, again probably because the set has a definite beginning and end. These examples highlight a need among OPAC users to be able to identify their position in a system and to know beyond doubt what the result of their next action will be. Some kind of order must be apparent in the display even if it is numeric.

The ways in which information is presented on the screen can also affect the success of searches. One user of BLCMP failed in his search because he did not understand that the phrase "Accountants Digest Vol. 1-; 1973-;" meant that the library held volumes subsequent to the first. Two users of AIS commented on the index displays (see figure 8) saying that they felt it would be useful to be able to see author, title and classmark information together without apparently having realised that this is gained by touch selecting an entry. This should warn interface designers of the hazards of assuming that the information speaks for itself. The first example is a classic of "library jargon" which it is unfair to expect the end user to understand. Details should be given in simple language i.e. Vol 1, 1973 and subsequent volumes". The second example demonstrates that users are not always capable of guessing the purpose of a display. The purpose of the AIS indexes is for browsing not for identification of items. It is evident from the above comments that this needs to be explained in order to ensure that users do continue their search to a successful conclusion.

6.3.3. Additional features

Loans Information

BLCMP was the only system studied to include a loans information facility. This is described in sections 4.1.2 ix and 4.1.3 ix. Observation data shows that 39.3% users interviewed consulted the facility during their search sessions and users of Okapi, which does not provide such a facility suggested that the addition of loans information would improve the system. In theory such facilities are designed to save the user time by informing him whether or not the item he desires is available in the library.

In practise, however, problems often arise when items appear as available on the screen but are not actually on the shelf. This can be frustrating for the user and embarrassing for the library. It is possible that in the long term it could have a detrimental effect on the user's trust of the system and on the library's image. The decision whether or not to include such a facility and the way in which information is best presented must rest with individual libraries. While undoubtedly a useful feature, provision of loans information is purely supplementary to the main aim of an online catalogue which is to provide the library user with increased retrieval power. An OPAC can function well without such a facility as demonstrated by Okapi.

6.4 Summary of conclusions and recommendations

1. Of the three systems studied, Okapi appears to be the easiest to use. It is recommended that designers study this system noting the way in which the interface guides and supports the user through the search.
2. OPAC users have information needs which are identical to those of traditional catalogue users. All OPACs should therefore provide an author search (section 6.3.1 i.).
3. An OPAC should be usable at sight by users of all ages (section 6.3.1 i.).
4. Menus should be kept simple. The number of options should be kept to a minimum with a single option representing searches by more than one access point when appropriate. Options should be expressed in simple English avoiding use of library jargon (section 6.3.1 ii.).
5. Users of ALS and BLCMP found classmark search facilities difficult to use and tended to avoid them. OPAC should therefore offer subject searching by keyword (6.3.1 iii.).
6. Users found it difficult to comply with complex input requirements such as the need to enter a classmark or combined author/title information in a particular format. None of the systems studied solved the problem of persuading users to read instructions on the screen and apply them to their input. It is, therefore, recommended that designers should work towards providing a system which can process input in any format (section 6.3.2 iii.).

7. Retrievable help facilities were rarely consulted. In order to be effective help should be displayed automatically by the system in response to user errors and should appear at the point of need (section 6.3.2 v.).
8. Users appeared to find it easier to work with a finite set of retrieved records rather than a section of the system's index. Sets should be displayed in some logical order which should be obvious to the user (section 6.3.2 vi.).
9. The manner in which records are displayed can affect the success of a search. Therefore, displays of bibliographic data, whether index displays or individual records, should occupy the entire screen. Where more than one record or entry is displayed, on a screen, these should be separated from each other by a space wide enough to ensure that each appears as a single entity. Spaces rather than extra punctuation should be used to separate data elements (section 6.3.2 vi.).
10. The use of library jargon in bibliographic records was seen to cause failure. Information should be expressed in such a way that the meaning is obvious to all (section 6.3.2 vi.).
11. Users of AIS had considerable problems using the touch screen. Problems with typing at traditional keyboards were minimal. It is suggested that if the amount of typing required of the user is kept to a minimum it ceases to be a barrier to success. There is, therefore, no need to develop an alternative means of input (section 6.3.2 ii.).
12. The loans information facility in BLCMP was heavily used and is therefore a desirable facility from the users' point of view. However, the provision of such information is not the main aim of an online catalogue and in the light of the attendant problems outlined above the final decision whether or not to include the facility should rest with the library concerned (section 6.3.3).

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APPENDIX 1

OPAC INTERFACE ADEQUACY ASSESSMENT GUIDE

1. Test for self-service usability. Is the OPAC self-explanatory?
Can an untrained user begin to use the system and successfully complete some searches without assistance from another person or printed aid?
2. If a formal command/argument dialogue approach is used,
 - a. are the commands selected from familiar natural language words,
 - b. are permitted abbreviations self-evident and uniform,
 - c. is the function of each command clearly conveyed by the words selected to name the command, and
 - d. is the system forgiving of minor inaccuracies or variations in command language or syntax?
3. Are the error messages specific, comprehensible, constructive and positive?
4. Is situation-specific help available at the point of need, in response to a simple (unqualified) help request?
5. Can the user say "whoops!" and cancel processing just begun?
6. Is the current search request and its status displayed throughout the search?
7. Will the system ignore stop words (words not indexed) included in the user's search statement and process search on the significant word(s)?
8. Will the system automatically search on grammatical variants (e.g. spelling, singular/plural, noun/adjectival forms) of the search term and retrieve the closest matches?
9. Are the bibliographic displays,
 - a. consistently formatted with similar data elements grouped together and
 - b. are their component clearly labeled, free of jargon, and unfamiliar and unnecessary punctuation?
10. If a single record results from a search, does it display automatically?
11. If multiple records result from a search, does the system instruct how to display one or more?
12. Can the user go backward and forward, sequentially or selectively, through a list or group of retrieved records?

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13. Is there authority control for the name, series and subject headings used (indexed) to permit access to records in which they occur? Specifically:
- a. does a search on a variant name retrieve works entered under the authoritative accepted form of the name and all other variant forms,
 - b. does the user have to search more than once to gather all the entries under various forms of headings and
 - c. are "see" references employed in subject searching to direct the user to the established headings, and
 - d. are related ("see also") terms/headings from a controlled vocabulary or thesaurus displayed online during a search?
14. Does the system display "suggestive prompts" or other messages to guide the user with the formulation of a search?. For example, when a search results in "no hits" or an excessive number of records, does the system suggest ways to broaden or narrow the search, recommend alternate search or browse approaches, display or direct the user to related terms or class numbers, etc?

Taken from HILDRETH C.R. Pursuing the ideal : generations of online catalogs : Online catalogs, online reference : converging trends.

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Question Nos.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20																																
User No.	Specific Book	Subject	Quick author/ title	Title	Subject	Author/ title	Author	Title	Subject	Other	Reading List	Recommended	Coursework	Other	Success	Problems	Improvements	Occupation	Subject	Essays/seminars	Projects	Practical	Other	Daily	Few times a week	Weekly	Fortnightly	Other	Use comp. cat. everytime in lib	Study	Specific Reading	General reading	Use of other Libraries	Recreation	Work	Card catalogue	Printed catalogue	COM Catalogue	OPAC	Other	School	Course	Home	A lot	Moderate	A little	None					
1.	/	/	/	*	/	/			/		/				Y/Y	N	Y	ug(2)	QS(2)	/				/	/				N	/			Y	/							/											
2.	/	/	*	*	/	/			/		/				Y/Y	N	N?	ug(1)	A	/				/	/				Y	/			Y	/			/												/			
3.	/	/	/	/	/	/			/		/				Y/L	N	Y	ug(1)	Acc(3)	/				/	/				N	/			Y	/			/											/				
4.	/	/	*	0	*	/			/		/				Y/?	N	Y	ug(2)	A	/				/	/				N	/			Y	/			/											/				
5.	/	/	0	*	*	/			/		/				Y/L	Y	Y	ug(2)	TCP	/			/	/				N	/			Y	/			/													/			
6.	/	/	*	/	*	/			/		/				Y/Y	Y	Y	ug(1)	FS	/	/			/	/				N	/			Y	/		/										/						
7.	/	/	/	/	/	/			/		/				N/N	N	Y	ug(2)	Gov(3)	/				/	/				Y?	/			Y	/		/											/					
8.	/	/	*	0	*	/			/		/				N/N	N	Y	ug(3)	EC(6)				/	/		/	/		N	/			Y	/		/	/					/	/									
9.	/	/	*	/	/	/			/		/				Y/Y	N?	Y	ug(2)	TCP(7)	/	/			/	/				N	/			Y	/	/											/						
10.	/	/	0	*	*	/			/		/				Y/Y	N	N	pg(4)	TCP	/			/	/		/			N	/			N															/				
11.	/	/	0	*	/	/			/		/				Y/Y	N	Y	ug(2)	EC(3)	/			/	/		/			F?	/			Y	/												/						
12.	/	/	0	*	/	/			/		/				Y/Y	N	N	st	BS	/			/	/		/			N	/			Y	/											/							
13.	/	/	/	*	/	/			/		/				Y/Y	Y	N	ug(3)	EM(3)	/			/	/		/			F	/			Y	/	/	/								/	/				/			
14.	/	/	*	0	/	/			/		/				N/N	Y	Y	ug(3)	TCP	/	/		/	/		/			F	/			N																/			
15.	/	/	0	*	/	/			/		/				Y/Y	N	N	ug(2)	BS(2)	/			/	/		/	/		N	/			N														/					
16.	/	/	*	/	/	/			/		/				N/N	N	Y	ug(1)	Acc(3)	/			/	/		/	/		Y	/			N													/						
17.	/	/	/	*	/	/			/		/				Y/Y	N	Y	ug(2)	Gov(7)	/			/	/		/	/		N	/			Y	/		/														/		
18.	/	/	0	*	*	/			/		/				N/N	N	Y	ug(1)	BS	/	/		/	/		/	/		N?	/			N												/	/						
19.	/	/	/	/	/	/			/		/				Y/N	Y	Y	0	N	/			/	/		/	/		N	/			Y	/	/									/	/			/				
20.	/	/	/	*	/	/			/		/				Y/Y	N	N	ug(3)	Gov(3)	/			/	/		/	/		F	/			N												/							
21.	/	/	*	/	/	/			/		/				Y/Y?	N	N	ug(2)	L				/	/		/	/		N	/			N																	/		
22.	/	/	*	/	/	/			/		/				N/N	N	Y	st pt	PA(1)	/	/		/	/		/	/		Y	/			Y	/														/				
23.	/	/	0	*	/	/			/		/				Y/L	N	Y	ug(2)	BS(5)	/			/	/		/	/		N	/			N												/							
24.	/	/	0	*	/	/			/		/				Y/Y	Y	Y	pg(1)	TCP	/			/	/		/	/		N	/			Y	/		/								/								
25.	/	/	/	/	/	/			/		/				N/N	Y	1st time	ug(1)	M	/			/	/		/	/		N	/			Y	/													/					
26.	/	/	*	/	/	/			/		/				N/N	N	N	st(2)	SW(9)	/			/	/		/	/		Y	/			N														/					
27.	/	/	*	/	/	/			/		/				Y/Y	N	N	ug(2)	Gov(4)	/			/	/		/	/		N	/			Y	/										/	/							
28.	/	/	*	0	/	/			/		/				Y/?	N	Y	st(1)	CS(1)				/	/		/	/		N	/			Y	/										/	/							
29.	/	/	*	/	/	/			/		/				Y/Y	N	Y	ug(1)	EM(4)	/			/	/		/	/		F	/			N														/					
30.	/	/	*	/	/	/			/		/				Y/Y?	N	N	0	S				/	/		/	/		N	/			Y	/		/													/			
31.	/	/	/	/	/	/			/		/				N/N	N	N	st	EE(10)	/	/	/	/	/		/	/		N	/			N															/				
32.	/	/	*	0	*	/			/		/				Y/Y	N	Y	ug(1)	LIS(1)	/	/		/	/		/	/		F	/			Y	/	/	/	/							/				/				
33.	/	/	*	*	/	/			/		/				N/Y	Y	Y	ug(1)	CS(5)	/			/	/		/	/		N	/			Y	/												/						
34.	/	/	0	*	*	/			/		/				Y/Y	N	Y	ug(2)	ME			/	/		/	/			F	/			Y	/		/	/							/								
35.	/	/	*	/	/	/			/		/				Y/Y	N	Y	ug(2)	ST	/		/	/		/	/			N	/			Y	/		/												/				
36.	/	/	*	*	/	/			/		/				N/N	N	N	ST	Acc	/			/	/		/	/		N	/			Y	/		/										/						
37.	/	/	*	0	/	/			/		/				Y/R	N	N	ug(2)	A(2)	/			/	/		/	/		Y	/			Y	/		/								/								
38.	/	/	0	/	/	/			/		/				N/N	N	Y	ug(2)	EM(2)	/			/	/		/	/		N	/			Y	/										/	/							
39.	/	/	0	*	*	/			/		/				Y/Y	N	Y	ug(1)	QS	/		/	/		/	/			N	/			Y	/										/	/							
40.	/	/	0	*	/	/			/		/				Y/L	N	N	ug(2)	CS(3)	/		/	/		/	/			N	/			N														/					
41.	/	/	/	/	/	/			/		/				Y/?	N	N	0(12)	Acc			/	/		/	/			F	/			Y	/		/											/					
42.	/	/	/	/	/	/			/		/				Y/Y	N	N	ug(2)	ME(2)	/		/	/		/	/			N	/			Y	/										/	/							
43.	/	/	*	/	/	/			/		/				Y/?	N	Y	ug(3)	ST(2)	/	/	/	/	/	/	/	/		N	/			N															/				
44.	/	/	/	/	/	/			/		/				Y/Y	N	N	ug(1)	BS	/			/	/		/	/		N	/			N														/					
45.	/	/	*	0	*	/			/		/				N/N	N	Y	ug(1)	ME	/			/	/		/	/			/			Y	/											/							
46.	/	/	*	/	*	/			/		/				Y/Y	N?	N?	st	ME(1)	/			/	/		/	/		N	/			Y	/	/									/								
47.	/	/	/	/	/	/			/		/				N/N	N	Y	st	MA	/		/	/	/	/	/	/			/			Y	/											/							
48.	/	/	/	/	/	/			/		/				N/N	N	N	ug(2)	BS(2)	/			/	/		/	/		Y	/			Y	/	/								/	/								
49.	/	/	0	*	/	/			/		/				Y/Y	Y	Y	ug(3)	TCP(3)	/			/	/		/	/		F	/			Y	/																		

tota

Key:- / = Positive response

* = Option used at other times

○ = option used particularly frequently

Y = Yes

$$N = N_0$$

f = use OPAC frequently but not every time use library

Y/Y = Item matches search terms and is relevant

N/N = no match, no relevant items

Y/N = Item matches but is not relevant

N/Y = No match but other relevant item retrieved

ug = undergraduate student

pg = postgraduate student

pg = postgraduate
pt = part time

st = non degree student

0 = other occupation

Acc = Accountancy

Ad. = Administration

BS = Business Studies

EC = Economics

ES = Film studies

FS = Film studies
FT = Food and text

FT = Food and textile studies

MS = Media studies

Ph = Photography

Ps = Psychology

SS = Social Studies

55 - Social Studies

User
No.

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21.

Total

17																									18					19					20														
Specific book	Subject	Title -Adult	Title -Junior	Audio- Title Visual	Subject-Adult	Subject-Junior	Author-surname	Author- organisa- tion name	Author- Visual	Author/Title	Author	Title	Subject	Other	Success	Problems	Improvements	Occupation	Daily	Few times a week	Weekly	Fortnightly	Other	Use OPAC every time use library	Study	Specific Reading	General Reading	School work	Other	Use of other libraries	Recreation	Work	Card catalogue	Printed catalogue	COM Catalogue	OPAC	Other	School	Course	Home	Work	Alot	Moderate	A little	None				
/		/										/			N/N	N	Y	SS			/			N					/	N										/									
/							/			/					Y/Y	Y	Y	St			/			N	/	/	/			Y	/	/	/								/	/							
	/						/						/		Y/Y?	Y	N	SS			/			1st time			/	/		Y	/											/	/					/	
/		/											/		Y/Y	Y	N	SS			/			Y			/	/		Y												/							
/		*	①				*			/					Y/N	N	N	SS			/			N			/	/		Y	/								/										
/		*	*	/	*	*	*	*	*			/			N/N	N	N	none					/				/			N																		/	
	/	/											/		Y/Y	Y	N	SS			/			Y			/	/	Y		/									/							/		
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					①		*						/		N/N	Y	Y	SS					/		Y		/			Y											/								
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	/				/								/		N/N	N	N	SS			/			N		/	/		Y	/									/										
/		/								/					Y/Y	N	Y	Pr.				/		N		/			Y	/											/	/	/						
	/		/										/		N/N	Y	N	SS					/		N		/			N											/					/			
/		/											/		Y/Y	Y	N	SS				/		N		/	/		N										/		/			/				/	
/		/											/		Y/Y	N	N	PS			/			Y		/	/		Y	/								/		/			/				/		
	/				/		*						/		N/N	Y	Y	NPr.				/		N		/			Y	/				/											/				/
11	10	/=7 *=2	/=4 *=2	/=1 *=1	/=6 *=1	*=1	/=3 *=4	*=1	*=1	2	3	4	10	2		Y12 N8	Y 6 N14			1	13	3	3	Y=5 N=13	1	2	14	9	5	Y=14 N= 6	8	4	2	1	1	0	0	5	0	7	3	2	0	7	3				

Appendix 3 ALS Browser survey results. Quantative data.

Key: / = positive response

* = option used at other times

① = option used particularly frequently

N = no

Y = yes

N/N = no matching item, no relevant item

Y/Y = matching item which was relevant

N/Y = no match but relevant item retrieved

Y/N = matching item retrieved but no relevant

SS = secondary school pupil

PS = primary school pupil

St = student

Pr = professional

NPr = non-professional

R = retired

