

# Performance Measures for 21st Century Libraries

Peter Brophy, Director

Centre for Research in Library and Information Management (CERLIM),  
The Manchester Metropolitan University, U.K.

The purpose of this paper is to review European Commission funded performance measurement studies and in particular to report briefly on the outcomes and lessons of the EQUINOX project. Based on this experience and other research in CERLIM, the paper then goes on to examine some models that may be useful in developing our understanding of libraries in the 21st century. Finally some examples of the types of library performance indicators, which might be applied in the future, are suggested.

“Librarianship is a curious profession in which we select materials we don’t know will be wanted, which we can only imperfectly assess, against criteria which cannot be precisely defined, for people we’ve usually never met and if anything important happens as a result we shall probably never know, often because the user doesn’t realise it himself.” (Charlton, quoted by Revill, 1985)

## European Commission Performance Measurement Projects

Although the European Commission (EC) had shown interest in the development of performance measurement for libraries as early as the late 1980s, the first significant EC-funded study was one led by De Montfort University in the UK under the title PROLIB-PI in 1994-95 (Ward *et al.*, 1995). The study analysed previous research into performance measurement for libraries, including work by Nancy Van House, Charles McClure and others, and drew up a consolidated list of performance indicators and the datasets needed to calculate them. It was particularly useful because it helped participants in the four subsequent major EC-funded library performance measurement projects – EQLIPSE, DECIMAL, DECIDE and MINSTREL – to focus on developing from a reasonably common, and reasonably advanced, starting point. The four projects were part of a Programme entitled, rather inelegantly, *Telematics for Libraries*, which had an overall aim of advancing Europe’s competitive position by the innovative use of information and communication technologies (ICTs) – the EC maintains a web site of information on the programme (European Commission, 2001a). A major focus of each project was therefore on the development of software tools which could assist library managers in applying performance measurement. However, because EC-funding is for ‘pre-competitive’ development (i.e. it should not give one developer a competitive advantage over others), it has subsequently become apparent that

the effort needed to bring such software beyond the pre-prototype stage to ‘shrink-wrapped’ product is too large for independent commercial exploitation in what is a small and specialised market.

The results of the four projects were subsequently used in a ‘Concerted Action’ called CAMILE. These Actions are funded by the EC in order to raise awareness of issues and provide a forum for discussion. CAMILE delivered a series of expert workshops across Europe, and was successful in bringing the whole issue of performance measurement to a much wider library audience than hitherto.

In the next Call for Proposals from the EC just one project was selected for funding. This was EQUINOX (the name is not in fact an acronym since it has no longer form, but was chosen to indicate continuity with EQLIPSE – which stood for *Evaluation and Quality in Libraries: System for Europe*). EQUINOX, unlike its predecessor projects, focused attention on the development of electronic library services. Again, it was part of the *Telematics for Libraries* Programme, so software development was also to the fore. There has been more interest in commercialising this product, although negotiations are still ongoing. The project made progress in four areas:

- the EQUINOX software product itself (illustrated in Figs 1 and 2);

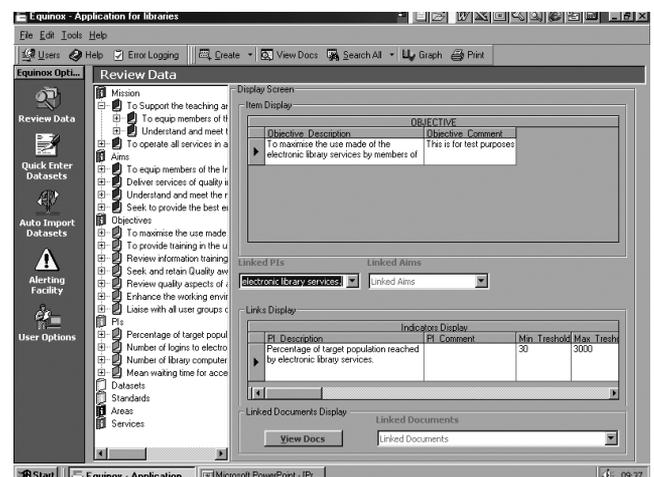


Fig. 1: The EQUINOX Software System, illustrating the hierarchy of mission, aims, objectives, performance indicators and datasets

- the publication of an XML DTD designed to resolve interoperability issues between heterogeneous library & information delivery systems and decision support systems like EQUINOX;

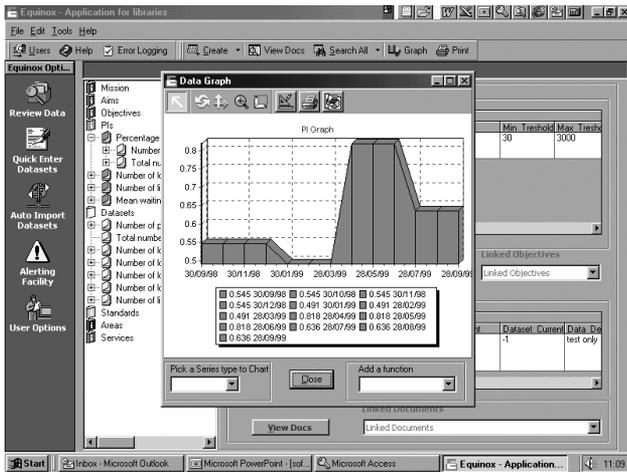


Fig. 2: The EQUINOX Software System, illustrating data display capabilities

- the promotion of quality management approaches. Unlike EQLIPSE, EQUINOX promoted a generalised approach which was not tied to the international quality management standard ISO9000;

- the development of international consensus on a set of performance indicators for the electronic library. In this aspect the project aligned itself closely with ISO activity in the field.

Only the last of these is considered in this paper.

### The EQUINOX Performance Indicator Set

As part of the project, EQUINOX convened a number of meetings and project staff held both formal and informal discussions with librarians from all sectors and from across Europe. We also maintained liaison with the work being undertaken by McClure and Bertot in the United States. A draft set of performance indicators was produced in early 2000, and this was refined in further discussions. By the formal end of the project, in November 2000, the set had been reduced to 14 indicators. These are shown in Fig. 3.

1. Percentage of the population reached by electronic library services
2. Number of sessions on each electronic library service per member of the target population
3. Number of remote sessions on electronic library services per member of the population to be served
4. Number of documents and entries (records) viewed per session for each electronic library service
5. Cost per session for each electronic library service
6. Cost per document or entry (record) viewed for each electronic library service
7. Percentage of information requests submitted electronically
8. Library computer workstation use rate
9. Number of library computer workstation hours available per member of the population to be served
10. Rejected sessions as a percentage of total attempted sessions
11. Percentage of total acquisitions expenditure spent on acquisition of electronic library services
12. Number of attendances at formal electronic library service training lessons per member of the population to be served
13. Library staff developing, managing and providing ELS and user training as a percentage of total library staff
14. User satisfaction with electronic library services

Fig. 3: The EQUINOX Performance Indicator set

The later stages of EQUINOX involved 45 libraries across Europe in the testing of the software tool and of the performance indicator set. Not all libraries were able to gather datasets for all indicators, although all tested some and their experiences with the software tool were uniformly positive. The full results of this work have been published in the project's formal reports, which are available from the web site (EQUINOX, 2001).

Among the key issues identified from these trials were:

- there is an ongoing tension between demands for performance indicators which describe the situation as it now is, and for those which describe newly emerging services. Because we were aligned with ISO practice, there was pressure to develop indicators which were applicable in the majority of exist-

ing libraries, rather than to move towards entirely new indicators. For this reason, the EQUINOX indicators are designed to be the 'equivalents' of established indicators for traditional services.

- from its inception, EQUINOX had taken the view that data collection should wherever possible be automated; indeed this was the motivation for the XML DTD development. However, as had been found in EQLIPSE, library systems are capable of providing only a small fraction of the required data. Much of the most interesting and valuable data cannot be collected in this way - user satisfaction is one example. The balance between using what is available - an example might be number of log-ins - against expensive manual data gathering - interviewing users to find out *why* they log in (and why they don't) - is not an easy one to achieve.

- the perennial problem of just what should be counted occupied a considerable amount of our time. This issue had been rehearsed in CERLIM's earlier work for the UK eLib Programme, and it is worth quoting from that report:

"use of electronic services could be measured by reference to *connect time, number of sessions, number of concurrent sessions, number of hits, cost, number of active users* or a variety of other factors. Care has to be taken with each of these possibilities, since it is possible that each could be affected by irrelevant and indeed uncontrollable variables. For example, *connect time* may well depend on network response times outside the control of the individual library, while *number of hits* could be drastically curtailed if a cache came into use." (Brophy and Wynne, 1998)

As in that earlier work, consensus was reached on the use of *sessions* as the basic unit, but of course this remains a controversial issue, not least because of differing definitions of session boundaries.

- there are considerable difficulties with interpretation of data and indicators. For example, while there was consensus that an indicator such as "Number of library computer workstation hours available per member of the population to be served" was needed, there was less agreement on its interpretation. For a university such as Carnegie Mellon in Pittsburgh, for example, which has recently announced that the campus is now fully wireless, such an indicator is all but meaningless.

- most importantly, these discussions and debates raised the most fundamental issue of all - just what is a library in the networked age? What should its role be? How is it related to other information providers, aggregators and intermediaries? When we attempt to measure its performance, how do we relate its contribution to the broader environment - of learning, of commerce, of leisure?

### What is a library in the 21st century?

The networked environment is not simply another issue for librarians to address. It changes fundamentally the whole business in which they are involved. Just a few of the impacts are:

- *Information plethora*: we have moved from a situation of information poverty, where people had to search hard, and needed expert help, to find the information they needed, to one of multiple sources competing for attention coupled with information overload. Far more than in the past, the role of the information intermediary will be to filter and select - to provide *less* rather than *more*.

- *Unstable information objects*: a large proportion of the world's information is now inherently unstable. Unlike print on paper, which has a reasonable life and in any case is held in multiple copies in distributed storage, electronic objects often exist in only one copy, and that copy is changed on a whim. There is no certainty that if I give you a URL the object you discover will be the one I viewed - assuming there's anything there at all. More and more objects will be created dynamically on demand, so that no two copies will be identical. This situation is entirely different from that which drove the development of traditional libraries.

- *Quality of content is patchy and often unknown*: it is far more difficult than in the past to judge the reliability and authority of any information object. Now that self-publication is so easy, the mechanisms which provided quality assurance of information are breaking down. Libraries have held a clearly understood place in the information chain in the past, but if that chain is shattering, what will their future role be?

- *Services are technically heterogeneous*: there are thousands of different information services available for access by libraries and their users, but they are not like books, which could be shelved, conveniently (even if a special 'Oversize' section were needed) in straightforward sequences. They use a wide variety of access protocols, hold data in different formats, respond differently to the same request and

the results they return are frustratingly difficult to integrate into a single service. This is a huge challenge for anyone wishing to use a wide variety of sources to deliver information services.

- *Metadata is haphazard and semantically confused*: in a world of almost endless information resources, description is all-important and offers the key to effective selection of resources. Yet only a minority of information objects have useful metadata, and even where this is structured it is often semantically confused or ambiguous. Libraries prided themselves on the quality of their catalogues – how do we reproduce this quality in the networked information world?

- *Users think they don't need intermediaries*: there is a growing body of evidence that students rarely use library interfaces in their search for information, preferring to go straight to an Internet search engine (in the UK the preference seems to be for Google – at least this is a preliminary finding of CERLIM's EDNER project, described later). They want some information on their topic, not a comprehensive list; the best is unnecessary if a 'good enough' resource can be found quickly and easily. How do services which pride themselves on the quality of their product market themselves to achieve survival in this environment?

- *Client access is pervasive and will soon be universal*: although the library has an important role in providing access to IT hardware and software at present, this can only be a transitional phase. Internet access via TV sets and mobile devices shows the likely trend. Before very long virtually everyone in developed countries – and this is not to deny the very real, but different, issue in less developed regions – will have Internet access at home or at work or on the move. In time – and the time period will not be all that long – Internet access will be as universal as telephony.

These are merely examples of the issues that we face, but they indicate the scale of the challenge. A step towards meeting that challenge will be to rethink our concepts of what libraries are for and what they do.

## Five models of the Library

### MODEL A: THE TRADITIONAL LIBRARY

This is the library with which we are familiar. It features:

- A physical building which, through its architecture and interior design, is a statement about the values of the institution or community that owns and sponsors the library service.

- Bookstock: carefully selected titles which are organised and presented to meet the likely needs of users.

- Journals and newspapers, enabling users to keep up to date with their areas of interest.

- Inter-library loans, extending the reach of the library beyond its own walls and stock.

- Reference services, designed to provide answers to the questions users pose.

- Friendly and knowledgeable staff, who are the approachable face of the library.

- A welcoming atmosphere, perhaps taking a leaf out of the bookshops' book by including a modern coffee bar and comfortable seating.

It is important that we do not lose sight of the advantages of this model of the library for the future. People will still need physical places, they will almost certainly want to use some kind of individual, physical information objects for some purposes and they will value the expertise of trained and knowledgeable staff who can help them with their enquiries.

### MODEL B: THE MEMORY INSTITUTION

In Europe there is an increasing emphasis on the library as a 'memory institution', a body – along with museums, archives, galleries etc. – with a responsibility for maintaining humankind's recorded memory. As Dempsey *et al.* (1999) have written:

“Archives, libraries and museums are memory institutions .... Their collections contain the memory of peoples, communities, institutions and individuals, the scientific and cultural heritage, and the products throughout time of our imagination, craft and learning. They join us to our ancestors and are our legacy to future generations. They are used by the child, the scholar, and the citizen, by the business person, the tourist and the learner. These in turn are creating the heritage of the future. Memory institutions contribute directly and indirectly to prosperity through support for learning, commerce, tourism, and personal fulfilment.”

In this description we have another model, which has a resonance with established library activity, but expressed in a different way and starting to pose some interesting challenges. While national, major academic and other libraries have taken on the role of preserving (mainly textual) heritage in the past, the commonalities with the broader 'memory institution' arena have not been explicit. Emphases on conservation and preservation, on bibliographic description will remain important. To these may be added the museum sector's expertise in interpretation.

The challenge of this model, of course, lies in its extension to the world of digital objects. So much of mankind's memory is being lost that a new emphasis on concerted efforts to preserve, conserve, interpret and make available the historical record is vital. This will take individual libraries away from their sole concern with "their" holdings into community-wide efforts to find collaborative solutions. As this happens, the role of the library will be redefined.

#### MODEL C: THE LEARNING CENTRE

Governments throughout the world are giving ever-increasing emphasis to education and lifelong learning, in recognition that a skilled and educated workforce is a prerequisite for economic well-being and prosperity. Libraries have recognised that, since information resources are crucial to education, they have a contribution to make. It is unfortunate, however, that their rhetoric is sometimes divorced from the reality of the role that they can realistically play. In the UK, for example, there has been talk of the public library as a 'street corner university'. Such sound-bites display a view of the library which is not only unrealistic but potentially damaging to the co-operative relationships which offer a real way forward. Libraries certainly have a role to play in education, but the model of the library as learning centre, in a networked world, needs much more rigorous analysis than has been undertaken so far.

The issue may be illustrated by reference to a report prepared for the *Formative Evaluation of the Distributed National Electronic Resource* (EDNER), a major UK project that CERLIM is leading (EDNER, 2001). EDNER is funded at approximately \$1 million over 3 years and is examining in depth the development of national-level higher education information services in the UK. Our partners in this work are educational researchers in the Centre for Studies in Advanced Learning Technology (CSALT) at Lancaster University. In an early contribution to the project (Goodyear, 2001), the CSALT team noted, in examining development projects designed to extend the use of networked information resources in learning and teaching, that little attention appeared to have been paid to pedagogical issues. I would suggest that that is a finding that might be applied more widely to libraries' efforts to become learning centres. CSALT's model suggests that attention needs to be:

- paid to pedagogical philosophy, including:
  - the high level pedagogy - the broad approach being taken, such as a belief in a *Problem Based Learning* approach.
  - pedagogical strategy - the planned actions, which enable tutor and learner to share and develop agreement on what is to be done at a general level.

- pedagogical tactics - the detailed level, such as how learners are to be encouraged to participate, how tutors will deal with problems and so on.
- associated with an educational setting in which tutors set *tasks*, students undertake *actions* (and note that the actions are often not the same as the tasks set) and there are outcomes - which are sometimes, but not always, learning outcomes. All of this happens within an educational context, which includes but is not limited to assessment regimes, student tutoring systems and other support, and so on.

Added to these issues we need to explore how the concept of the library as learning centre relates to current developments in the area of virtual learning environments (VLEs) and managed learning environments (MLEs). Clearly there is a great deal of work to be done.

#### MODEL D: THE LIBRARY AS COMMUNITY RESOURCE

The fourth model focuses on the role of the library within its own community. In part this is traditional territory, but a number of developments suggest that it could become more critical. 'Community librarianship' has a long track record and has made important contributions. This role may be more important in a networked world in two ways: partly by offering a human presence when so much else is virtual; partly by helping create community 'glue' in both physical and virtual communities.

One of the limitations of the library's role in this area in the past has been a reluctance to go beyond 'information provision' to the offer of 'advice'. There have been cogent reasons for this reluctance, not least fears over liability if the advice is mistaken, but it does not fit with community needs. Citizens, particularly those who are disadvantaged, do not want to be referred to a book or even a web page, but want help in understanding the possible answers to their problems and queries and in making informed choices. Librarians may need to form alliances with social workers, counsellors and others to provide the kind of integrated service that is needed.

In the networked world, citizens can also become publishers. CERLIM has recently been awarded a major new European Commission project entitled *Cultural Objects in Networked Environments* (COINE) which will seek to create systems that enable local communities to create their own structured information spaces, which might be termed *MyWorlds* (COINE, 2001). This offers a role for expert institutions, at the local level, which can not only point citizens towards information-resources but also help them capture, record and share their own stories. Such interactive systems that pro-

mote involvement may help libraries to secure their future as community resources.

MODEL E: THE INVISIBLE INTERMEDIARY

The final model is perhaps the most important, for it suggests that libraries could forge for themselves a central role in the information society. As has already been noted, the vastness of the ‘information universe’, and its lack of comprehensive organisation, makes information overload and what might be termed ‘information confusion’ serious problems. Organisations are needed which can select from the information universe on behalf of their users – creating their own ‘information population’ by discarding the dross and the irrelevant – and present meaningful descriptions of that information to enable selection and retrieval.

The universe of potential users needs to be treated in the same way: users are ‘registered’ with the service and detailed descriptions are developed. In this case the descriptions will include preferences data, individual interests and so on. In the future the library may need to pay as much attention to maintaining this type of metadata as to that related to information objects – many commercial e-providers already do so.

The library, in this model, acts as an intermediary between user and information, but may be largely invisible – it facilitates meaningful interactions and ‘smoothes the way’ for the user. The model is depicted in Fig. 4, and has been further described in *The Library in the Twenty-First Century* (Brophy, 2001).

An important issue for libraries is that they are not alone in seeking to fulfil this role. Each library is, to some extent, in competition with others and there are many other players in this marketplace. But libraries do

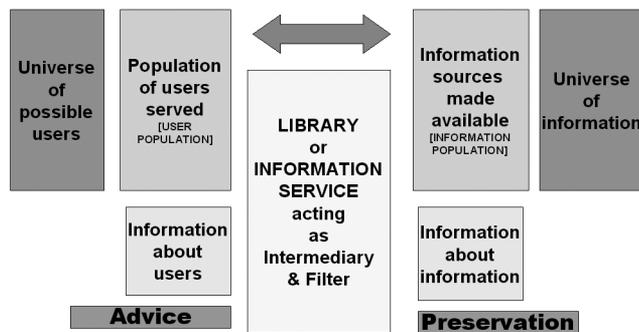


Fig. 4: the Library as Invisible Intermediary

have advantages: they are already trusted as intermediaries, they have vast experience in organising and describing information and they have developed experience of the real issues in the interoperation of heterogeneous information systems in complex environments.

New Performance Indicators for New Libraries

In this final section I want to make some suggestions as to the kind of performance indicators that might be appropriate to the models outlined above. These are no more than indicative suggestions, and much work is needed to define a suitable set, but they illustrate how far we may need to go beyond the performance indicator sets currently available. Briefly:

FOR MODEL A: THE PHYSICAL LIBRARY

We already have a wide range of indicators. As this conference has illustrated, effort now needs to be concentrated on assessing outcomes and impacts, and on quality assessments, which go beyond simple user satisfaction statements. LIBQUAL+ is an excellent example of such work (Cook *et al.*, 2001).

FOR MODEL B: THE MEMORY INSTITUTION

Here we need to assess how well the library is fulfilling the role of preserving and encouraging use of humankind’s memory. We might want to measure:

- The proportion of archival objects, which are archivally secure – conserved in appropriate ways.
- The quality of the descriptive metadata available.
- The number of scholars served per archival item.
- The number of interpretative events (akin to museum exhibitions) per archival item.

FOR MODEL C: THE LEARNING CENTRE

In this case we might want to concentrate on:

- The proportion of ‘events’ designed by or run by the library for which explicit learning objectives exist. (This is akin to the kind of performance indicator that is common in educational institutions, though these days 100% would be required.)
- The proportion of learning outcomes that were successful.
- The proportion of information objects cited in dissertations or essays that were library-supplied.

FOR MODEL D: THE COMMUNITY RESOURCE

Here the concerns might include:

- Market penetration, especially among targeted groups, measured by reference to active participation.
- “MyWorlds” created per member during the last 12 months.
- The user view of the service against its rivals.

FOR MODEL E: THE INVISIBLE INTERMEDIARY

Possible performance indicators might include:

- Personalisation
  - The proportion of users for whom personal metadata has been updated in the previous 3, 6, 9, 12 months.
- Reach
  - A Conspectus-style measure of the extent of sources to which access may be provided.
- Information description
  - The proportion of sources delivered which had 'high level' descriptive metadata.
- Quality of content delivered
  - 'Quality' results returned per query.
- Interoperability
  - The ability to handle the latest versions of all standards (e.g. full Z39.50).
- Delivery mechanism of choice
  - The proportion of cited references in users' papers, which were accessed via library mechanisms.

**Conclusion**

In this paper, I have reported on the state of research and development in library performance measurement in Europe. I have also suggested that we need to rethink the underlying models of libraries in order to find new and relevant performance indicators for libraries operating in the networked world. I have suggested some examples of the type of indicator which may be appropriate.

In concluding, however, I would also like to draw attention to a problem I alluded to earlier but which will loom ever larger, namely the interpretation of those indicators. The issue is best illustrated by two diagrams. In Fig. 5 there is a depiction of our traditional interpretation of library 'goodness' - we assume that the more books issued per user or the more documents delivered, the better the service. This is illustrated by the straight line. But in the networked environ-

ment, Fig. 6 may be more apposite. The library which delivers no documents per user is, we would probably all agree, poor. But so also is the library that delivers very large numbers (indicated by M in Fig. 6) - it is simply swamping its users and overloading them with information. The 'good' library will be somewhere in the middle - indicated by N - for it will have selected the items it presents carefully and filtered out the irrelevant. Operating in such environments will require very careful attention to the real messages that performance indicators bring.

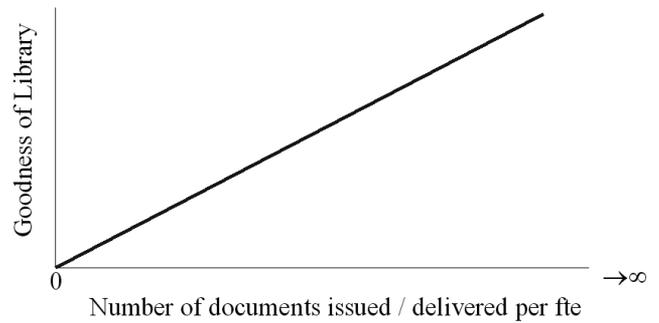


Fig. 5: 'Traditional Library' goodness

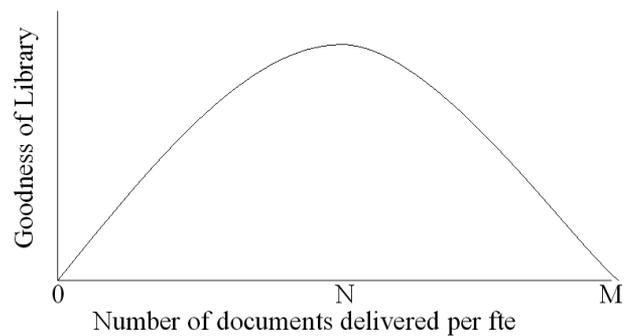


Fig. 6: 'New Library' goodness

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