



CURL Study of the OCLC/Lacey iCAS Software

External Evaluator's Report

Final Report of the RSLP SCONE project
Annexe A.3

1. The Context of the Study: Collaboration is now a Necessity

Co-operation in the provision of information resources and associated finding aids has become essential as well as desirable. Increasingly, the 'collections' required to meet the needs of researchers are geographically distributed - regionally, nationally, even globally. Accordingly, information managers aiming to meet these needs must themselves co-operate beyond institutional boundaries. Distributed networked collections need collaborative management if they are to meet the needs of users in a cost-effective fashion, and they need collaborative standards-based description if they are to be findable as and when required. Coherent distributed virtual 'libraries' won't just happen – practitioners must co-operate to manage the distributed collections and the associated user retrieval environments. To do so they need reliable standards-based tools that facilitate the objective analysis of both institutional and inter-institutional collections, and that do so, for preference, through automated methods that minimise the commitment of expensive staff time that might otherwise be required to support such an exercise. The iCAS tool evaluated by CURL in this study offers an automated method of:

- Analysing institutional collections down to item level and mapping the results - via DDC or LC classifications – to the Conspectus subject headings used world-wide to measure and encode collection strength (used in Australia, the US, and Scotland, for example) .
- Providing a detailed subject breakdown of institutional collections over time.
- Identifying areas of inter-institutional overlap or uniqueness.

The study results not only illuminate both the positive features of this method of collections assessment, and its potential and current limitations, but also:

- Show how results might be improved through future action on metadata interoperability and other areas.
- Highlight the importance of other ongoing UK work in the field.
- Identify areas where additional research is needed to take the collaborative collection development agenda forward.

As such, they should help inform the development of a UK-wide collection mapping strategy, compatible (as it must be) with international work in the area.

2. Automated Collection Mapping: The Requirement

Collection mapping data is potentially valuable as management information to support:

- Efficient institutional, inter-institutional, regional, national, and international collection management policies and practices.
- The provision of effective and reliable guidance for users and potential users of both institutional and distributed collections.

In Scotland, for example, data from a SCURL inspired Conspectus based exercise carried out in the mid 1980s in the eight older universities and the two main public libraries in Edinburgh and Glasgow, and updated and added to on an ongoing basis since then, is used to:

- Guide users either to strong individual teaching, research or comprehensive collections in particular subject areas under the Conspectus scheme and link them to the appropriate online catalogues to search for specific items of interest, or to groups of geographically distributed subject collections that can then be cross-searched via Z39.50.
- Support collaborative collection management and development by providing the same facilities for staff to assist them in recording and identifying collaborative collecting responsibilities, gaps in Scotland-wide or regional collections, and potential collaborative partners for closer co-operation in particular areas.

One SCURL concern being addressed by the RSLP-funded SCONE project¹ is that in the past assessments in SCURL libraries have been regarded as too subjective and labour intensive. The project has accordingly been asked to examine possible ways of improving the objectivity of the collection strength measurement process, whilst at the same time reducing the effort and time involved in carrying it out. An examination of the iCAS approach investigated by CURL was outwith SCONE resources, and an attempt to obtain funding failed. SCONE accordingly concentrated on manual methods, and on a theoretical analysis of the strengths and weaknesses of an automated approach, in the knowledge that the costs of an automated analysis would have been regarded by many SCURL libraries as unattractive given other pressures on the local purse. SCONE, which reports in May 2002, has concluded that objectivity and low labour intensity is best achieved in SCURL libraries through:

- A short to medium term programme based on informed professional judgement. This to be constrained – in the interests of objectivity - by informal peer review and a functional focus on user navigational and discovery needs and staff local and collaborative collection development needs. Online interaction, mediated through the SCAMP collection management portal, would mediate this process.
- A linked gradual progression towards an increasingly automated approach in the longer term, this being regarded – potentially at least - as a key element in any future approach to reducing effort, improving objectivity, and enhancing staff tools for collaborative collection development on the one hand user facilities for accessing strong collections on the other.

The recognition of the potential importance of the automated approach reflected in this latter point is a direct result of examining the work of the CURL iCAS study in the light of a SCONE analysis of the strengths and weaknesses of an automated approach.

3. The Potential and Problems of an Automated Approach

The outcome of this examination is presented in tabular form in Appendix A. This charts:

- 3.1** The optimum position possible with regard to the extraction of collection strength data as determined through the SCONE analysis.
- 3.2** The current position in respect of the capabilities of the iCAS software and the metadata situation in the UK, as evidenced by the CURL study libraries and the libraries in CAIRNS.
- 3.3** The implications of a comparison of the two.
- 3.4** Implied actions required to improve the situation ('Solution Paths').
- 3.5** Additional relevant comments.

The results of the analysis charted in the table support the following conclusions:

- a. Automated methods offer the potential of providing a wholly objective means of measuring most aspects of the idea of collection strength from item level metadata, although:
 - i. Some aspects such as the 'significance' of a collection may always entail the need for human assessment may always entail the need for human assessment.
 - ii. The success of any automated method is dependent on the quality of the item level metadata available, the percentage of the collection that is catalogued, the data elements recorded in each item level record, the relevance of these data elements to user and staff needs, the compatibility of the metadata with the automated method in question (e.g. whether or not an iCAS compatible classification scheme is employed), and a number of other factors.
 - iii. Objectivity depends not just on objective methods of measurement, but on objective description, and an understanding of the limits of what may be inferred about the

¹ See <http://scone.strath.ac.uk/>

collection from the element measured (e.g. a numerically large research collections may be a 'strong' collection to a researcher but a 'weak' collection to a learner).

- b. Assessing the value of automated methods in general, and of the iCAS approach in particular, requires an examination of a number of factors not associated with the efficacy of the approach in respect of objective measurement. These are mainly associated with costs and needs and include:
 - i. The cost to the institution or group of institutions of employing the method concerned.
 - ii. Whether the cost is within the means of the institution or group concerned.
 - iii. The extent to which the requirement in terms of the needs of users and collection managers is understood in detail
 - iv. The extent to which the requirement is met by the method in question
 - v. The extent to which benefits are seen to justify costs, regardless of whether the costs are within the means of the institution or group

Very little hard and reliable information is available on these various factors. However, it is likely that there would be a split in UK libraries between those willing and able to fund an iCAS approach and those opting for a non-automated approach such as is proposed by SCONE in the short term.

- c. The iCAS approach is of potential value now to libraries whose collection is entirely covered by its online catalogue, or where collections not covered are readily susceptible to human assessment. However, all of the various points noted at (a) and (b) above are also a consideration, and may in many cases be a major one. Its value to groups such as CURL depends to a large degree on its value to individual CURL member institutions, although the fact that a group like CURL has a co-operative focus presumably tends to mean that the importance of measuring collection strength is itself increased for CURL member institutions.
- d. It is possible in the longer term to envisage collection strength measurement being carried out automatically by local library management systems at marginal cost to institutions. This would require:
 - i. Good, complete, cross-compatible metadata that entailed elements such as class number, subject, research or teaching code, language, location, access category, unique item identifier.
 - ii. A collection strength index incorporating these elements at each of a number of institutional catalogues or, in cases of systems like COPAC, at a central site.
 - iii. Interface mechanisms to allow staff and users to search or cross-search the indices and interact intelligently with the data in the indices.

This approach would not only be low-cost (assuming good metadata) but would provide largely objective, up to the minute information, in contrast to the (current) iCAS approach which is (perforce) based on relatively infrequent snapshots. Strength in this scenario would be measured by numerical strength within categories such as research or teaching. Collections with low numerical strength but containing unique items would be evident, although elements such as the 'significance' of a collection would require subjective professional judgement.

- e. Further research is required with a view to determining:
 - i. The exact requirements of funding bodies, institutions, inter-institutional groups, collection managers, and users in respect of collection strength measurements.
 - ii. Which elements of collection strength can be objectively measured and which must always entail subjective judgement.
 - iii. How these may best be measured and any limitations on what we may legitimately infer from them as regards the strength of the collection in question.

- iv. Whether, given the actual requirements identified through e(i) above, there is a significant difference between objectively measured strength assessments and those based on (subjective) professional judgement.
 - v. Comparative costs of at least four approaches to measuring collection strength (iCAS, the library management based system suggested in this report, Conspectus, and the proposed SCONE alternative), and an assessment of costs against benefits of each in a variety of circumstances (e.g. for CURL, for SCURL, and for the DNER, where legacy metadata problems are probably more manageable).
- f. The outcome of this research may show that there is one best short term method for all and one best long term aim. More likely, however, it will show that, in the short to medium term, different approaches are sensible in different circumstances - the SCONE approach, iCAS, or, possibly, where problems with legacy metadata are minimal, the collection index based approach suggested at (d) above.
- g. Problems with legacy metadata are a barrier to advancement in this area, as in so many others.

4. Summary and Recommendations

There is value in pursuing the goal of an approach to collection strength measurement that is either wholly or largely automated. Some institutions (such as Hull University in the present study) may already be in a position to take some advantage of it through iCAS, and this may also apply to some inter-institutional groups, but for most institutions and groups in the UK, there is much work to be done before the potential of an automated approach can be fully realised. Taking this work forward requires research work in various areas, undertaken with a view to informing the development of an agreed collection mapping strategy and collaborative collecting programme. This should be co-ordinated at UK-wide level but should probably be based – at a sectoral, regional cross-sectoral, or special interest (e.g. research interest) level – on smaller groups with a track record in the area such as CURL and SCURL. It is important that it be based on consensus and be as inclusive as possible, and that it therefore recognise the weaknesses of the automated approach in the current situation, whilst at the same time, aiming to make it the future basis of the strategy.

The automated approach has great potential, offering the long-term possibility of objective measurement, marginal costs, support for deep resource sharing, immediacy of collection 'strength' data, and a much improved service to users, but it also entails major implications in respect of what will be required of institutions before this potential can be fully realised. It should, for example, be possible one day for staff and users to have access to a 'clump' of cross-searchable collection strength indices based at COPAC, the National Libraries, and members of CAIRNS, M25 and RIDING. These indices could be built automatically at marginal cost by library management systems operating in real time as institutional cataloguers added records, could offer up to the minute data to both users seeking materials and staff engaged in deep resource sharing, and could theoretically allow filtering for uniqueness (regardless of numerical strength), language, research or teaching code, location, access category and other relevant elements. As with other automated approaches, however, full functionality will only be possible if institutions are willing to undertake significant long-term work on metadata, if common classification and subject schemes are adopted, if institutions will add additional collection strength data to item records, if they will pay for the creation and maintenance of associated indices, and so on. Exactly how the distributed index described above would be designed, and what the specific implications for institutions would be requires more detailed work as described below under 'Recommendations'. There may be value in considering examining this approach in the arena of e-resources in the first instance, there being less of a problem with legacy metadata in this area.

It is possible, of course, that there are various intermediate solutions that will entail less in respect of requirements on institutions, and that one or more of these may be found attractive because of this, despite a likely reduction in the value and accuracy of the data. Improving iCAS algorithms for mapping materials classified against a non-iCAS scheme or not classified

at all to an iCAS scheme may be one such approach. Equally, it may be that such a reduction is acceptable in some cases where data accuracy is sufficient to meet requirements and the method employed is cheaper than a more accurate assessment would be. Determining the number and precise nature of such intermediate solutions is beyond the scope of this evaluation, however. Again, these would be drawn out by the way forward proposed below under 'Recommendations'.

Recommendations

4.1 Aim to build a consensus on a UK-wide collections mapping policy, this to be based initially on a mix of automated and non-automated methods but to have the long-term goal of optimising the use of automated methods where these are the most cost-effective and affordable option

4.2 Inform this process by funding research into the issues listed below, either through a single project or through a co-ordinated group of projects:

- Research on actual requirements of funding bodies and policy makers, inter-institutional groups (like CURL, SCURL, M25, RIDING, CALIM), institutions, collection managers, and users in respect of access to materials and resource sharing, and on the best way of building these into either automated or non-automated assessment methods, bearing in mind the various elements drawn out in the table in Appendix A.
- An examination of alternative manual and automated approaches to meeting these requirements, their limitations, and the best means of overcoming these. This to include an examination of costs against benefits in relation to each approach, involve OCLC, system vendors and open source experts, and include a consideration of a UK-wide deal with OCLC iCAS.
- An examination of associated requirements on institutional policies and practices and of the practicalities and value of implementing these as widely as is necessary in UK institutions, taking into account considerations such as the metadata creation and maintenance requirements of a particular approach.

One possible approach would be a research project that seeks to combine the 'constrained professional judgement approach' recommended by SCONE in Scotland as an approach to existing collections and an automated approach based on distributed indices for newly acquired materials. Comparing this with an iCAS based approach would permit research into the various elements outlined above but only require 'full disclosure', adopting a single scheme, adding additional metadata elements, and so on, in respect of newly acquired material. Possible participants would include CURL, SCURL, M25, RIDING and CALIM institutions, the DNER and the RDN. DNER and RDN might have an interest because of the possible usefulness of distributed collection strength indices as a means of allowing users to navigate the JISC Information Environment.

4.3 Determine at the end the best way forward in respect of a UK-wide policy, bearing in mind all of the following:

- The requirement of all of the key stakeholders, including funders and users
- The implications of a particular approach in terms of institutional and inter-institutional practices (e.g. the need to do things such as implement Full Disclosure, adopt a common subject scheme, agree and apply common standards generally, build new indices, do deep resource sharing, agree relevant inter-access policies, and so on)
- The likelihood that institutions will implement and maintain these practices over time, given staffing and funding implications and other relevant consideration.

| Appendix A | | | | |
|--|--|--|--|---|
| Optimum Position | Current Position | Implications | Solution Paths | Additional Comments |
| All items in all collections catalogued and online; none have cataloguing backlog when collection strength measurement snap shot is taken. | This is not true of most collections in the UK and it is often the older, most important collections that are not catalogued, a fact reflected in the figures from the CURL study. | Manual work needed to complete the assessment; this likely to be of variable level across the institutions; resultant reduction in objectivity and increase in costs over automated costs. | A gradual move towards complete inter-compatible catalogues of all materials at all UK sites; Value in considering e-materials separately to obtain earlier improvements in metadata in e-materials. | Automated analysis likely of most value currently to libraries like Hull with 100% online catalogues, or those with only easily assessed older collections offline; Whether costs within budget a factor. |
| Individual items are distinguished not just by subject, but by other criteria are <i>known to be</i> needed by users and staff (e.g. whether teaching or research, what language, intended use, current or historical subject relevance etc.). | There is little or no machine processable data of this kind in records of items in either the CURL iCAS study or elsewhere, and more information is required on actual user and collection manager needs, particularly in respect of collaborative collection development initiatives. | Automated methods can indicate that collections are numerically 'strong' but users and staff likely to need to know specifics - e.g. a user seeing a 'strong' research collection may be misled by a 'strong' coding based on a general count. | Research on actual user and collection manager requirements and on the best way of building these into automated assessment (e.g. by libraries coding particular class mark ranges as mainly bought for research or for teaching or both). | If the main function of a collective is to build and promote the use of members collections mainly for either research or teaching, but not both, this element is less of a problem (improvements still required, however). |
| Analysis software can breakdown based on these additional characteristics; same descriptive terms used for these by all and chosen to convey limits of usefulness objectively. | Online catalogue data does not usually entail the terms, iCAS software cannot use them, there is no gauge on limits of usefulness, and no data on how best to ensure objective description. | Manual assessments may in some cases provide better guidance currently to users and staff if methods of ensuring objectivity of these are first agreed and then applied consistently. | Research as described in the column above, but taking the points made here into account; software developments to allow new data to be reliably extracted. | Numerical assessment is objective in the sense that it counts exactly what it counts. However, this objectivity can be lost if data is then interpreted subjectively or described in a way that implies this. |

| Optimum Position | Current Position | Implications | Solution Paths | Additional Comments |
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| Collection analysis software allows unique material to be highlighted even in small collections, preferably based on a unique identifier such as ISBN so that users and staff can tell if numerically weak collections have unique material. | iCAS provides uniqueness data, but not to title level and likely to be affected by accuracy of comparison algorithms and of problems noted elsewhere in this chart (such as differences in metadata standards). | Uniqueness data should be recorded and made available to users and staff; some manual evaluation of automated uniqueness assessment is probably advisable. | Inter-compatible metadata using unique identifiers in all cases and software functionality able to show uniqueness accurately at title level based on unique identifiers. | In an ideal world this would be 'up to the minute' information, available to users and staff soon after a new unique item was added to a collection. |
| Collection analysis software can indicate numerically small but significant strengths. | iCAS shows uniqueness but not significance; metadata does not record significance; significance requires human assessment. | Some non-automated assessment will always be required for this, but uniqueness measures at least alert users and staff to check for significant material. | Needs agreed definition of significance; agreed method of describing and recording it; software that can process the metadata. | Given that manual assessment a requirement here, a simple staff coding that indicates significance may be sufficient and can be assigned without automation. |
| All libraries use one version of an iCAS compatible classification scheme for collections and items, apply it accurately 'as is' to all items at appropriate agreed granularity level, apply the same number to the same item, form and record the number correctly, update the scheme frequently. | As HILT ² has shown, a wide variety of schemes are in use across the UK, there is currently no standardisation of approach even where the same scheme is used, some use no scheme, or a scheme that is not iCAS compatible, some do not apply the scheme to all items. | Automated methods will not be applicable to all libraries and will entail a (currently incalculable) margin of error that will require manual intervention at a local level and that will make inter-institutional comparisons suspect. | Adopt a common subject scheme and apply it in a common way to all items everywhere ³ ; have common training scheme; perhaps investigate whether it is possible to usefully gauge margin of error in current situation based on things like % of stock covered; edition differences etc. | This is a major barrier to the use of automated methods in or across libraries who fall short of the situation described under 'optimum position' in this row and, hence, a significant difficulty for the use of automated methods in the UK as a whole. |

² See <http://hilt.cdjr.strath.ac.uk/>

³ Or, at worst, a scheme entailed in any inter-scheme mapping solution agreed in HILT Phase II.

| Optimum Position | Current Position | Implications | Solution Paths | Additional Comments |
|--|---|---|---|--|
| Data gathered beneficial and relevant to both users and collection managers. | Data on actual requirements of users and staff in respect of collection analysis and mapping is sparse at best. | Unless we know in detail what we want to do with collection analysis and mapping data, we cannot readily assess what data we need, how it may best be gathered, and how much effort and expense it is worth committing to it. | Conduct research to determine - in respect of all levels of user and all types of institution - what the requirement is, taking into account a range of factors, but including the view if users, staff, institutions, inter-institutional bodies like CURL and SCURL, and funders and national policy makes. | A major issue of high priority - should be tackled at an early stage. |
| Total cost is within the means of all participants. | Not known in detail, but cost of automated mapping through methods such as iCAS would probably be regarded as too high by many. | More information is required, but the long-term possibility that data of this kind might be automatically available from local library systems should be investigated. | Research the requirements in respect of having this kind of data available from library systems; talk to system vendors about the best way to implement this. | There is no reason why, in the long term, up to the minute information of this kind should not be available a marginal cost in both central systems like COPAC and distributed systems like CAIRNS, RIDING, M25. |
| Benefits outweigh costs, even if cost within budget. | Not known, but clearly a consideration. | Time, effort, funds spent in this area should focus on research to minimise the potential for waste caused by lack of hard information. | Requirements analysis should consider costs against benefits as a factor. | Could make the 'minimalist' SCONE approach best in the short term. |

| Optimum Position | Current Position | Implications | Solution Paths | Additional Comments |
|---|--|--|---|---|
| It is measured against a baseline such as WorldCat and the baseline itself covers all publications in all countries, all cultures, all languages. | This was not done in the present study, but if the aim is to alert users and staff to the strengths of UK collections in a global context, and of the need to look elsewhere for materials in some instances, then it is a key element for the future; Even WorldCat would not claim the ideal level of comprehensiveness. | Users and staff may know collection weaknesses and strengths in relation to the collections of participants but will be unaware of whether material elsewhere is worth pursuing. | Aim for a global approach as far as possible (e.g. all major research libraries world-wide); include a comparison with major databases like WorldCat if possible. | Requirements and cost-benefit analyses relevant here. |
| On order items included. | They are not included. | Early classification estimate. | Include on order items. | Importance depends on depth of resource sharing. |
| Only items in collections accessible to the user who is searching are shown in strength measurements for individual users. | Not directly available through automated methods but could be. | Useful for users to see strengths even if they can't have access but also useful for users to know they can't have access. | Include accessibility data; determine best way of approaching this. | Not of major importance but useful to the user. |
| There is a flexible approach to age analysis. | Level of flexibility unknown. | A single approach may not be useful to all. | Age data should be recorded in raw form to allow maximum flexibility. | Level of need for flexible approach requires examination. |
| Apply different class numbers for items covering more than one subject area. | Not known but probably not widely applied. | Unknown, may or may not have significant bearing on strength measurements. | Determine how significant this is; apply in future if it is significant considering both costs and benefits. | Possibly not a major issue but should be examined to confirm. |

| Optimum Position | Current Position | Implications | Solution Paths | Additional Comments |
|---|--|--|---|---|
| <p>The objectivity of the data is not undermined by the claims made.</p> | <p>Numbers are objective in the sense that they measure what they measure. Noting that three collections have 100, 200, and 300 items is objective, indicating that the third of these is a 'strong' collection may not be - e.g. strong in relation to what, for whom, for what purpose are considerations.</p> | <p>Objective measurement methods can be undermined by subjective approaches to description.</p> | <p>Determine what can be measured objectively, how it can best be objectively described, and what the limits of its use are for both users and staff.</p> | <p>An important aspect of a requirements analysis.</p> |
| <p>Title matches are of a very high accuracy.</p> | <p>Level of accuracy in iCAS unknown.</p> | <p>Overlap and uniqueness measures flawed if not.</p> | <p>In the long term, a unique identifier for every item.</p> | <p>Manual methods cannot normally provide this level of detail at all so automated methods best here already.</p> |
| <p>Up to the minute data on strength, overlap, and uniqueness allowing access down to individual and identifiable titles across all participating institutions.</p> | <p>Even iCAS can only offer occasional (and relatively expensive) snapshots at a given point in time and does not provide title level information on overlap and uniqueness.</p> | <p>iCAS data insufficient in itself to support implications of 'deep resource sharing' for either staff practising it or users living with it. The long term aim should be something better.</p> | <p>Aim long-term for cross-searchable 'collection strength' indices at each participating institution, these to include subject, unique identifier, language, research or teaching code, location, access category.</p> | <p>With Z39.50, this could be done now given the existence of appropriate and inter-compatible metadata at participating sites - as ever, the problem is in (or not in) the metadata.</p> |