

Centre for Research in Library and Information Management



User behaviour in the searching of union catalogues: an investigation for Work Package C of CC-interop

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Glossary of abbreviations and terms used

BUCOP	British Union Catalogue of Periodicals
CAIRNS	Co-operative Academic Information Retrieval Network for Scotland
CERLIM	Centre for Research in Library and Information Management
CDLR	Centre for Digital Library Research
COPAC	CURL OPAC
CURL	Consortium of University Research Libraries
EDNER	Evaluation of the Distributed National Electronic Resource
JISC	Joint Information Systems Committee
JUBILEE	JISC Framework for evaluating user behaviour in information seeking
JUSTEIS	JISC usage Surveys
LAMDA	Document delivery service
LISA	Library and Information Science Abstracts
LSE	London School of Economics
M25	M25 Consortium of Academic Libraries
MIMAS	Manchester Information and Associated Services
MMU	Manchester Metropolitan University
NoVA	Non-visual Access to the Digital Library (Cerlim project)
NUD*IST	Non-numerical Unstructured Data Indexing, Searching and Theorizing
OCLC	Online Computer Library Center
OKAPI	Experimental OPAC
RIDING	RIDING Consortium of Libraries
RLIN	Research Libraries Information Network
SALSER	Scottish Academic Libraries Serials
SCONUL	Society of College, National and University Libraries
UKNUC	UK National Union Catalogue
UNITY	Union catalogue of Public Library holdings
WLSP	World List of Scientific Periodicals
WorldCat	OCLC World (Union) Catalogue

Executive summary

The report provides details of the methods to collect data from 34 volunteer searchers and 26 librarians. The data collection methods have proved to be robust and provided much useful data.

A number of practical suggestions for union catalogue service providers have emerged from this work. They are discussed fully in section 4 and summarised in section 6. However, points to note are:

- the importance of the ability to use a range of search criteria
- the importance of the ability to refine the initial search in response to search results
- the importance of a clear indication that system is processing
- the review of on screen information to remove jargon
- the possible benefit of incorporating a spell checker
- the importance of information about the availability of the item, as well as holdings data.

In addition, the research identified concern amongst librarians about the reliability of search results from union catalogues. It also noted that a small number of searchers wanted to see more information about book content displayed in records. Web tools such as Google and Amazon are having an increasing impact on the views of searchers about facilities and interactions expected of union catalogues.

It seems clear that continued collaboration between the service providers as a means to share best practice and develop services is important.

This appears to be the first report to have investigated users' searching of and requirements for union catalogues. The comments from this small study suggest that there is a need for a larger study to investigate both the required content and the search facilities to exploit it. It would make sense for this to occur alongside continued development of the various services.

1. Introduction

This report presents the CERLIM contribution to Work Package C of the JISC-funded CC-interop project. CC-interop is the COPAC/CLUMPS technical cooperation project which seeks to build on the skills, knowledge and expertise gained at CDLR, MIMAS, M25 and RIDING in the area of union catalogues, whether physical or virtual, in recent years.

CERLIM's role in this project was to study user behaviour in the searching of union catalogues, regardless of whether the catalogues were physical or virtual. CERLIM's role was emphatically not to consider the relative search effectiveness of different approaches to union catalogue delivery. Some investigation of the important matters of search effectiveness and reasons for different search outcomes has been undertaken in Work Package A. The aims of the various strands of the whole CC-interop project are noted briefly in the next section of this report.

The report has a conventional structure. The next section contains background information relevant to the project sufficient to set this report into context. The methods used to collect data are outlined in the third section. The results of those data collection exercises are presented in section four, whilst the results are discussed in section five. Conclusions and recommendations are made in section six of the report. Finally references and appendices are presented.

2. Background

The broad context of this project is the dramatic increase in the availability of electronic resources and the revolution in information retrieval and accessibility which this has created (Hartley 2001). In this new digital environment it is envisaged that there will be an infrastructure which, in the words of Tennant,

“supports simultaneous searching of multiple and geographically distant collections” (Tennant 1998).

What this quote does not make clear is the supposition that, in addition to being geographically distributed, these collections may be heterogeneous. That is to say that the collections might be distinctly different in type and purpose with marked differences in the metadata used to describe, represent and access them. Successful simultaneous searching of these collections requires a high degree of interoperability, a concept helpfully explored by Miller (Miller 2000).

This project confines itself to the area of union catalogues. Even here, the challenges of providing simultaneous access to the catalogues of several libraries have been demonstrated to be demanding. COPAC (<http://copac.ac.uk>) has developed considerable expertise in the creation of physical union catalogues, providing access to the library catalogues of more than 20 large university libraries. The various clumps projects, InforM25 (<http://www.m25lib.ac.uk>), CAIRNS (<http://cairns.lib.strath.ac.uk>) and RIDING (<http://www.riding.ac.uk>), have

developed considerable expertise in the creation of virtual union catalogues by the use of standards, principally Z39.50.

Cousins has addressed some of the advantages and disadvantages of the physical and virtual approaches to providing simultaneous access to library catalogues (Cousins 1999). Stubley has considered the strengths and weaknesses of clumps (Stubley 2000), whilst Dunsire has explored some of the issues involved in the operation development of clumps in two brief papers (Dunsire 2001, Dunsire 2003).

The CC-interop project is concerned with furthering the technical cooperation between the COPAC team at MIMAS and the clumps teams at Glasgow, Hull and London. Full details of the project and its aims, objectives and progress to date are available on the project website (<http://ccinterop.cdli.strath.ac.uk/>). Briefly, Workpackage A has examined

- working co-operatively to test the feasibility of inter-linking between union catalogues, both physical and virtual
- investigating various ways of getting a virtual union catalogue to be co-searchable with a physical union catalogue without having to re-key the search
- testing further some of the findings of the UKNUC Feasibility Study Report in relation to comparative speed of searching, de-duplication and ranking of records, and precision of results sets between COPAC and the clumps;

whilst Work package B has been concerned with

- investigating collection level description schemas in relation to both clumps and COPAC
- looking at the intelligent selection of targets in clumps utilising collection level descriptions based on dynamic landscaping
- working on the development of guidelines for dealing with variations in cataloguing indexing practices in libraries, in the context of facilitating interoperability between the clumps and COPAC.

This work package (Work package C) has investigated user behaviour in the searching of union catalogues. It is hoped that this investigation of user behaviour in searching COPAC and clumps will contribute to an increased understanding of how the JISC Information Environment can be further developed.

Finally, to set the work in context, brief mention should be made of the huge literature and long history of research in information seeking behaviour. This has been extensively reviewed in an outstanding textbook by Case (Case 2002) and in a lengthy research report for the Council on Library and Information Resources by Tenopir (Tenopir 2003). In the specific area of union catalogues, initial work on testing physical and virtual union catalogues was undertaken by Stubley and colleagues (Stubley, Bull and Kidd, 2001). Data collection methods used in this project are based upon accepted practices as indicated in these texts and on our own experience and projects (Griffiths, Hartley et al. 2002, Griffiths and Brophy 2002, Griffiths 2003).

3. Method

3.1 Introduction

This section of the report outlines the data collection methods adopted for the exercise. These were developed in close consultation with the Work Package C Advisory Group, at meetings and also more often via email.

Data collection consisted of three distinct phases: searches, interviews and focus groups. The data collection instruments were developed specifically for the project and in consultation with the Advisory Group. Wherever possible, advantage was taken of previous data collection instruments developed within CERLIM for other projects. In particular, use was made of instruments developed as a part of the NoVA (<http://www.cerlim.ac.uk/projects/nova.html>) and EDNER (<http://www.cerlim.ac.uk/edner/welcome.html>) projects. Following EDNER, the issues pursued in the post-search interviews had their origins in Garvin's work on quality attributes (Garvin 1987), which has been redeveloped for information services by Brophy (Brophy 1998).

3.2 Searches

The search tasks were intended to enable a group of typical users at each location to perform searches for realistic queries, which represented the type of query presented to a union catalogue. 12 volunteer searchers were recruited at each of the three sites by staff at those sites. At an early project meeting it was decided that those searchers should be restricted to postgraduate students, research staff and academic staff, on the grounds that these groups were much more likely to make use of union catalogues than were undergraduates. In the event, 12 searchers appeared and undertook searches in both Glasgow and London, whilst 10 of the volunteers arrived in Leeds.

Each searcher completed a pre-search questionnaire, which was designed to provide both basic background information and to determine the search experience of each of the volunteers; that is to say data was collected regarding the volunteers' experience in use of search engines, bibliographic databases and OPACs, and finally whether the volunteers were aware of any of COPAC, CAIRNS, InforM25 and RIDING.

The searches used in the research are best characterised as realistic but contrived queries. That is to say that the Project Advisory Group identified a variety of search types which experience had suggested to them are put to union catalogues. These were:

1. A search where the user needed to find a common item in a library close to them (to ascertain whether libraries were selected before carrying out the search).

2. A search where the user was given a lot of information about a book or a journal (to observe which search option was selected).
3. A search where the user needed to find an obscure or unique item, or an item for which the user was given partial information, such as a possible author name, or part of a title or subject (to observe the strategies employed by the user to locate the item).
4. A general, subject type search (which may give a large results set).

The researchers used these search types, together with a brief log of some search queries input to COPAC during September 2003, to generate some real query statements. These were supplemented by further contrived queries, which were generated from the researchers' experiences. In each case, the query was presented as a mini-scenario; that is to say that the searchers were not simply presented with a set of keywords but with a statement about the information need and the context in which that information was required. Two examples of the queries are:

You urgently need to get hold of a copy of 'Clinical Medicine' edited by Parveen Kumar and Michael Clark. You need to get the most up to date edition you can find in the nearest library.

You are doing some research into monasticism and are interested in books on monks behaving badly. Someone has told you about a book that was published some time in the late 90s. They aren't sure of the title but think that the author might be Justice or Jestice.

A full list of the queries used is presented in Appendix 2.

Each searcher performed 4 searches on each of two services, namely COPAC and the local virtual union catalogue. Different searchers received the searches in a different order to reduce the overall impact of any learning effect. This was done using a form of Latin-squares design. The searches were presented to the searchers on a task sheet, an example of which is presented in Appendix 3.

In order to simulate reality as closely as possible, searchers were not given any training prior to executing their set of tasks. However, each searcher was given the opportunity to spend a short time exploring both COPAC and the relevant clump prior to starting their searches. Each volunteer was told that there was no time limit on the task and it was their decision when to terminate the search. They were asked to spend as much time on the search as they would do in a 'real world' situation. Reasons for stopping a search could be:

- that the searcher was satisfied that the appropriate search result had been achieved,
- that the searcher was not satisfied but did not want to proceed further,

- that the searcher was not able to proceed further,
- that the searcher was fed up and wanted to go to the next task.

In cooperation with colleagues at the test sites, each search was recorded using data logging software. For a variety of technical and operational reasons different software was used, as described below.

Testing began at LSE using SnagIt (<http://www.techsmith.com/products/snagit/default.asp>). This package had been used in the pre-testing without any problems, as the recorded files were saved to the network. At LSE, the files needed to be saved directly onto CD before they could be played back to the user. As SnagIt produces recordings with a large file size, this took a considerable amount of time and at one point the system froze. After SnagIt had been used for the first two searchers, it was decided to switch to using Camtasia Studio. This package is from the same company as SnagIt and has the same recording ability but is able to produce smaller files. This meant that saving the file directly to the CD took less time, and a full record of all the searches was achieved. In addition, HB observed the searches and took notes on points to follow up in the post-search interview.

3.3 Interviews

The post-search interview was based upon schedules developed for previous CERLIM research projects but was kept sufficiently flexible so that the researcher (HB) was able to ask questions about the search session that had just been observed.

Volunteers were asked questions about the following areas:

- **Search options**
The participants were asked which options they had selected and the reasons for their selection. They were also asked for their thoughts about the search options they were offered.
- **Selecting libraries**
They were asked whether they used the 'select a library' feature to choose libraries before carrying out the search, or whether they used the results list to look for the libraries they wanted. If they had used the feature, they were then asked about which libraries they had selected, the reasons for their selection and whether they thought being able to select libraries was useful. If they had not pre-selected the libraries they were asked for any reasons why.
- **Results**
The searchers were asked whether they thought it was easy to understand the information given in the results pages. They were also asked about their thoughts when they had not received any results, or when they had received a very large results set, and their next steps and strategies for dealing with these.

- **Error messages and feedback from the service**

The searchers were asked if they had received any error messages, whether they could understand the information they were given and whether they knew why the error had occurred.

The participants were asked whether they had received any feedback from the service that enabled them to know what was happening with their search, for example, that the searching process had begun, or that there was a problem. They were also asked whether they could understand any feedback messages they received.

- **Problems**

The participants were asked whether they thought there had been any problems with carrying out the search.

- **The search session**

The participants were asked how easy or difficult they had found learning to search the service. They were also asked whether they were satisfied or dissatisfied with the search session and their reasons for this.

- **Features**

The searchers were asked about which features of the services they liked and disliked, and whether there were any features that they would like to see included.

General feelings

- The participants were asked to give their general feelings about the service, considering the entire experience, and whether they would use the service again.

At the end of the second interview the searchers were asked questions about union catalogues, such as:

- Have you heard the term union catalogue?
- Have you used a union catalogue before today? – If yes, what did you use it for?
- Would you be likely to use union catalogues in the future?

They were also asked for any further comments they may have about the services or the search session.

The schedule for the interviews is presented as Appendix 4.

Before starting the search session, each participant signed a consent form in line with MMU research ethics policy, and after the post-search interview they were thanked for their participation with a £35.00 book token. The combination of recorded search logs, observation and interviews immediately after a search

session enabled the researcher to collect data on what the searchers did, and to some extent why they did it, what they thought and how they felt about it.

3.4 Focus groups

Focus groups were used to determine the opinions of library staff regarding the use of union catalogues. Focus groups were used rather than individual interviews or questionnaires because it was anticipated that group discussion might well reveal information not revealed in individual interviews, as comments from participants generated ideas from other participants. Additionally, it enabled the canvassing of more opinions and experiences of more participants in a time efficient manner. The participants were asked both about their own use of union catalogues and the use of union catalogues by end-users. Focus groups were conducted at each of Glasgow, Leeds and London. Participants in each focus group were identified by the local contact. The groups included a mix of front line and “back room” staff, many of whom had undertaken a variety of roles within their own library which gave broad experience on which to draw. All participants were members of staff of the host library, except for one person in Glasgow who was a member of library staff from Glasgow Caledonian University, rather than Strathclyde University.

The focus groups were conducted by both researchers. The general pattern was that RJH acted as facilitator, whilst HB took detailed notes and recorded the focus groups on minidisks. The discussions were based around a semi-structured schedule, which is presented as Appendix 5. However, this was flexibly interpreted and as far as possible the conversation was allowed to flow. In effect, the document presented in Appendix 5 was used as a checklist to ensure that the same points were discussed by each focus group.

At the start of the session, RJH gave a brief explanation of the purpose of the project and the place of the focus group within this. This was done in as neutral a way as possible to seek to avoid influencing the tenor of the discussion. In line with MMU’s research ethics policy each participant was asked to sign a statement agreeing to take part in the research. At the end of the session each person was given a £15.00 book token to thank them for their participation.

3.5 Data analysis

Data from the search logs was analysed by developing a spreadsheet within Excel, in which the individual searches were represented by rows, and features of the search/actions taken represented by columns. This produced a complex spreadsheet but one which enabled the researchers to analyse how the various searchers dealt with different query types. The spreadsheet was produced by HB and the analysis undertaken principally by HB with help from RJH.

Consideration was given to the use of standard qualitative data analysis software such as NUD*IST or Atlas TI but the decision was taken to analyse the data manually. This obviated the need to learn a specific package and enabled us to remain close to the data. There is an argument that, in any event, qualitative data

analysis software imposes its own restrictions on the data and the conclusions that can be drawn from it (see for example Shenton and Dixon 2004).

Data collected from the post-search interviews was selectively transcribed by HB and analysed principally by RJH, with help from HB. Data from the focus groups was transcribed by HB and analysed by RJH.

4. Results

This section contains the results of the searches undertaken by end-users together with findings from the interviews with those searchers and the results from the focus group discussions with library staff in the three locations. Before presenting these results in each of three successive sections, the next section contains a profile of the volunteer searchers.

4.1 Profile of end-user searchers

Prior to undertaking the searches, each of the volunteers completed a short questionnaire which provided demographic information and basic information about their search experience. Across the three locations 34 volunteers undertook searches. Information about their gender, age group, occupation and subject area are presented in table 1. Overall, there is a wide range of subject coverage, age and occupation, with a mix of both full-time and part-time. Whilst there were participants from many disciplines, it can be seen that the sciences were under-represented and engineering subjects were not present at all amongst our sample. Predictably, given the number of taught Masters and research students involved, there was an over-representation of the 21-30 age group and this may have accounted for the very heavy emphasis placed upon the Internet and its tools in respondents' expectations of union catalogues. Whilst it is reasonable to point out the over-representation of this younger age group, it could also be argued that they provide a better representation of the expectations of union catalogue users in years to come.

Table 1: Profile of volunteer searchers.				
CC-interop WP C User profile information				
Gender	Female	20		
	Male	14		
Age groups	21-30	19		
	31-40	4		
	41-50	5		
	51-60	5		
	61-70	1		
Occupations			FT	PT
	PGCE		1	
	Taught Masters student		4	3
	Research student		9	2
	Research staff		8	2
	Academic staff		3	1
	Admin staff		1	
Subject	Accounting and finance		2	
	Archaeology		1	
	Biology		1	
	Counselling		1	
	Economics		3	
	Education		5	
	English		1	
	Environmental science		2	
	Genetics		1	
	Information management		1	
	Linguistics		1	
	Marketing		2	
	Media and communications		1	
	Medicine		1	
	Neuroscience		1	
	Philosophy		1	
	Politics		2	
	Psychology		3	
	Sociology		3	
	Statistics		1	

Table 2 indicates that all the volunteers had experience of using search engines, OPACs and bibliographic databases. Whilst all the volunteers professed use of the various electronic resources, it can be seen that Internet search engines are used far more regularly than are the more longstanding bibliographic databases and OPACs.

Table 2: Volunteer searchers' experience of using electronic resources			
Use of electronic services			
Internet search engines			
	Every day	28	
	4-5 times a week	1	
	Once or twice a week	5	
Bibliographic databases			
	3-4 times a week	3	
	Once or twice a week	13	
	Every other week	6	
	Once or twice a month	5	
	Less than once or twice a month	6	
	Haven't used any yet	1	
Online library catalogues			
	Every day	3	
	3-4 times a week	3	
	Once or twice a week	15	
	Every other week	6	
	Once or twice a month	4	
	Less than once or twice a month	2	
	Never	1	

Finally, table 3 shows that there was very little awareness of the CC-interop tools within the sample of searchers. It is, of course, apparent that InforM25 is far better known than the remaining services and it may be that the other services have lessons to learn from LSE regarding this difference. The lack of awareness of COPAC is in interesting contrast to the heavy use that this service receives on a permanent basis. However, it is an indication that even though this service is heavily used there is considerable scope for increased awareness of its existence, functionality and, of course, the necessary funding to support increased use.

Table 3: Volunteer searchers' awareness of CC-interop union catalogues			
Have heard of ...?	Yes	No	How often do you use...?
COPAC	1	33	Years ago (1)
CAIRNS or SCONE		34	
InforM25	8	26	Never (6) once or twice a month (1) less often (1)
RIDING	1	33	Never (1)

4.2 Searches

Searches were recorded in the three locations. 12 searchers were recruited in each location. In the event, only 10 volunteers arrived in Leeds, so a total of 34 searchers were used across the three locations. Each searcher carried out a maximum of four searches on each of COPAC and the local "clump". This meant there was a theoretical total of 272 searches to examine.

A problem with real world research in information retrieval and information seeking is the dynamic nature of the evolving information environment. In this case, there were problems with RIDING. There were considerable changes to the RIDING system after the volunteers had undertaken their searches but before the focus group took place in Leeds. Changes included different search options, a new screen layout, different results page and a change to selecting libraries. Summary notes of these changes to RIDING are detailed in Appendix 6. In the judgement of the researchers, these substantial changes addressed so many of the problems that the volunteers had experienced, that it was decided that any data generated by analysis of these searches was rendered meaningless. Accordingly, the RIDING searches have not been analysed. It would obviously be possible to go back and analyse this data should the CC-interop team so desire.

At the meeting with the Advisory Group in early December, it was reported that the researchers planned to examine the searches by considering

- features used
- whether help pages were accessed
- search options chosen
- common errors
- whether users selected libraries to be searched or used the default
- the number of attempts per search
- whether the search was abandoned.

The results of this analysis are presented below.

- **Searches abandoned**

Table 4 contains an analysis of abandoned searches. The first column refers to the specific searcher, the second column records the system on which the search was abandoned and the third column records the search number. The full details of each search are presented in Appendix 2. The number of attempts made before the search was abandoned is recorded in column four and in the final column there is a note of reason for the search being abandoned.

Of the 34 searchers, no less than 15 abandoned one or more searches. Out of 228 analysed searches, 30 were deemed to have been abandoned. Eight searches were abandoned after one attempt, whilst in one search the searcher persisted for 15 attempts before giving up. Overall, the average number of attempts before a search was abandoned was 3.96.

Table 4: Abandoned searches				
Searcher no	Service	Search no	Attempts	Reasons (apart from just decided to give up)
LSE				
LSE2	InforM25	B1-3	14	
LSE8	InforM25	B1-3	4	
LSE8	COPAC	B2-3	4	No results
LSE10	InforM25	C1-3	7	
LSE12	InforM25	C1-3	2	
LSE12	COPAC	C2-4	1	Didn't wait for results, too slow
LSE12	COPAC	C2-1	1	Didn't wait for results, too slow
LSE12	COPAC	C2-2p	1	Didn't wait for results, too slow
Strathclyde				
Strath4	CAIRNS	A1-4	5	Kept getting error messages
Strath4	CAIRNS	A1-1	3	Didn't wait for results, too slow
Strath4	CAIRNS	A1-3	11	Got error message on last attempt
Strath4	COPAC	A2-4	4	Slow - searcher kept deleting elements of the search while it was searching
Strath5	COPAC	B1-3	2	Slow
Strath5	CAIRNS	B2-3	3	
Strath6	CAIRNS	A1-3	4	Got error message
Strath6	CAIRNS	A1-1	1	Got error message
Strath6	COPAC	A2-3	5	No results
Strath7	CAIRNS	A2-3	6	No results
Strath8	CAIRNS	B1-3	15	No results
Strath9	COPAC	C1-1	2	No results at Glasgow
Strath9	COPAC	C1-3	1	Searcher entered Mo* and the date. Didn't wait for results, too slow.
Strath9	CAIRNS	C2-1	4	No results and error messages
Strath10	CAIRNS	C1-3	2	Found another item they would make do with.
Strath11	COPAC	B1-3	2	Didn't wait for results, too slow
Strath11	COPAC	B1-4	4	Didn't wait for results, too slow
Strath11	CAIRNS	B2-1	3	No results
Strath11	CAIRNS	B2-2p	1	Error message
Strath12	CAIRNS	C1-3	4	Error message
Leeds				
Leeds4	COPAC	A2-1	5	No results - searcher had entered two authors.
Leeds8	COPAC	B2-4	1	Didn't wait for results, too slow

Table 5 presents, for each service, the number of searches which were abandoned because, in the view of the searcher, the search took too long.

Table 5: Searches abandoned because the search took too long	
Service	Number of searches abandoned
CAIRNS	1
COPAC	9
InforM25	0

It is clear that in these searches, COPAC had a particular problem with slow response time. . It is believed that this was a particular problem and the time that the research was conducted and that COPAC normally responds more rapidly than was the case whilst we were collecting data.

Table 6 contains details of abandoned searches by search service and search type.

Table 6: Searches abandoned because searcher had error messages, no results, or decided to give up			
	CAIRNS	COPAC	InforM25
Search type	No of searches	No of searches	No of searches
Type 1	3	2	0
Type 2	1	0	0
Type 3	7	2	4
Type 4	2	0	0
Total fails	13	4	4

It is clear from table 6 that CAIRNS performed particularly poorly in respect of failed searches. Of these 13 failures, 7 were caused by error messages, 3 because the searcher could not obtain any results and in the final 3 searches the searchers simply gave up. The four searches on COPAC were all abandoned because the searchers could not find any relevant items. The four abandoned searches on InforM25 were abandoned because the searchers simply gave up. It is clear from this table that all services experienced particular problems with search type three and perhaps this merits further investigation. Search type three was a search where the user needed to find an obscure or unique item, or an item for which the user was given partial information, such as a possible author name, or part of a title or subject.

- **Search facilities used**

Given that the search features and facilities available differ between systems, one table has been used for each system. In these tables the data is presented by number of searchers who used the facilities, rather than the number of searches within which the facility was used. Therefore, the maximum number in the right

hand column of tables 7 and 8 is 12, and in table 9 it is 33 (one searcher at LSE was unable to complete COPAC searches for technical reasons).

Table 7: Features used/pages accessed on CAIRNS (total number of searchers = 12)	
Features/pages accessed on CAIRNS	
Feature/page	Number of searchers
SCONE	4
Using SCONE	1
SLIR	1
Miniclumps	3
Glossary	1
Edit search	2
Refine search	8
Selecting libraries before search	6
Using CAIRNS	1
Help	1
Help on selecting catalogues	1

It is clear that CAIRNS searchers attempted to make use of facilities to limit the search to chosen libraries and it is equally obvious that they were keen to attempt to amend an initial search statement, since out of 12 searchers 8 attempted to refine the search and 2 attempted to edit a search. At the bottom of the table it can be seen that 3 out of the 12 made use of various help facilities.

Features and facilities used by searchers of InforM25 are presented in Table 8. It is clear from this data that searchers on InforM25 made great use of the map feature. Though later examination of interview data questions whether or not the map in its current form is particularly useful. However, taken with the frequency with which this group of users used the list of libraries, it does suggest that these searchers recognised the need to restrict searches to particular libraries or groups of libraries. Limited use of FAQ is in line with the generally agreed notion that little use is made of help facilities.

Table 8: Features used/pages accessed on InforM25 (total number of searchers = 12)	
Features/pages accessed on InforM25	
Feature/page	Number of searchers
Map	11
List of libraries	9
Directory of libraries	1
FAQs	1

Because searchers in all three locations undertook searches on COPAC, there is data from rather more searchers in table 9, which reports the way in which the searchers used COPAC facilities. The interesting feature in this data is the very large percentage of users who took advantage of the facility to select particular libraries. The other interesting feature is the remarkably large number of people who made use of the COPAC help pages. Help pages are generally perceived to be little used features on systems of all types. It would be interesting to know why these help pages seem to be well used. Is this a feature of the help pages themselves, the system or this particular group of users?

Table 9: Features used/ pages accessed on COPAC (total number of searchers = 33)	
Features/pages accessed on COPAC	
Feature/page	Number of searchers
Help pages	17
History	6
Tag record	4
Sort	4
Language: English	16
Selecting libraries	28

- **Search attempts by service and by search**

Table 10 contains data of the average number of attempts made on each service for each of the four search types.

Table 10: the average number of attempts made for each search type on each service			
Search type	InforM25	CAIRNS	COPAC
1	1.4	2	1.7
2	1.4	1.5	1.3
3	3.3	4.4	1.9
4	2.3	1.5	1.7

There are dangers in using averages of averages in analysing information retrieval results. However, in this case, the use of averages does provide some useful further analysis. Table 11 contains the average number of attempts for all searches over each of COPAC, CAIRNS and InforM25. In the next section of the results, it will be seen that searchers generally recorded a preference for using

COPAC over using the virtual union catalogues. The data in table 11 suggests that this is because they were able to find the information required with less effort.

Table 11: Average number of search attempts by service	
Service	Average number of attempts
CAIRNS	2.1
COPAC	1.65
InforM25	2.35

Data on the average number of attempts by search type is presented in table 12. It can be readily seen that search type 3 required markedly more attempts than the other three search types. It was noted in table 6 that more searches of this type were abandoned than of any other type. Taken together, the data in these two tables suggest that this is an area of particular concern. It would be dangerous to draw any firm conclusions from such a small data sample. However, this does at least suggest that this is an area for further investigation. One possible tentative conclusion could be that union catalogue service providers need to pay particular attention to the way in which this search type is handled. A second speculative conclusion might be that this search type is not appropriate for union catalogues.

Table 12: Average number of search attempts per search type	
Search type	Average number of attempts
1	1.7
2	1.4
3	3.2
4	1.83

- **Search options chosen for search type 2**

Tables 13 and 14 contain an analysis of the data used in entering queries of type 2, that is those searches in which the searcher was provided with very full information. The intention here was to observe which elements of data were used by the searcher to locate the items. A total of 57 searches were analysed; 28 searches for books and 29 searches for periodicals. Each of 12 searchers in Strathclyde undertook one type 2 search on both COPAC and CAIRNS, giving 24 in total. One of the 12 searchers at LSE was unable to access COPAC; therefore there were 23 type 2 searches from LSE, and 10 from the COPAC searchers in Leeds. Table 13 provides a simple summary of the number of times that each search option was used, whilst table 14 provides an analysis of the way in which the data elements were combined. It is interesting to note the frequency with which both ISSN and ISBN have been used, given that this might be thought of as the information of information professionals, rather than end-users. The slight preference for the use of title over the use of author in book searches confirms to

the long known fact that library users recall titles more effectively than authors' names (Lancaster,1977).

Table 13: Search options chosen /information entered for search type 2		
	Book (28 searches)	Periodical (29 searches)
	No of searches	No of searches
Author	14	/
Title	16	17
ISBN	14	
ISSN	/	24
Organisation	/	3
Publisher	4	/
Date	5	/

Table 14: Combination of data elements used in type 2 queries	
	Number of searches (out of 57)
Just author	1
Just title	9
Just ISBN	7
Just ISSN	14
Just author and title	7
Just author and ISBN	1
Just title and ISBN	1
Just title and ISSN	7
Just title and date	1
Just ISBN and date	1
Author, title and ISBN	1
Author, title, ISBN, publisher	1
Author, title, ISBN, publisher and date	2
Author, publisher, date	1
Title, ISSN, organisation	3

- **Typing or spelling errors**

It has long been known that searchers make frequent errors in entering their search criteria. Indeed in one of the early OKAPI projects about 20 years ago, it was suggested that incorporating a spell checker on input data would improve search performance. Whilst it might have been assumed that keyboarding skills and interaction with retrieval systems had improved markedly through the last 20 years, it came as no real surprise to find that there are still frequent errors in search input. However, the data below suggests that not only would searcher input benefit from the use of a spell checker but so too would catalogue input. Several of the inaccurately entered search terms produced results. It was noted

that 13 out of the 34 searchers made typing or spelling errors. Overall, there were 19 errors of this variety. The searchers corrected 8 after the first search and a further 2 were corrected whilst the search was in progress. The results are presented in table 15. The left hand column indicates the details of the searcher who made the typing error, the nature of the error is indicated in the middle column and in the final column is recorded whether or not the searcher noted and corrected the error.

Table 15: Typing/Spelling errors		
Searcher / service	error	Corrected?
LSE2	Wrong ISBN entered	Yes, after search
LSE2	Louise Cohen (instead of Louis)	No
LSE2	HTLM	Yes, after search
LSE6	Clinical meicine	No (not until after 3 searches)
LSE7	Doing you research project	Yes, whilst search in progress
LSE7	Wrong name entered – Robinson (instead of Robson)	No
LSE9	Shapespeare	No
LSE9	Wrong name – Peter Williams Atkins (instead of William)	No
LSE10	chemisdtry	Yes, after search (no results)
Strath1	Doing your resaerch project	Yes, after search
Strath4	Parlement	No
Strath5	Bryon (instead of Byron)	No
Strath6	Victroia and Albert	No
Strath8	Liguistics	No
Strath8	HTML for the worold ...	Yes, after search (no results)
Strath11	2001- 2203	Yes, after search (no results)
Leeds10	Econimics	Yes, after search (fewer results than expected)
Leeds11	Doing you research project	Yes, after search (no results)
Leeds11	Hundetwasser (Hundertwasser)	Yes, whilst search in progress

The search for 'econimics' retrieved 15 results. The search for 'Bryon' produced 8 items. The first record was for 'Byron and Romanticism', whilst the remaining 7 records were not for Byron. Most bizarrely, a search for 'Shapespeare' produced 5 items, of which one was at the British Library.

- **Other errors**

Several other errors were noted in the search input. Three searchers enclosed phrases within inverted commas. Two of these were searchers at Strathclyde, whilst one searcher at Leeds used quotation marks to enter three of the four queries.

Two COPAC searchers at LSE entered title details into the organisation field.

Several searchers attempted to use the asterisk (*) as either a truncation symbol (eg Mo*) or a within word wildcard (eg J*stice for Justice or Jestice). Most bizarrely, one searcher entered J*. It is doubtful that they can have intended to retrieve every occurrence of words beginning with J.

Finally, several searchers attempted to enter more than one author name when these were present in the search statement.

4.3 End-user interviews

Even the selective transcription of the interviews led to the creation of a large volume of data. Whilst this has been analysed as carefully as possible in the available time, it is not impossible that some interesting observations have been missed. Points included in these comments are either those opinions that represent the views of several end-users, or were comments which seemed to us to be particularly helpful for the system designers. As an example of the latter, only one person (LSE10) commented upon the consequences of screen resolution for the system designer, saying that with the screen resolution of 800 x 600 the 'Search catalogues' button was missing from the screen, resulting in the need to scroll down. This was something the user viewed as "an absolute disaster". Later in the interview, the same person comments that

"only about 35% are now set on 800 x 600 resolution but that's an important part of your audience, so it has to be designed with that in mind."

Without commenting upon the specifics of screen resolutions, it is clearly important that action buttons are present on all workstations without the need for scrolling.

This section of the results is presented under the following headings: end-user awareness of union catalogues, general observations about the use of union catalogues followed by specific observations about the use of each of the four systems investigated.

- **End-user awareness of union catalogues**

There was almost a complete lack of awareness of the concept of union catalogues amongst end-users; even the few who had used a union catalogue, usually COPAC or InforM25, were unaware of the concept. For example, searcher LSE1 had used InforM25 prior to this work but indicated that the initial reaction to the concept of a union catalogue was that it related to Trades Unions.

- **General observations about the use of union catalogues**

It is clear that users compare union catalogues to Web services and especially internet search engines. They seem to expect the same speed of response and functionality. Some of them made it quite clear that if they did not get this then they would simply use the Web tools. For example Searcher LSE8 noted

“The first thing I’d want to know is the availability. Getting hold of the book and whether there’s any facility for returning the book to your own library. If not, then it wouldn’t be any use to me and I’d use Amazon.”

Similarly searcher S4 noted

“If I don’t find it in this catalogue then I would go to Google.”

And in the same vein a searcher at LSE noted

“I would like to see something a bit like you get on Google, where you can...”

Searchers also expect systems to be easy to master. Searcher S7 said

“If I can’t get the hang of what I’m doing in the first half hour then I’d reject that package out of hand and look for something else.”

Searchers generally seemed unprepared to wade through large numbers of hits, though there was the occasional person who did indicate that they would be prepared to go through all the results.

Approaches to dealing with a large results set varied. Many people made the comment that they would seek to narrow the search. Some indicated that if necessary they would need to go away to find out more about the topic in order to enable them to search more effectively. However, some indicated that they would simply give up and turn to the Web.

Perhaps there is a useful lesson in searcher expectation management from searcher S5 in Strathclyde. This person searched COPAC first then CAIRNS and whilst searching CAIRNS noted

“I didn’t mind waiting as much with this one as the other one [COPAC] because it did say on the first page that it may take a long time.”

- **Observations about use of CAIRNS**

Searchers' reactions to CAIRNS were mixed. Four people indicated that they would use the service again, three indicated that they might use it again and five were certain that they would not use it again, though one did add the rider "in its present form". The most extreme negative reaction came from searcher S3 who said

"I'm sure you're doing it on purpose, to show me one good one [COPAC] and one crap one [CAIRNS]."

The following paragraphs are organised with views about the experience of searching CAIRNS presented first, followed by views about the way search results are presented. Specific comments on the overall interaction come next, followed by specific likes and dislikes. Finally, searchers' suggestions for improvements are presented.

Some searchers experienced uncertainty about where they were searching. Four searchers moved unknowingly from searching all libraries on CAIRNS into searching only in one specific library OPAC (that of the University of Abertay); one of whom noted

"I'm not sure how I got into that [University of Abertay] on those occasions."

A fifth searcher moved into Scottish Collections Network whilst attempting to move from advanced search to simple search.

Opinions were divided about the fact that within Advanced Search the default is to search all libraries. For example one searcher noted

"The idea is useful but it's not actually useful there because they are all selected and if I want to use one I have to go through and un-tick all the others."

However, other searchers viewed this as a positive feature of CAIRNS.

The severe restriction on search input was disliked by many of the searchers. For example searcher S5 commented

"You couldn't put in a title, just a keyword. You couldn't put in an author's name, it was just a keyword."

Reflecting on the consequences of the limitation, searcher S3 remarked

“But still the search term, only one term for economics, you’re going to get millions.”

Two further searchers commented that they thought the lack of examples next to the search box led to uncertainty over the format required for entering search terms.

Views on the organisation of the search results by library were mixed. The negative view was reflected in the comment

“It’s crap, really. Because you get a reply from all the catalogues and you have to go through it all. First you want to know the book and then you want to know where you can get it, as far as I’m concerned.”

Searcher S7 concurred with this view, saying

“I thought it was dreadful because the first thing you’re trying to find out is whether you’ve got the information that you wanted. To start telling me that it’s got two in Dundee and one in... I just want to know how many times they found something to do with chintz. So that was useless.”

However, two searchers specifically praised this approach, as one of them commented

“The best part was where it identified the universities and the matches. It was quick and helpful”.

One of the searchers who was more favourably disposed towards CAIRNS was initially confused by the date in the record and needed to bring some real-world knowledge to the situation, to realise that in fact it was the author’s date of birth and not the date of publication of the book. The real-world knowledge was the fact that there could not have been a European Fisheries Policy in place in the year on the screen.

A further CAIRNS enthusiast was critical of some of the information which appeared in a record saying

“There’s information there that I would never use, like encoding level and acquired status, that sort of stuff. When I’m looking for a book I’m looking for whether it’s available or on hold, short loan or long loan. I’m interested in whether I can go there and get it or put a hold on it.”

Several searchers commented critically on the interaction with CAIRNS. Some of the comments concerned their lack of understanding of terminology on the screen. For example searcher S1 noted

“I’m not sure what mini-clumps are”,

whilst another searcher commented that they did not understand the terms “Z-servers” and “clumps”.

In addition at least one volunteer commented critically on the error messages. For example, the message “Unable to retrieve results. Out of range” does not convey useful information to a catalogue searcher.

A number of searchers were unsure whether CAIRNS was processing their search. The call for an indication that the search was still being dealt with was quite common. For example,

“..but it doesn’t tell you ‘Oh I’m thinking.’ Maybe a wee notice, or something...”

More generally, some of our volunteers were unclear what was happening for most of the interaction. Searcher S7 commented

“I wasn’t sure at any stage using this package that I knew what I was doing.”

A further issue with the interaction was the searcher (S2) who ascribed too great a capability to CAIRNS. Having realised that the results for one search were much lower than expected, this searcher assumed that this was because the system was somehow filtering the results and only giving a selection. What filtering criteria might be being used and how the system acquired them is not at all clear!

The most commonly voiced positive comment about CAIRNS was the fact that it included local libraries. This view was typified by searcher S9 who commented

“I think that’s quite useful and it’s better than COPAC as it gives a range of libraries that I might want to search in. And the feature where you can unselect the libraries is good but I only found that later. I’d gone through and unselected them by hand. The problem is that you have to scroll down the page and you forget what buttons are at the top. It might be good to have them at the top and the bottom.”

The severest criticisms of CAIRNS were the fact that the search criteria were too limited and the fact that the refine search facility did not work. These views are succinctly summarised by searcher S2 who expressed frustration that refine search “got me nowhere”. As searcher S1 pointed out

“The refining search button really kind of spoiled the whole thing.”

Several interviewees, not just in Glasgow, noted that their normal search behaviour is to start with a broad search and narrow down to home in on the required material. Thus implementing the refine search feature would seem to be important because it fits the search behaviour of many people.

Amongst the comments made about features that searchers would like to see incorporated into CAIRNS by far the most common were regarding the search facilities. Nearly every searcher wanted to see greater flexibility in searching, including the ability to set search criteria such as date and the ability to combine search criteria. One volunteer (S12) indicated that the presentation of the search output in a ranked order would be useful. Presumably this would be ranked by relevance.

Finally searcher S2 made a request which merely reflects the oft made criticism about the limited amount of information in catalogue records, with the comment

“I’d look for a summary of the book, or there are some things that give you a contents page, so you can gauge the depth of the coverage.”

• **Observations about use of COPAC**

Of the services examined, COPAC was by far the most liked by the searchers. Very few people said that they would not use it again, however several searchers commented unfavourably about the slowness of the search. Many would only use it after the local OPAC and some saw it as a last resort because of its slowness. Presumably, the generally positive nature of the comments about COPAC reflects the fact that it has been an operational service for a number of years. The positive comments about COPAC generally referred to the clarity and simplicity of the layout and interaction and the examples next to the search boxes.

Nonetheless, there were some criticisms of COPAC in addition to its lack of speed which it is worth recording. Several searchers recorded that they were uncertain about the use of the ‘anything’ search box, whilst 2 searchers indicated that they did not understand the difference between ‘subject’ and ‘anything’. Having noted that, searcher Leeds2 specifically praised the clarity of the help pages and highlighted the explanation of the difference between subject and anything as an illustration. A second searcher commented favourably on the ‘frequently asked questions’ and indicated that in the real world it would be worth downloading.

Two searchers were unclear about the purpose of the 'organisation' search box; indeed one searcher assumed that this was intended for publisher details. A further 2 searchers wanted to be able to enter the names of 2 authors and the ability to combine with Boolean OR. Clearly this is a reflection of one of our sample queries.

Several authors commented that since English is the dominant language, the default should be English with the option to change to other languages. One searcher felt that at least English should be moved to the top of the language list.

Finally, as far as searching was concerned, one searcher commented that there was no indication that it is possible to search more than one library.

Unsurprisingly, the greatest problems in the search output from COPAC were caused by the appearance of duplicate records. Several searchers recorded the fact that they did not understand why there were several records for apparently the same item. The other problem mentioned by two searchers was uncertainty about the meaning of the phrase 'holding library'. One of the searchers at LSE expressed the desire to sort the results.

Searchers generally indicated that they would not spend a lot of time and effort on searching through long results lists. One searcher suggested only the first 5 results would be examined and another indicated that only the first page would be examined. This obviously places a high demand on service deliverers to get relevant information to the top of the results, however little search information the system has to work with.

Favourable comments about COPAC included mentions of

- clear screen layout
- the range of search options
- inclusion of date in search options
- useful help pages
- examples next to search boxes
- download option.

There were some criticisms of COPAC, the major ones being

- slowness
- lack of information that the system was processing a query
- on screen language 'z39.50', 'holdings', 'tag'
- 'organisation' search box
- the limited number of libraries covered by the service
- inability to search by 2 authors.

Despite the favourable reception for COPAC, there were several suggestions for features that searchers would like to see added to the existing system. Two people suggested that English should either be the default language, or the language at the top of the language options. Two other searchers wanted to see more information about the subject matter of the book displayed in the record. One suggested a table of contents, whilst the other suggested a book summary.

Several searchers mentioned that they would like the ability to refine initial search statements. Mention was also made of the need for some browser independent means of informing the user that the search was still being processed. Finally someone requested the facility to search using a 4,4 acronym search key. It was noted earlier that COPAC's response time was a particular problem at the time this research was undertaken.

Finally, one of the COPAC searchers (LSE8) made the following comment

"I'd be very happy using it if I was looking for a specific book. I wouldn't use it if I was trying to root around for more general or vague topics."

This comment does raise the issue of whether or not it is sensible to try to offer good subject search facilities on union catalogues.

- **Observations about use of InforM25**

The searchers' reactions to InforM25 were mixed. There was certainly greater awareness of the system amongst end-users than there was of the other clumps amongst our small sample of the respective target users. Generally, users felt that they were able to search with InforM25 but all reported some problems and frustrations in their attempts to use this system.

Attitudes towards the map at the front of the system were varied. Generally, after initial enthusiasm, there was some criticism of the map and a belief that in fact the use of the list of libraries was a more flexible mechanism for restricting the libraries to be searched. Some users suggested that the map needed to be broken down into more areas, another felt that it would be helpful to have all the universities included in the map and to select them by clicking on the university on the map. Another searcher wanted greater detail on the map, including an indication of the nearest tube station and directions on how to get to a particular library (LSE7). Perhaps the most interesting and ambitious comment about the map was from searcher LSE4 who suggested that

"In an ideal world I would have been able to search not just on the three basic regions but to put in a postcode and find the nearest library that way."

There were several comments of interest regarding the search capabilities of InforM25. The way in which these comments were couched was once again evidence of the influence of the Web and search engines, since there were requests for an "advanced search" capability and requests for an increased ability to use different data elements in the search. More than one searcher emphasized the importance of the date of publication in helping to identify specific items and latest editions and wished to be able to include this in the search criteria. One person wished to be able to include more than one author in a search and one even wished to be able to include the publisher name in the search.

Others indicated their uncertainty about whether to choose 'subject' or 'keyword anywhere' from the available choices of search types at the left hand side of the search screen.

The greatest dislike with InforM25 related to the search output. Most of the test searchers were unclear about the ordering of the search output. The lack of an obvious order to the presentation of records, or an ability to either sort the records or refine the search were features criticised by most users. The other feature that caused confusion was the results table. These criticisms are summarised by searcher LSE 11 who noted

“Why it says 25 of 557 was not clear to me, I have to say. And why it lists the 0 results is not clear either.”

Several searchers complained of confusion that hitting the enter key after entering the search terms did not start the search, but instead the service returned them to the top of the page and changed the search type they had selected to the next one on the list. Searcher LSE11 summarised this as follows

“What I was finding annoying here is that when you press things it skips back to the top of the page. And also when you hit enter, it doesn't search, it skips back to the top of the page.”

The following quote from searcher LSE10 indicates both concern about search output and a lack of understanding about the search processing

“Using the ISBN search gave me the books, but it gave me some books that should have come up earlier when I did the author and title search. So I don't know what's going on.”

Searcher LSE6 inadvertently made an important point about the way that search output is displayed when saying

“It's not obvious on the results page what it means when one of the journals is all in capitals and the others aren't. One hunch is that all in capitals means it's electronic.”

Clearly it is important not to provide information in such a way that users might attribute significance to the way in which the data is displayed.

Searcher LSE2 made a lengthy but useful comment about interaction with InforM25 as follows

“It seemed very slow. Until I noticed that there was a little sort of horizontal thermometer thing down there. That was the only way to know that clicking on the search had actually done anything. I think more than once I went back and clicked again because I thought that nothing was happening. So it wasn’t very...so if it had said, 'Ok I heard you the first time, I’m searching!' that would have been better. It wasn’t as reactive and didn’t give me as much feedback as some software does.”

Features attracting positive comment but not mentioned elsewhere included the ability to choose specific libraries and the ‘Keyword anywhere’ search facility.

Most of the critical comments concerning InforM25 related to the presentation of results, in particular the format of, for example, "225 of 392". Other features which attracted criticism were

- the presence of too much information on screen at once
- it is not clear how to narrow a search
- pressing ‘enter’ changing the search type
- losing input and being returned to the top of the search page when changing the search type (on the page with the list of libraries at the top)

Searchers made a number of suggestions for ways in which they would like to see InforM25 improved. These included

- improved results presentation
- ability to mark records for retention
- ability to sort and rank records
- further geographical divisions on the map.

Searcher LSE8 would like a feature “to get holdings information, reserve things online and get them immediately put down for delivery by ILL.” Finally, searcher LSE10 would like it linked to Athens authentication, as indicated in this quote

“It may be harder to do, but as an LSE staff member I have certain rights at some of those Universities, and to be able to automatically select those libraries in the list. If I had some kind of Athens log in and it could recognize me as a member of LSE staff, so it could select as a group all those Universities that can lend me books.”

- **Observations about use of RIDING**

Numerous problems were encountered in the searching of RIDING. Two searchers had problems because they did not spot the need to select libraries before starting a search. A third person encountered problems when the service unselected the previously selected libraries and the searcher did not notice that this had occurred. A fourth searcher indicated that there had been problems in selecting the desired libraries.

Several other searchers made comments about the search process, which serve to demonstrate just how difficult is the task facing the system designer. Searcher Leeds2 indicated a preference for searching by title since this obviated the need to understand how different systems dealt with authors' names.

“I find that title is a fairly unique way of looking for books and you don't worry too much about how the thing is storing or searching the authors' names... whether it wants initials at the start, or the end, or the full name or whatever...what I would usually do is just stick a title in and see what happens”.

On the other hand searcher Leeds10 expressed a preference for searching by author's name whenever possible.

“I always go for the author rather than the title”.

Attitudes towards use of Boolean operators was similarly variable. On the one hand searcher Leeds9 confessed to not being comfortable about using Boolean, whilst on the other Leeds2 demonstrated clear understanding of Boolean with the following statement

“I liked the fact that you could combine the search fields but I wasn't sure how it was going to bracket the terms and it didn't tell me until it had done it. It had done it in a way that I was not expecting. I wanted to do (Moore or Moreton) AND HTML but what it did was Moore OR (Moreton AND HTML). Maybe there is a control to sort that out but I didn't know where it was.”

Not only did the comments of searchers in Leeds indicate different preferences for search terms (author or title) and different levels of knowledge about use of Boolean operators but they also demonstrated completely different approaches to searching. Whilst some searchers deliberately start with as narrow a search term as possible, others deliberately started with a broad search and narrow down the search output to home in on the needed material. Accordingly, several searchers of RIDING emphasized the need for facilities to enable them to refine an initial search output.

Three volunteers made comments about the results display which may be of interest to the RIDING team. Two commented on the lack of circulation data which limited the value of the output. As searcher L2 put it

“The glaring thing is that it doesn’t tell you whether it’s available and what kind of loan it is. I am not going to drive to Hull to find that a book isn’t there.”

Another user commented upon the display of the search results and argued that the bold presentation of author and title details actually meant that the location information was much less obvious. Finally, one user was concerned that the results were inconsistent.

“There seemed to be some errors in the searches because it told me that things were there and they weren’t and the other way round.”

This refers to different results for entering what the searcher deemed to be the same search.

There were several critical comments about the terminology used in RIDING which presumably can be corrected easily. Two searchers commented that it was unhelpful to use the term “Super search” when the term “Advanced search” is used much more frequently in other systems. Two other searchers suggested that the error message “You have not selected any targets” was unhelpful jargon and could usefully be replaced by a phrase such as “You have not selected any libraries”.

Two searchers indicated that they found the system difficult to use and irritating because they were not certain what was happening as the search progressed. Indeed it was not always certain to them that the search was progressing! One searcher expressed annoyance that the system timed out and another made very critical comments about the need to scroll from side to side.

Some of the searchers expressed lack of understanding about the information at the bottom of the screen, whilst another cheerfully admitted to not paying attention to the detail on home pages. Finally, one of the searchers confessed to not looking closely at the bottom of the screen and simply suggested that the whole experience “was making me fed up”.

The features of RIDING noted below were given a positive mention by some searchers.

- The choice of simple or advanced search was mentioned by two searchers.
- The use of drop down menus was mentioned by one searcher
- The ability to search all libraries in Yorkshire was mentioned by one user.

When asked what features they would like to see incorporated into any future version of RIDING, by far the most popular request was for a “Select all libraries” button. This was suggested by 6 of the 10 volunteers. One searcher suggested that the ability to select a subset of libraries near here would be useful, though of course this begs the question on the definition of “near here”. Another searcher suggested that it would be useful to be able to move between simple search and super search modes and not lose search results, so that those initial results could be refined.

When asked if they would use RIDING again, 6 of the 10 indicated that they would not. Some of the negative feelings were expressed quite strongly. Searcher L9 thought that the colour scheme was garish, saying “I cannot believe a web designer would produce this” and describing it as “bloody awful”, whilst searcher L8 noted “I don’t really have a use for it.”

However, four searchers did indicate that they would use it again; at least one of these was on the assumption that some of the problems were ironed out.

- **A note on the comments from searchers**

This section has included a large number of comments taken verbatim from the 34 volunteers. Overall, this presents a lot of criticism of the various services. In order to reflect the opinions of the searchers, we have on occasion presented some highly critical comments. However, many of the comments were intended both by the searchers and by ourselves to be constructively critical comments, which might help to improve services, and also to draw out what searchers do with union catalogues and what they would like to do if the facilities were there. It is in the very nature of such an exercise that a section such as this may appear very negative and the reader should bear this in mind.

4.4 Focus groups

- **Participants**

A total of 26 library staff took part in the focus groups. They represented a range of experience of both front-line and backroom roles and a variety of levels within their respective libraries. There was one person in each of Glasgow and Leeds who had been involved in the initial discussion about the setting up of their respective “clump”.

- **Participants’ awareness of union catalogues and union catalogues mentioned**

All the library staff involved in the focus groups were aware of the concept of union catalogues and all indicated that they did use, or had used, union catalogues in the course of their work. When asked to name the union catalogues that they had used, or did use, the responses were far wider than COPAC and the “clumps”. Understandably, cataloguers referred to the use of RLIN, CURL and

OCLC World Cat in cataloguing, whilst many librarians referred to the use of union lists of serials, especially SALSER in Glasgow and the University of London Union List of Serials in London. Other union catalogues that were mentioned included the LAMDA Union List. There was even mention of BUCOP and WLSP by one librarian.

- **Participants' awareness of CC-interop union catalogues**

Of the union catalogues of interest to this project, it was clear that COPAC was both the most widely known and widely used union catalogue. Virtually all the library staff in all three locations indicated that they had used COPAC, though with varying degrees of frequency. Whilst COPAC was the most widely used of the union catalogues, there was concern about its limitations, notably the fact that currency was dependent upon data provision from the constituent libraries. As one participant noted

“...whereas on COPAC you've only got what was in the last load, so you can miss a lot of new material.”

- **Participants' perceptions of patron awareness of union catalogues**

When asked about patron use of union catalogues, the general reaction was to think in terms of undergraduate students and to suggest that there was a complete lack of awareness of the existence of union catalogues. When pressed, there was a recognition that this statement related to undergraduates and several participants were able to recall incidents when researchers had demonstrated an awareness of union catalogues. The overall view is reasonably summarised by the participant who remarked

“I would say that I don't think students are particularly aware but some researchers might be.”

- **Participants' perceptions of researchers' use of union catalogues**

Predictably, the overall view was that researchers use union catalogues either to identify locations of items not held locally, or to confirm bibliographic details of items. In effect, they were saying that union catalogues are used for known item searching and not for subject searching. Indeed, one librarian went as far as to say that subject searches should be banned from union catalogues. Determination of location of an item might be either with the intention of visiting a library to use the item, or to present a known location when requesting the item from the Library's Inter-Library Loans Department.

There was some disagreement between participants regarding patron use of union catalogues. Whilst one participant, who works in an Inter-Library Loans Department, expressed surprise “at how many people actually used it (ie COPAC)” saying that

“They come to us with a printout saying ‘I want this book and it’s at Edinburgh can you get it for me?’ ”

However, there was some perception, especially in Glasgow, that union catalogues not only solved problems but also caused them. This was not associated with the process of searching, rather with the subsequent matter of obtaining the material and also of patron understanding of the range of retrieval tools and their inter-relationship.

- **Participants’ views on the willingness of researchers to travel varied between locations**

Generally, the view within the focus group at LSE was that researchers would not travel outside London to view material. Librarians in Glasgow felt that researchers there might well travel within the Central Belt and very occasionally to Dundee but that Aberdeen might as well be on another planet! Librarians in Leeds generally felt that researchers would travel to use material if necessary, so long as that did not necessitate travelling to Hull. This was apparently such an awful prospect that it was mentioned more than once! Presumably, willingness to travel is in fact conditioned by the necessity to so do.

- **Marketing and promotion of Union Catalogues**

There was little evidence from these interviews of concerted efforts to promote and market union catalogues. Several participants indicated that they mentioned COPAC in discussions or lectures with research students. For example

“I do show COPAC to the research students in the Business School...”

Librarians at LSE noted the presence in their library of bookmarks and posters drawing attention to the InforM25 service. At LSE, there were several comments about the efforts made within library liaison to draw union catalogues to the attention of relevant users. It was noted in Leeds that there had been a concerted effort to draw attention to the RIDING project at its inception “but it was as much for the reciprocal access scheme as for the clumps catalogue”. Again in Leeds there was a discussion about the link from the library web page, coupled with criticism of the fact that many unexplained tools were hidden behind a small heading “Other” on the library web page. Further, some participants noted that the names of the union catalogues are meaningless to most users; names such COPAC, CAIRNS or InforM25 on a menu convey nothing to library users about their content or potential use.

- **Participants' views on the scope and coverage of union catalogues**

Participants were clear that they did not feel that there was much logic to, or merit in, the notion of union catalogues created on the basis of subject or discipline. This view was based on the difficulty of defining subject boundaries and therefore opportunities for overlap. A typical comment was

“That would cause a few problems because subjects, as the name said are subjective. They are not universal concepts. For mathematics would you include statistics or would statistics be another subject...?”

There was a diversity of views amongst participants regarding the merits of union catalogues based upon geographical region. Some felt that they had merit because they would enable the identification of material to which the searcher could travel without too much problem. The matter of researchers travelling within the Scottish Central Belt is a good example of this. However, the converse opinion was that it would be better to have a National Union Catalogue. Different reasons were advanced for this option. A participant in Leeds felt that the importance of regional union catalogues had declined with the emergence of SCONUL Extra and UK Libraries Plus. Participants at LSE felt that there were simply too many Union Catalogues but recognised that regional restrictions had value. Accordingly, the view in this group was that there was a preference for a National Union Catalogue, with the ability to restrict searches by region or library group if this was appropriate. One participant in Leeds wanted to know why COPAC and UNITY could not be merged into a single database.

Another telling point in favour of a national union catalogue was that students wanted to be aware of material close to their home, as well as their place of study. For example, a union catalogue covering Yorkshire is of little value to the student in Hull who lives in, say, Portsmouth. That person might find value in a union catalogue which included not just material from the place of study but also at the libraries of Portsmouth and Southampton. Finally, it was argued that the emergence of distance learning meant that students were increasingly living outside the region in which their university is located. By definition, this situation could not be dealt with by union catalogues covering pre-defined geographical areas.

There was also a diversity of opinion concerning the material to be included in any union catalogue. A considerable number of participants advanced the opinion that there was limited value in a union catalogue which covered everything, including modern and relatively accessible material. The quotation at the end of this section concerning wading through lots of duplicate records is germane here. Though, of course, it is apparent that this material would need to be included to meet the needs of the distance learners discussed in the previous paragraph. Participants in all locations were strongly in favour of a National Union Catalogue of serials, on the grounds that this is where they find the greatest need for a union catalogue.

There was, however, a discussion in Strathclyde about the difficulty of making detailed holdings information accessible in a form which is both detailed and comprehensive and at the same time comprehensible, so that the end-user understands exactly where a particular volume of a journal is available.

The issue of material in addition to serials was pursued in most detail by librarians at LSE. The conclusion there was that it would be very useful to have a union catalogue which included older material, although there was no clear definition of older material. It was suggested that this would be useful not just from the point of view of resource discovery but also to aid those many libraries which were still engaged in retrospective conversion of catalogue records for old material. From a research perspective, archives were seen as an important area for union catalogue development and the final area identified was that of grey literature. In the words of an LSE participant

“What it would be useful for is pamphlet type things, you know, grey literature. If you’re wading through loads of duplicate entries for textbooks it would kind of put you off, but if you were getting hold of the more obscure things...”

- **Perceived problems with union catalogues**

A markedly different attitude towards union catalogues was noted in the focus group in Strathclyde. Here, there was scepticism, not just of users’ understanding of the interrelationship of various tools but also there was an admission of concern of the potential impact of union catalogues on the inter-library loan bill. However, and importantly for this project, there was a considerable lack of trust of the search effectiveness of union catalogues. One participant in Glasgow noted

“I was very worried about CAIRNS when it *did* work because it gave some very odd results.”

Another user rather more bluntly said

“...CAIRNS, it just crashes when you get a lot of people trying to use it. And also the Z39.50 matching just doesn’t work properly.”

As a result of this lack of trust, a third Strathclyde participant noted that

“We’ve made an active decision not to put a link to CAIRNS on our web pages because it just causes too many complaints and problems.”

Participants in the focus groups perceived numerous problems which they felt might inhibit both trust in, and effective use of, union catalogues. Already mentioned earlier in this report was the issue of the currency of the data held in COPAC and the lack of trust in the results of Z39.50 searches. A related concern to lack of trust in the results was uncertainty within the focus groups of the impact of error messages indicating that not all the libraries had been searched because a connection could not be established. Some felt that this would inhibit users' trust in virtual union catalogues. Concern about the impact of union catalogues on document delivery services was also noted by one focus group. The problem of presenting complex serials holdings data in a manner which is both comprehensive and comprehensible to the end-user has also been reported. That is to say the end-user needs to have data presented that enables them to identify easily not just the owning organisation but also, if necessary, the branch at which any particular journal issue is located.

Focus group participants were also concerned that search results containing duplicate records were confusing to library patrons. Comment was also made in the focus groups about the slow response time of COPAC.

Some concern was expressed by some participants in the LSE focus group that the results display in InforM25 was confusing to users. The concern was with results indicating something like "25 of 1278", where it was felt that this would not be understood by users. Indeed, when a live search was undertaken at the end of the focus group, there was uncertainty amongst some of the staff about the meaning of such results.

Finally, one LSE participant emailed after the focus group to express the view that quality control of records was crucial. Reference was made to the variability of the data in the CURL database in the difficult area of publication date.

- **Features wanted in union catalogues**

Understandably, librarians had numerous positive suggestions about how current union catalogues could be improved. These suggestions included

- Ability to sort by date
- Ability to sort by title and by author
- Ability to place own library first
- Ability to sort geographically
- Ability to link search output to inter-library loan software
- Ability to pass search results to reference management software.

Participants in one focus group thought it would be useful to have more than one sort criteria, for example to be able to sort first by author and then within that by date.

- **Controlling the interaction**

There was unanimity amongst focus group participants that it was important that they were in complete control during an interaction with a union catalogue. There was a strong feeling of the need to control the interaction, which was typified by the comment from a participant in Strathclyde who said “you don’t like the machine to take control”. This strong desire for complete control over the interaction is interesting given the fact that there is ‘behind the scenes’ processing occurring on a regular basis in COPAC. For example, there are automatic plurals in a subject search, automatic truncation of initials in an author search and search trees in a title only search.

Within the issue of control, the issues of personalisation or even “groupisation” were explored. That is to say that there was some discussion of whether it was desirable to have some recognition of the user, or more likely a group of users, from their log on. There was little support for the notion of search facilities such as OPACs searched being restricted by user category or group, and only marginally more for complete personalisation.

- **Awareness of the term Information Landscape**

During the first planning meeting it was noted that the term Information Landscape was used frequently. It was felt that it would be interesting to see whether librarians working in an operational environment rather than a research environment were aware of the term. Even though the concept and this precise rendition of the term appear in the literature, there was a complete lack of awareness of the term amongst focus group participants. Despite considerable prompting from ourselves, no focus group member came close to understanding the term without our explanation and so discussion of altering the information landscape had to be undertaken using very different terminology. This does suggest some communication problem between practitioner and researcher within our community.

5. Discussion

The results presented in the previous section need to be treated with caution for two reasons. First of all, the results are based on findings from a small sample of only 34 searchers in three locations. Whilst the depth of data collected from this sample has value and interest it would be dangerous to generalise from such a small sample. Secondly, whilst we have confidence in the robustness of our data collection methods, it is appropriate to point out that the data analysis was hurried and this phase of the work might well have benefited from more time.

Having commented upon the limited size of the sample it was pleasing to see that within those 34 people we did get representation from a wide range of people from taught Masters upwards and across a wide range of subject disciplines. It would be fair to suggest that the sciences were slightly underrepresented, as were academic staff. As noted in section 4.1, the overrepresentation of younger age groups and postgraduate students can be viewed as a positive benefit in this study, since this is the group from which future academics, and therefore future users of Union Catalogues will come. Accordingly, their views and expectations are particularly relevant.

The library staff perception that undergraduate students are unaware of union catalogues and the limited awareness of those tools amongst our sample of users confirmed our decision (see section 3.1) to restrict our sample to postgraduate students, research staff and academics.

It is very clear in table 2 that our volunteers use Internet search engines more frequently than they do either OPACs or bibliographic databases. Anecdotal evidence suggests that in this respect our sample is representative of the wider community. Comments from participants indicated clearly that their expectations of union catalogues, and indeed other search engines, are influenced by their experiences with Internet search engines. One user expressed the view that user-friendliness was determined by similarity of behaviour and functionality to Web search engines and another indicated that if a specific search engine did not produce useful information rapidly then the response would be to turn to Google. Others referred to Amazon as a source to which they would turn.

An area where the influence of Web search engines was particularly apparent was the expectation of a rapid response. This can be noted in the number of searches that were abandoned simply because the union catalogue was deemed to be too slow. COPAC performed particularly badly in this respect. Whilst those of us in the information community are well aware of the limitations of general Internet search engines, it is important to accept that they form an important part of the revolution in information retrieval which has occurred in recent years. The crucial difference which they have over more sophisticated information retrieval services is that they are very widely used. Therefore, it is important that comments about making information services as similar to Web search engines as possible are taken seriously.

It is apparent in the comments from searchers and from librarians that there is a preference for COPAC over the other systems. The tabulated data on searching also shows that users generally find COPAC easier to use. This should not cause surprise. COPAC has been an operational service for nearly 8 years, whilst the other systems are more recent developments. Given that COPAC has so much more experience and user feedback on which to draw, it would also be wrong to reach the conclusion that physical union catalogues are in some way inherently superior to virtual union catalogues. The high level of use of COPAC, as noted on its web pages, attests to the continuing need for union catalogues. Therefore, there is scope for the developers of these systems to learn from each other and from the comments of this small sample of their users. It seems likely that continued collaboration between the various teams would be to the benefit of all.

There was an obvious difference between the librarians in the focus groups and the volunteer searchers in their awareness of the existence and function of union catalogues. Understandably, the former were much more aware than the latter of the existence of union catalogues. Though as noted earlier, it was something of a surprise that the range of union catalogues to which they referred extended well beyond those which are the subject of this research. Nevertheless, the focus groups and the post-search interviews produced some interesting agreements concerning union catalogues. There was strong agreement that the most important area for development was a union catalogue for serials. The only proviso here was the comments in the focus groups in both London and Glasgow that it is very difficult to produce a union catalogue of serials which is both easy to use and unambiguous in its detailed holdings information, especially in the case of an organisation with multiple libraries.

As far as a union catalogue for books is concerned, there was a reasonable degree of agreement that it was more important to include in such a tool the rare and older material rather than the more modern and widely available material. There was less agreement regarding the notion of a single national union catalogue rather than the notion of a series of regional union catalogues. Some people favoured the former and noted that the emergence of distance learning increased the need for a single tool, whilst others favoured the regional approach and being able to locate material relatively locally. There were some useful pointers in user comments. As far as users in Strathclyde were concerned, a distinct disadvantage of COPAC is that it does not include material from Strathclyde. It follows from this that from the user perspective any national union catalogue needs to be just that; national, not partially national. Whilst the academic library community understands the distinction, it is of no relevance to the user population.

One way of approaching future developments would be to produce a national union catalogue in which the ability to restrict a search to geographical areas was much more developed than any of the systems currently available. In addition to a list of all the libraries in the service, it would be worth exploring further the notions of mini-clumps as developed by CAIRNS or the selection by a map as developed in InforM25. Whatever approaches might be developed, it is worth noting that whilst CAIRNS adopted an approach of selecting all libraries by default and RIDING adopted the approach of selecting no libraries; both led to problems.

Some simple mechanism for selecting all libraries is clearly necessary. There was unanimity amongst the focus group participants that a series of union catalogues developed on a subject basis was a non-starter.

Turning attention to the functionality of union catalogues, both a small number of our volunteers and one of the focus groups emphasized the potential benefits that could accrue from developing mechanisms to export the results from a union catalogue search straight to the searcher's home library's inter-library loans department.

It is clear from comments in the post-search interviews that all the systems explored have scope for improving the use of language in their interfaces. There was consistent comment about the use of library jargon from the participants. Several examples were given of terminology which is taken for granted in the bibliographic community but which has no meaning to most end-users. For example, there are several references to terminology from Z39.50 in the various services: examples include Z39.50, Z-servers and targets. Other jargon which was noted by the searchers included clumps, mini-clumps and holdings. One error message included the unhelpful phrase "out of range".

A regular comment from searchers in all locations was the importance of receiving some indication from the system that it is still working and has not ended a process. It was noted that whilst this could be determined from a browser, that was not sufficient and a clear indication from the system itself was desirable.

The function of a union catalogue is to enable searchers to find material not available in their own library and so it follows that links to circulation data are important. As the RIDING searcher noted, it is no good driving to Hull only to discover that the item is on loan. The point was made rather succinctly by the participant in Glasgow who commented

"When I'm looking for a book I'm looking for whether it's available or on hold, short loan or long loan. I'm interested in whether I can go there and get it or put a hold on it."

It is widely assumed that Help facilities are rarely used and so it is interesting to note that the COPAC Help facility was widely used. Whilst we have a suspicion that this was caused in part by the fact that COPAC was responding slowly and some participants were using Help simply to pass the time, it is worth exploring the COPAC approach to Help presentation to see if there are lessons for other services.

Examination of the search recordings and the post-search interviews, ensured that we had more than a little sympathy for system designers! There are clearly widely different approaches to searching which need to be catered for. These range from those who prefer to start broad and narrow down, to those who prefer to start narrow and widen out. However, these differences do indicate that searchers require search facilities which enable them to refine or amend a search as a result of initial search output. Tables 13 and 14 demonstrate the wide choice

of data elements which even this small group of searchers chose to use in their attempts to deal with the queries presented. Perhaps the most surprising of these findings is the heavy use that was made of ISSN in serial searches. It comes as something of a surprise that so many users are aware of the existence of a standard serial number.

Not only is there a wide range of search approaches to cope with but there is also reluctance on the part of some users to observe closely what is happening during the interaction. This was admitted by some searchers with comments about unwillingness to look at Home Pages, the top of the screen and the bottom of the screen. The failure to spot spelling mistakes is a further indication that some searchers do not observe the screen closely. The frequency of spelling or typing errors does raise again the issue of running initial search input past a spell checker prior to search. The fact that some curious misspellings retrieved some items also raises the issue of whether or not spell checking should be used at the database creation stage. As if these searcher traits do not make system development difficult enough, many searchers indicated that the number of pages of search output that they would be prepared to work through was severely restricted. Therefore the plea of numerous searchers for a means of sorting search output is of importance. Various suggestions were made including sorting by date, by author and by library.

Other facilities which searchers were keen to see incorporated into union catalogues were facilities for refining initial search output. Some suggested that this should be by the ability to change the search criteria, whilst others were keen to see improved duplicate record removal.

Both the comments in the focus groups and the responses in table 3 indicate limited awareness amongst potential users of these JISC-funded services. This merely confirms the findings of other research such as our CERLIM colleagues in the EDNER project (Griffiths and Brophy 2002, Griffiths 2003) and the findings in the JUBILEE and JUSTEIS projects. Nevertheless, the markedly greater awareness of InforM25 amongst volunteers at LSE suggest that there is considerable scope for libraries to draw services to the attention of potential clients and perhaps other union catalogues (physical or virtual) and indeed other JISC services might find useful lessons in the LSE approach. Several searchers and some librarians commented on the fact that the names of the services are not helpful. Assuming that there is a link on a library home page to COPAC, the name does not convey to potential users what it is, nor in this case is explanation simple since it will soon require explanation of CURL. This is not to pick COPAC out for particular treatment; the names of the other systems are unlikely to convey anything of their content to most potential users.

A search of LISA revealed nearly 1200 items with the descriptor "union catalogues" and just over 600 items with the descriptor "Information Seeking Behaviour". However there were no items which combined the two terms. Nor was it possible to find any papers which considered how people search union catalogues. This report has produced some preliminary findings which give indications of both the search facilities people require of union catalogues and their views on the content of union catalogues. It would be wrong to think that this

report has produced all the answers and we certainly make no such claim. Rather, we would claim that it has uncovered interesting information on how union catalogues are both perceived and used. Alongside further development of union catalogues it is important to continue to improve our understanding of what people want from these tools and how they use them. We would expect such studies to yield a better understanding of the materials that it is most useful to present in union catalogues, and the search facilities which are needed to most usefully exploit the information therein.

6. Conclusion and recommendations

The data collection methods outlined in section 3 of this report have proved to be both appropriate and robust and have yielded much interesting information. There were only minor problems associated with the collection of search logs which were essentially caused by equipment differences between institutions. With hindsight, it would have been prudent to allocate rather more time for data analysis than was done.

Data was collected from 34 searchers across three institutions and from 26 library staff in the same three locations. Whilst this data has proved interesting and we hope useful, it is important to bear in mind that the actions of 34 people and the views of 60 people is a relatively small data set on which to base future actions concerning union catalogues. The results of this work should be seen as indicative rather than conclusive and we would like to see further work with different groups of users in order to either confirm, or amend, the findings presented in this work.

The usage data on the COPAC web site confirms the fact that union catalogues are heavily used, despite the limited awareness of their existence that was noticed in the sample of searchers used in this study. It was noticeable that there was much greater awareness of InforM25 amongst our sample of searchers at LSE than were any services in the other locations. This suggests that there may be lessons to be learnt from LSE by the other service providers and indeed possibly by other JISC information services.

Amongst our sample of searchers it was clear that COPAC was found to be easier to use than any of CAIRNS, InforM25 and RIDING. Users generally liked its simplicity and clarity. Librarians similarly favoured COPAC over the other services. This is not surprising given that COPAC has been an operational service for nearly 8 years and should not be taken as an indication that physical union catalogues are inherently superior to virtual union catalogues. There were some features on each service which met with the approval of our sample of users and thus it seems that each service could benefit from continued collaboration with the other services. It is to be hoped that funding can be found to ensure that the services can continue to develop and share experience.

A number of lessons can be learned from the behaviour of our searchers and the comments of both searchers and librarians. On the basis of this admittedly small sample of users, it seems that union catalogue providers should

- provide clear on-screen guidance that the system is processing
- review terminology on screen to remove some of the jargon which has confused users and is noted in section 4
- consider the search facilities which are offered to searchers in light of the comments again reported in section 4
- note that searchers have a wide variety of approaches to searching; whilst there was a slight majority in favour of starting with a broad search and narrowing the search down, there was also a considerable number who took the reverse approach
- note that searchers use a wide variety of data elements in their searches, with some strongly favouring author and others strongly favouring title approaches. Perhaps the most surprising finding was the frequency with which ISSN was used in searches for journals
- note that searchers wish to be able to have facilities to refine an initial search
- note the high impact that the web and web tools such as Google and Amazon are having on the expectations of searchers
- note the number of input errors and consider the use of a spell checker at data input
- note that there were requests for greater information about the content of books in the records presented
- note that there was a clear requirement for access to availability data, not just holdings data, on the part of a number of searchers
- note that each of their services have features that met with end-user approval and therefore that they should continue to collaborate and share experience to enhance all the services
- note that there is concern amongst some librarians about the currency of the COPAC database
- note that there is concern amongst librarians and a smaller number of users about the reliability of search output from current virtual union catalogues.

Whilst we are aware of the study of perceptions of both academic staff and library staff perceptions of the need of a National Union Catalogue (Stubley and Kidd, 2002), we believe that this is the first study of the *use* of Union Catalogues. Given the investment in their creation, this in itself is interesting. The discussions with both users and librarians demonstrated a clear need for union catalogues. However, there were questions raised as well as answers provided. It was clearly the view of both groups that the most important area for union catalogue development is in the area of periodicals. As far as books were concerned, both librarians and users felt that concentration should be given to the inclusion of rare and old material. Indeed, some argued that it did not make sense to include common widely held material. Opinions differed on the notion of national or regional union catalogues. From the data presented to us the solution would appear to be a national union catalogue but with facilities to restrict the search

both by selecting specific libraries and by designating differing types of geographical areas...what might be termed dynamic mini-clumping. So, to use a parochial example, it might be useful to be able to specify all libraries in the north west of England or all libraries in Manchester.

On the basis of this study there are two clear recommendations, namely

1. That there should be continued collaboration between the CC-interop partners in the development of their various union catalogues so that experience and best practice can be used to the advantage of all.
2. That, alongside continuing development of union catalogues, there is a larger study to consider what type of union catalogue(s) in terms of coverage and search facilities best meet the needs of the HE community.

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8. Appendices

Appendix 1 Pre-search questionnaire

CC-interop pre-search user profile

Please tick the category that applies for the following questions:

1) Female: Male:

2) Age:

18-20 21-30 31-40 41-50
51-60 61-70 70+

3) Occupation: (if you fall into more than one category, please select the occupation at which you spend the majority of your time)

Taught Masters student: F/T <input type="checkbox"/> P/T <input type="checkbox"/>	Research student: F/T <input type="checkbox"/> P/T <input type="checkbox"/>
Research staff: F/T <input type="checkbox"/> P/T <input type="checkbox"/>	Academic staff: F/T <input type="checkbox"/> P/T <input type="checkbox"/>
Other (please state) _____ F/T <input type="checkbox"/> P/T <input type="checkbox"/>	

4) Please indicate the subject area of your study, research or work and the University where you are based:

Subject/research/work: _____

University: _____

5) How often do you use Internet search engines? (tick one):

Never Every day Once or twice a week Every other week
Once or twice a month Other (please state) _____

6) How often do you use bibliographic databases, **for example** Web of Science, BIOSIS, Chemical Abstracts, PsychINFO, Artbiographies Modern, FAME, Emerald, Ingenta **etc?** (tick one):

Never Every day Once or twice a week Every other week
Once or twice a month Other (please state) _____

7) How often do you use online library catalogues (OPACs)? (tick one):

Never Every day Once or twice a week Every other week
Once or twice a month Other (please state) _____

8) Please indicate whether you have heard of the following services. If yes, please also indicate your experience of using them:

a) Have you heard of **COPAC**? Yes No

If yes, how often do you use COPAC? (tick one):

Never Every day Once or twice a week Every other week
Once or twice a month Other (please state) _____

b) Have you heard of **CAIRNS** or **SCONE**? Yes No

If yes, how often do you use CAIRNS or SCONE? (tick one):

Never Every day Once or twice a week Every other week
Once or twice a month Other (please state) _____

c) Have you heard of **InforM25**? Yes No

If yes, how often do you use InforM25? (tick one):

Never Every day Once or twice a week Every other week
Once or twice a month Other (please state) _____

d) Have you heard of **RIDING**? Yes No

If yes, how often do you use RIDING? (tick one):

Never Every day Once or twice a week Every other week
Once or twice a month Other (please state) _____

Appendix 2 Search tasks

Searches A1

1. You are about to start a research project and need some advice. You have heard of a book called "Doing your research project" but you don't know the author. You need to find the most up to date edition that you can, in the nearest library.
- 2bk. You need to find a copy of the following item:
"Real world research",
2nd edition,
by Colin Robson,
published in 2002 by Blackwell,
ISBN: 0 631 21305 8
- 2.per You need to find a copy of the following journal:
Applied economics
ISSN: 0003-6846
Chapman & Hall
3. You are looking for a book on the artist Hundertwasser by Harry Rand. You need the 1993 edition, as it contains an image not included in later editions.
4. You are about to start your research into politics and need to find out what items are available on this topic.

Searches A2

1. You urgently need to get hold of a copy of 'Clinical medicine' edited by Parveen Kumar and Michael Clark. You need to get the most up to date edition you can find in the nearest library.
- 2bk. You need to find a copy of the following book:
'Doing postgraduate research' edited by Stephen Potter, published in 2002 by Sage in association with the Open University. (ISBN: 0761947442).
- 2per. You need to find a copy of the following journal:
Art history
ISSN: 0141-6790
Association of art historians / Blackwell
3. You are preparing a lecture on printed textiles and need to find items about chintz. You are particularly interested in locating a catalogue of an exhibition of Indo-European cotton-paintings that you think was held at the Victoria and Albert Museum and possibly also at a museum in Canada.

4. You are about to start your research into genetics and agriculture. You need to find out what books there are on this topic.

Searches B1

1. You are working on your dissertation and are not sure how to put it together. Your tutor recommended a book called "Surviving your dissertation". You need to find the most recent edition you can in the nearest library.
- 2bk. You need to find a copy of the following book:
"Research Methods in Education",
5th edition,
by Louis Cohen, Lawrence Manion and Keith Morrison,
published in 2000 by RoutledgeFarmer
ISBN: 0 415 19541 1
- 2per. You need to find a copy of the following journal:
Mathematics today
ISSN: 1361-2042
Institute of mathematics and its applications.
3. You are building a website and need to find a book recommended by a colleague on HTML and CSS. Your colleague thinks the book is by someone called Moore, or Moreton and it was published within the last two years.
4. You are starting your research in linguistics and need to find out what books are available on this topic.

Searches B2

1. You need to put some information into onto the Web urgently and you need to refresh your memory of HTML. A colleague has recommended that you look at 'HTML for the World Wide Web' by Elizabeth Castro. Find the most recent edition you can in the nearest library.
- 2bk. You need to find a copy of the following book:
'Action research: principles and practice' by Jean McNiff, published in 2002
by RoutledgeFalmer. (ISBN: 0415219949)
- 2per. You need to find a copy of the following journal
British journal of sociology
ISSN: 0007-1315
London School of Economics and Political Science
Routledge and Kegan Paul

3. You are doing some research into monasticism and are interested in books on monks behaving badly. Someone has told you about a book that was published some time in the late 90s. They aren't sure of the title but think that the author might be Justice or Jestice.
4. You are about to start your research on the poet Byron and need to find out what books there are on this topic.

Searches C1

1. You urgently need to find a copy of a book called 'Challenge and change in the information society' for a presentation you are preparing. You need to find a copy in the nearest library.
- 2bk. You need to find a copy of the following book:
'Business research: a practical guide for undergraduate and postgraduate students' by Jill Collis, published in 2003 by Palgrave Macmillan (ISBN: 0333983254)
- 2per. You need to find a copy of the following journal:
International marketing review
ISSN: 0265-1335
MCB University Press
3. You are building a website and need to find a book recommended by a colleague on HTML and CSS. Your colleague thinks the book is by someone called Moore, or Moreton and it was published within the last two years.
4. You are about to start your research into Shakespeare and need to find out what books are available on this topic.

Searches C2

1. You urgently need to get hold of a copy of 'Atkins' physical chemistry' by Peter William Atkins. You aren't sure when the latest edition was published but you would like to get hold of the most recent one you can find in the nearest library.
- 2bk. You need to find a copy of the following book:
'Doing and writing qualitative research' by Adrian Holliday, published in 2002 by Sage. (ISBN: 076196391X)
- 2per. You need to find a copy of the following journal:
Cell biology international
ISSN: 1065-6995
Academic press.

3. You urgently need to find a book by Mark Wise on the topic of the European Fisheries Policy for a paper you are writing. You aren't sure of the exact title of the book.
4. You are about to start your research into economics and need to find out what books are available on this topic.

Appendix 3 Sample search task sheet

Please carry out the following search tasks.

Please let me know when you feel you are satisfied with each search or you wish to stop a search and move on.

1. You are about to start your research into politics and need to find out what items are available on this topic.

2. You are about to start a research project and need some advice. You have heard of a book called “Doing your research project” but you don’t know the author. You need to find the most recent edition you can, in the nearest library.

3. You need to find a copy of the following item:
“Real world research”,
2nd edition,
by Colin Robson,
published in 2002 by Blackwell,
ISBN: 0 631 21305 8

4. You are looking for a book on the artist Hundertwasser by Harry Rand. You need the 1993 edition, as it contains an image not included in later editions.

Appendix 4 Post-search Interview schedule

CC-interop interview questions/plan

Questions about the search

Play back the interviewee's search *Ask the following questions when/if appropriate:*

FIRST SERVICE SEARCHED WAS _____

1. Search option

- a. Why did you choose that search option?

2. Selecting one or more libraries

- a. Did you notice that there was a feature to select one or more library catalogues?
- b. How useful do you think this feature was?

3. Results list

- a. Could you understand what each item was from the results list?
- b. What did you think when you got those results?

4. No results

- a. What did you think when you didn't get any results?
- b. What would you do next if you didn't get any results?

5. Large results set/overload

- a. What would you do if you got a very large set of results?

if **'nothing'** or **'would look through them'** –

- b. How long would you spend going through the results?

If **'would search again'** or **'would try to narrow search'** –

- c. How would you narrow the search? How would you change your search terms?
- d. If your second search still yielded a large set of results, how long you do think you would spend going through them?

6. Error messages

- a. Did you get any error messages?
- b. Could you understand the error messages/why you got error messages?

7. Feedback messages/searching messages

- a. Did you feel that you knew where you were up to with your search?
- b. Did you feel that the service kept you informed of what was going on?
- c. How clear did you think feedback messages were?

8. Problems with carrying out search

- a. Were there any problems with carrying out your search?

9. Learning to search

- a. How easy/or difficult did you find it to learn how to search this service?

10. Search satisfaction

- a. Overall, how satisfied, or dissatisfied were you with this particular search session?
Please give any reasons for this.

11. Features liked

- a. Were there any features of this service that you particularly liked?

12. Features disliked

- a. Were there any features that you didn't like?

13. Other features

- a. Are there any other features that you would like to see included in this service?

14. General feelings about the service

- a. Considering the entire experience, what would you say your general feelings are about this service?

SECOND SERVICE SEARCHED WAS _____

*Ask the questions from the section above, in the same way as for the first service.
Then ask the questions below.*

UNION CATALOGUES – general questions

15. Awareness of union catalogues

- a. Have you heard the term union catalogue?

If the searcher does not know what it is give them the definition:

16. Used before?

- a. Have you used a union catalogue before?
- b. If **YES**,
What were your reasons for choosing a union catalogue? (What did you use it for?)
- c. If **YES**
Have you used any other union catalogues than the ones we asked you about in the questionnaire? (COPAC, InforM25, CAIRNS, RIDING)
- d. If **NO**,
Do you have any reasons for not using union catalogues?
- e. If **NO**
Now that you've had experience of union catalogues, do you think you would be likely to use them in the future?

17. Further comments

Do you have any further comments?

NOTES/COMMENTS

Appendix 5 Focus group schedule

Introduction

- a. Welcome and introductions RJH and HB and our roles recording and notes...Mention access to a system if necessary to demonstrate a point.
- b. Introductions from the group (name and role esp whether or not able to speak for users)
- c. Explanation of the project. Not concerned with effectiveness. Looking at how people are using Union Catalogues. Does everyone know what Union Catalogues are? What we've done so far is to ask people to use various services and then ask them questions about their experience. The aim of today is to find out the views of library staff. Possibly use the trade union bit to introduce. Encouraged to be concise with the constraints of getting point across, to be as specific as possible and to explain why whenever appropriate
- d. Ask group to sign the two copies of the consent forms and explain that they get a voucher for attending at the end...that is to make you stay to the end

Focus group questions

1. Do you use Union Catalogues? Which ones do you use and what do you use them for? How often do you use them?
2. Do you have any views on why library users use union catalogues and which ones they use? Or indeed why they do not use Union Catalogues
3. When you use a union catalogue do you alter the settings to restrict your search to one or more library catalogues? (Is it useful to alter the default 'landscape'? Are you familiar with the term landscape in the context of electronic information services? Do you want to search part of the service or all of it? System defined versus user defined?) Why?
4. What have your experiences of using Union Catalogues been like? Have you had any problems with using them? What problems? Only prompt if necessary. (Access, reliability, error messages, **speed** of search/results etc.) Which features do you like? Which features do you dislike? Are there any features that you would like to see added to the services? Why do you like/dislike particular features?
5. What do you think about the results you get? (How do you deal with a large results set? Do you want combined results from each library, or separate ones for each institution? Do you want to wait for all the results to be complete and have them presented at once, or do you want to have

them shown as they come in? Is ranking important? How do you want the results sorted? By author, title, holding library? Do you want the system to rank / sort your results, or do you want control over this? What about duplicate records?)

6. What do you think about grouping databases by region? Would you like them grouped by other themes?
7. Have you used a Union Catalogue from outside your region? (Have you used a non-local library OPAC rather than using a Union Catalogue?)
8. What do you do about marketing of the various services? (Library inductions, leaflets? Links from library website?) Do you find that users are asking about these services, or want help with using them?
9. Do people want big Union Catalogues? Are there limits to the scope, coverage size of union catalogues which you think catalogue developers should take into account?
10. What do you want to tell us that we have not asked you about?

Thanks for your time and help.

Appendix 6 Summary of changes to RIDING

New features

There is a 'merge duplicates' option.

The user is able to set a 'profile' for their entire session of the libraries that they wish to search.

Screen layout

The search boxes are now at the top of the screen and the list of libraries is below this.

Search options

There are more search options in the drop down menus. There is also a 'power search' available. This is accessed by clicking on 'details' on the right hand side of the search fields.

Selecting the libraries

All libraries are automatically selected. (In the previous version, one or more libraries needed to be selected by ticking the box next to the library name before the search could be carried out. Some searchers had problems with doing this.) Once the user has selected a set of libraries they wish to search this set remains selected for the entire session, unless the user decides to alter it.

Library catalogues

LMU is now a separate library catalogue.

The appearance

There is less 'flashing' of the screen, as the page does not seem to continually update itself. This flashing was something that a number of the searchers had disliked.

The status bar at the bottom of the screen no longer includes the number of hits from each institution and is therefore smaller. This means that the user no longer needs to scroll sideways to see the 'missing' information. Having to scroll sideways was something that searchers had found annoying.

The colour scheme is no longer bright red and green but is much less garish, using dark red, beige and white, with navy blue for the links.

The results page

The results page now shows the date of publication of the item. The lack of this in the previous version was something that searchers had found frustrating.

Feedback messages

When the search is being processed the user gets a feedback message to say 'waiting for details to be returned' with a moving magnifying glass image. The previous version had a feedback message 'please wait while the page updates.' Some searchers commented that they were not sure what was happening with the previous version and did not know when it had finished updating.

Terminology

Something that has not changed is the use of the term 'super search' for the advanced search option. This confused some searchers, as they were used to the term 'advanced search'. In the previous version the status bar had a link to 'advanced search' even though RIDING called its advanced search option 'super search'. This meant that the same search option was referred to by two different terms, which could be confusing. This 'advanced search' link, however, had enabled some searchers to find the advanced search option that they had previously missed on the first page because they did not expect it to be called 'super search'. The link to 'advanced search' does not appear in the latest version.

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