Commission of the European Communities

Directorate General XIII: Telecommunications, Information Market and Exploitation of Research

Telematics Systems in Areas of Common Interest: Libraries Programme

Project LIB-EQLIPSE/4-3019.3077

EQLIPSE

Evaluation and Quality in Library Performance: System for Europe

Final Report and Final Functional Specification (Deliverable Report 7)

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1. PROJECT OVERVIEW

The EQLIPSE (Evaluation and Quality in Library Performance: System for Europe) project commenced in February 1995 and was completed at the end of March 1997. The Project was funded as part of the European Commission's Libraries Programme and was carried out by a consortium comprising the following partners:

Centre for Research in Library and Information Management, U.K (co-ordinator)
Dynix Library Systems (Ireland) Ltd.,
Dublin City University,
National Microelectronics Applications Centre Ltd.,
Universitäts und Landesbibliothek Münster,
Copenhagen Business School Library
Biblioteca Nazionale Centrale Vittorio Emanuele II
Stockholm University Library
Stadtbüchereien Düsseldorf
University of the Aegean

1.1 Objectives of the project

The objective of the EQLIPSE project was to improve the effectiveness and efficiency of European libraries through the application of IT to quality management and performance measurement. Its overall objective was the production of a fully-tested functional specification for a software 'toolbox' product designed to meet this need in an open systems environment.

The specific objectives of the project were:

- to research the state of the art of appropriate quality management and performance measurement systems and their actual and potential application to libraries, based on recent studies in the field, the participants' own experiences and further investigations of the key issues;

- to specify an EQLIPSE methodology which would conform to the relevant international standards, including both ISO 9000 and the impending ISO 11620 standard on performance indicators for libraries, which would incorporate our research findings, provide detailed guidance on data collection, system management and other relevant features, be compatible with emerging IT trends and products, and provide an open functional specification that can be incorporated into mainstream library IT systems;

- to provide a prototype EQLIPSE system with appropriate quality management and performance measurement tools which can be integrated into a mainstream open, client-server based library IT system;

- to field-test the prototype system at two operational libraries so as to provide detailed testing and experience of its operability and validity;

- from this prototype to develop a standard open EQLIPSE system and to test its implementation in six libraries chosen to provide a wide variety of types (academic, public, national), levels of IT, library environment and types of library systems. On this basis to deliver an implementable system specification and implementation manual which would enable the system itself to be adopted widely across the European Union;

- to produce a final report which would record the key issues raised in the Project, relate these to ongoing standards development (in both the technical and performance measurement areas) and provide recommendations for further actions in this area.

1.2 Structure of the project

In order to meet these objectives the EQLIPSE project has progressed through a series of six phases or workpackages and from these phases the consortium delivered a series of publicly available reports:

1. Library Requirements Analysis, in which a series of tasks brought together expertise from the 10 partners and associates with internationally recognised quality management, library performance measurement and technological perspectives to define the libraries requirements from EQLIPSE and hence the groundwork for development.

2. Initial functional specification, in which the technical issues, including networking and systems integration, were reviewed, leading to the production of the initial functional specification.

3. Prototype system, in which the initial functional specification was used to design and build a prototype, functional system.

4. Data tools and data collection, in which the partners adapted and designed tools for collecting data, supplementary to that contained in their operational IT-based systems, and built up test datasets for use with the system.

5. Field trials and evaluation, in which the prototype system was installed in two libraries, debugged and developed into a fully functional system.

6. Integration in libraries, in which the debugged system was fully trialled, in a pseudo-operational environment, in six libraries (representing the different types of libraries found across the EU, including those in LDRs) and evaluated.

1.3 Purpose of this report

This report forms the Final Report of the EQLIPSE Project and presents the work process throughout the project, the Consortium's conclusions and also the Final Functional Specification of the EQLIPSE software. A number of reports have been produced during the Project's two year period and reference should be made to these reports for specific details of the Project and of the work carried out.

- Library requirements analysis (deliverable report 1) (Centre for Research in Library and Information Management, University of Central Lancashire & Dublin City University 1995)

- Initial functional specification (deliverable report 2) (Dynix (Ireland) Ltd, 1995)

- Data tools and data collection (deliverable report 4) (Dublin City University Library, Centre for Research in Library and Information Management, University of Central Lancashire, & Universitats und Landesbibliothek Munster 1996)

- Demonstration trials report (deliverable report 5) (Centre for Research in Library and Information Management, University of Central Lancashire & Dynix (Ireland) Ltd 1996)

- Implementation Manual (deliverable report 6) (Centre for Research in Library and Information Management, University of Central Lancashire & Dublin City University & Dynix (Ireland) Ltd 1997)

2. LIBRARY REQUIREMENTS ANALYSIS

The EQLIPSE Project initially investigated the requirements of the Consortium's library partners in terms of performance measurement and quality management. The following sections of this report detail the results and findings of this part of the research.

2.1 Performance measurement requirements

While there is much discussion of performance measurement and its benefits and disadvantages, the work relating to performance indicators themselves has often been presented in the form of manuals or handbooks which aim either to help the library manager develop a set of indicators suitable for his or her library as in the *'Keys to Success"* report developed by King Research Ltd. (King Research Ltd 1990) or they present the library manager with a predefined set of indicators which the manual asserts to be tested and useful.

Abbott (1994) details six reasons for measuring performance which, given the ever-increasing pressure on libraries world-wide to justify resources, are becoming more relevant for all libraries.

- the political imperative
- accountability to the parent institution
- accountability to customers
- performance indicators in relation to service level agreements
- performance indicators in relation to quality
- decision support

These reasons are of such clear importance that library managers would be unwise to avoid measuring their library service's performance. Library managers are presented, however, with initial difficulties when attempting to do so. The following points paraphrase Goodall's (1988) conclusions:

> Developing practical measures for each library service is difficult but this is exponentially increased when measuring the whole library's performance

Library staff do not have time to incorporate complex techniques into their routine while quick and simple methods might not provide useful information.

Ideally, performance measurement should be a continuous process but the time involved often means that the process is carried out on a sample or one-off basis which, while easier, provides less meaningful data.

It may be impossible to design performance indicators which can provide information on both library management and justifying resources.

The lack of standards in this area means that performance indicators often are useful only locally. For reliable comparisons between libraries there would have to be standardised collection and presentation procedures.

Library managers are reluctant to measure performance, primarily due to the effort involved in collecting and interpreting the data but also to the fear of comparisons with other libraries.

Traditionally, performance indicators have been developed for specific types of institutions and therefore it is unusual to discover a manual which attempts to present a set of indicators which would be suitable for both academic and public libraries (which are the types of library most commonly dealt with in the literature) while national or special libraries have barely received consideration.

A fundamental part of the EQLIPSE research was to identify those performance indicators which librarians believed to be important and which, if possible, would be included as part of the EQLIPSE software. The major documents in the area of performance measurement were identified and these included:

Keys to success: performance indicators for public libraries
(King Research Ltd 1990)

Output Measures for Public Libraries

(Van House, Lynch, McClure, Zweizig, & Rodger 1987)

Measuring Academic Library Performance A Practical Approach
(Van House, Weil, & McClure 1990)

Library Performance Indicators and Library Management Models
PROLIB/PI
(De Montfort University/European Commission, 1994)

It will be seen that the first three documents identified are specific to particular types of libraries whilst only the De Montfort study attempts to define indicators for a wider group. King Research Ltd's *"Keys to Success"* study uses a different approach in defining its performance indicators.

In a European context, the main documents of those listed are the King report and the De Montfort study, one of the most recent attempts at defining such a set of performance indicators. This study, carried out by De Montfort University, LISU at Loughborough University and Essex County Libraries (all in the U.K.), as part of the European Commission Libraries Programme had the large task of developing "a toolbox of performance indicators which are relevant to and applicable in all types of library within Europe" (p. 3). Recognising the fact that there is no widespread use of performance measurement techniques in libraries within Europe the executive summary of the study states that the toolbox aims to help librarians "overcome the educational and technological barriers which have so far hampered their progress" (p. 2).

A problem facing librarians is that the level of effort required in creating practical, useful and informative performance indicators is discouraging. There is a clear need for a system which will help to assist the library manager in identifying and, most importantly, implementing performance measurement. For many librarians the difficulty of fitting an effective performance measurement system into the library's routine appears to be insurmountable.

The problem of defining a broadly acceptable set of Performance Indicators was undertaken by an international committee which has prepared an ISO draft standard. ISO 11620 *Information and documentation - Library Performance Indicators* (ISO 1995) is in draft form and is under review by ISO committee members but a draft copy was made available to the EQLIPSE consortium. The

intention of this draft standard is different from the King report manual and the De Montfort study in that its main purpose is to “endorse the use of performance indicators in libraries and to spread knowledge about how performance measurement can be carried out.” (p. ii). It also differs from the King report by relating its indicators to libraries of all types.

It was a requirement of the committee that all of the indicators specified in the draft standard have been either tried and tested or are well documented in the literature. Much of the confusion with performance measurement and indicators to date has been related to the lack of any standardisation in the literature and the ISO draft standard seeks to eliminate this by standardising the terminology and definitions. To this end the standard provides definitions of such terms as target population, user, loan, capital expenditure etc.

The latest draft of the ISO standard describes twenty-nine indicators for this standard which deal mainly with user satisfaction, services and facilities, document delivery and acquisitions, cataloguing and processing. The indicators are each dealt with under the headings of objective, scope, definition, method and interpretation and factors affecting the indicator.

Clearly the information related to these activities could be of great interest to the library manager but the “soft” nature of the qualitative data makes it difficult to collect and also to interpret and indicators dealing with these activities have not been tested or well documented.

There are several advantages to using such a standard as a “core” set of indicators when designing software such as EQLIPSE:

- It has been formed by a panel of international experts, many of whom have made valuable contributions to the area of performance measurement in their own right. These experts have contributed to previous performance measurement manuals and handbooks as well as the international literature on the subject.

- Using an internationally recognised standard also ensures that the comparison of indicators between different libraries is more reliable.
-
- The indicators in the ISO standard are well documented in the literature and have been tried and tested. Librarians can therefore be assured of the indicators' validity.

- The standard provides definitions of the terms used in the indicators, eliminating uncertainty over what to include in certain headings.

- The standard includes specific advice on data collection methods.

The fact that the draft standard has been drawn up by a group of internationally recognised experts is extremely important. It would not be helpful to try to define yet another set of performance indicators, this would just be duplicating the efforts of many people whose sole objective was to identify those indicators which are the most useful. It is more useful to synthesise the work of these past studies.

That previous manuals have been specific to certain types of libraries indicates that it is very difficult, if not impossible, to define just one set of indicators for all types of libraries. As already mentioned, the De Montfort study makes an attempt to do so but does not cover certain types of libraries. The EQLIPSE consortium contains academic, public, special and national libraries which clearly suggests that the scope of these previous studies needed to be widened. A possible design for EQLIPSE could be that a set of indicators could be defined and presented to the end user as being the definitive set. This approach is not satisfactory, however, as it is unlikely to satisfy the needs of the different types of libraries and unless the librarian could alter those indicators to local needs the software would run the risk of being redundant.

An alternative scenario was to provide a core set of tried and tested indicators which were known to supply useful information to library managers and which could be augmented as necessary according to local needs. The ISO 11620 draft standard was therefore investigated to determine if it could prove to be a satisfactory core set of indicators.

2.1.1 Creation of the EQLIPSE set of performance indicators

In order to establish the validity as to whether the ISO draft standard would be a satisfactory core set the following exercise was carried out. A comprehensive list of performance indicators was compiled which contained indicators drawn from the following sources:

Output Measures for Public Libraries: A Manual of Standardized Procedures
(Van House et al 1987)

Measuring Academic Library Performance: A Practical Approach
(Van House et al 1990)

Keys to Success: Performance Indicators for Public Libraries
(King Research Ltd 1990)

Library Performance Indicators & Library Management Models
PROLIB/PI
(De Montfort University/European Commission 1994)

ISO 11620 Information and documentation - Library performance indicators
(ISO 1995)

Measuring Quality: International Guidelines for Performance Measurement in Academic Libraries
(Poll, Boekhorst, Abad Hiraldo, IFLA 1996)

The Effective Academic Library: A Framework for Evaluating the Performance of UK Academic Libraries
(UK Joint Funding Council's Ad-hoc Group on Performance Indicators for Libraries 1995)

The compiled list of indicators was circulated to all EQLIPSE partners with the intention that they would study the list and identify those which they consider essential for their organisation. Significantly, of the twenty-six indicators included

in the original ISO draft standard circulated to partners, twenty-four of these were classed as being essential by at least one of the partners and the remaining two were classed as being desirable.

The responses provided important information, principally about the wide divergence of requirements amongst the partners, due to the different types of libraries (highlighting the already mentioned fact that it may be impossible to define one set of performance indicators which satisfies all types of libraries).

The responses also reinforced the assumption that different libraries require different indicators to suit their needs and that no one set of performance indicators will suit all libraries; the Italian National Library, for example, required less information dealing with circulation than the academic partners but required more detailed information about acquiring, processing and cataloguing material. A second result of the research was that the ISO draft standard emerged from the research as being a way forward in solving the needs of different types of libraries, confirming its suitability as a core set of indicators.

After consideration of the responses to the list of indicators, it was decided to adopt the ISO draft indicators and to complement them with additional indicators from other sources. This would offer the advantage of widening the applicability of the EQLIPSE software to various types of libraries and to make the set of performance indicators even more relevant. It is very important to re-emphasise that any decision support system such as EQLIPSE needs to be flexible in order to suit the needs of different types of institutions. To best deal with this issue it is useful to draw on the work done by experts in the field, in particular the De Montfort study, the work of Van House and McClure, the HEFCE's "*Effective Academic Library*" and the IFLA document. These works demonstrate performance indicators for a wide range of library types; they serve to augment the ISO draft standard by including indicators not mentioned in the ISO document and also provide alternatives to some of the ISO performance indicators.

Although it is probably unrealistic to expect one set of performance indicators which would contain all the indicators that all types of libraries might require, it is important, however, when defining a core set of indicators that it is as comprehensive a set as possible and also that it does cover a full range of library functions. Supplementing the ISO performance indicators with extra measures addresses this issue.

Accordingly, these indicators were further reviewed and analysed by all partners in order to determine which indicators to add the ISO list. Some of the indicators were already covered by the ISO standard and others were slight variations on what was essentially the same activity. The indicators chosen to supplement the ISO standard were included, together with the ISO list, as the EQLIPSE set of recommended measures.

2.2 Quality management requirements

2.2.1 Definitions

There is often a lack of clarity about what is meant by "quality" and various definitions are available. For example ISO 8402 (BS EN ISO 8402: 1995) offers the following: Quality is "the totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs" (p. 3). This definition is based on two classic definitions of quality, namely, "fitness for purpose" and "conformance to requirements" which provide a starting point for quality management.

As an example of how quality is defined in practice the following definition can be cited. It was developed by the Ford Motor Company (Ford Motor Company, 1985):

> "Quality is defined by the customer. The customer wants products and services that throughout their life meet his or her needs and expectations at a cost that represents value."

At the simplest level quality management may be summarised as a need for clarity of purpose (i.e. the organisation needs to be very clear as to what it is trying to achieve), a focus on customer satisfaction (i.e. success or failure is measured on the basis of whether the customer's requirements are being met), and an emphasis on continuous improvement (i.e. products or services are always being improved, while failings and errors are treated as opportunities for improvement). There is no general agreement on what constitutes Total Quality Management (TQM) although the term is used widely. The diagram on the following page offers one possible synthesis of TQM as it applies to services such as libraries (taken from: Brophy, & Coulling 1996). It is suggested that attention to all these issues, in a holistic and co-ordinated fashion, will lead towards the delivery of quality services.

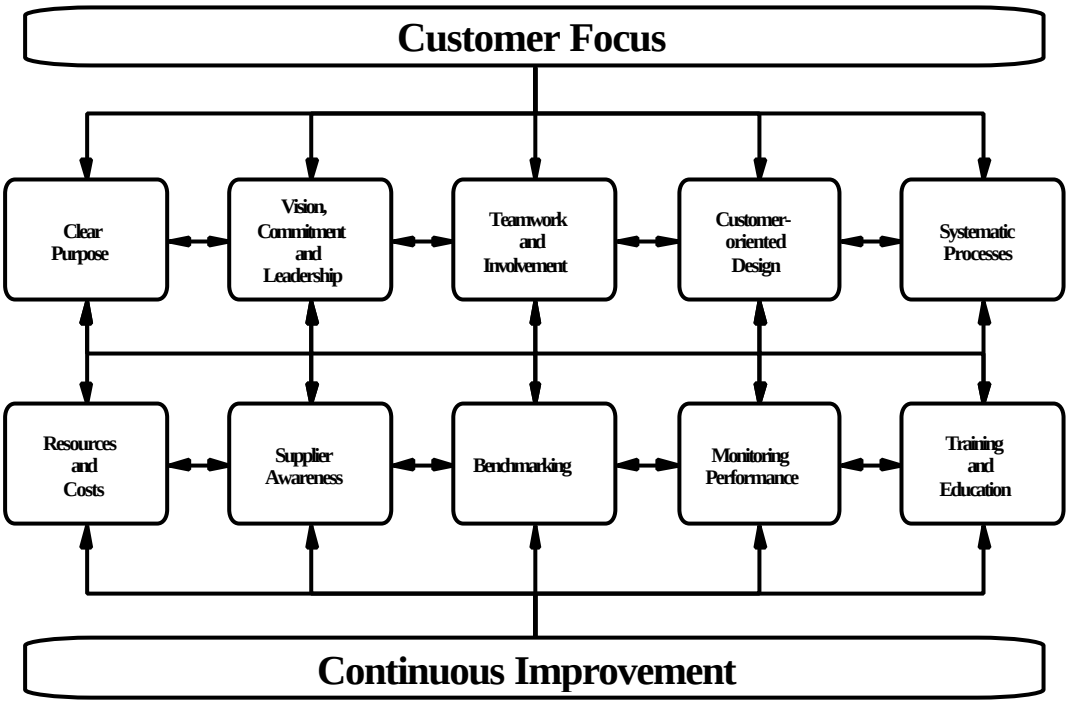


Figure 1: Total Quality Management

2.2.2 Measuring quality

The measurement of quality is as complex a subject as its definition and there are many approaches. A useful overview can be obtained by looking at the way in which the major quality awards in the USA (the Baldridge Award) and Europe (the European Quality Award) are structured. Note the predominance of the "process" model of organisations in these awards and related publications.

Malcolm Baldridge was a US Commerce Department Secretary who took a particular interest in quality matters and encouraged a number of initiatives: the Award was set up in his honour by the US Congress in 1987. For this Award there are seven categories, each with a quantitative weighting. The criteria and weightings are reviewed each year. In 1991, to take one example, the categories were as follows (with points out of 1000 in brackets):

1. Leadership (100)
- Senior Executive Leadership (40)
- Quality Values (15)
- Management for Quality (25)
- Public Responsibility (20)

2. Information and Analysis (70)
- Scope and Management of Quality Data and Information (20)
- Competitive Comparisons and Benchmarks (30)
- Analysis of Quality Data and Information (20)

3. Strategic Quality Planning (60)
- Strategic Quality Planning Process (35)
- Quality Goals and Plans (25)

4. Human Resources Utilization (150)
- Human Resource Management (20)
- Employee Involvement (40)
- Quality Education and Training (40)
- Employee Recognition and Performance Measurement (25)
- Employee Well-being and Morale (25)

5. Quality Assurance of Products and Services (140)

- Design and Introduction of Quality Products and Services (35)
- Process Quality Control (20)
- Continuous Improvement of Processes (20)
- Quality Assessment (15)
- Documentation (10)
- Business Process and Support Service Quality (20)
- Supplier Quality (20)

6. Quality Results (180)
- Product and Service Quality Results (90)
- Business Process, Operational, and Support Service Quality Results (50)
- Supplier Quality Results (40)

7. Customer Satisfaction (300)
- Determining Customer Requirements and Expectations (30)
- Customer Relationship Management (50)
- Customer Service Standards (20)
- Commitment to Customers (15)
- Complaint Resolution for Quality Improvement (25)
- Determining Customer Satisfaction (20)
- Customer Satisfaction Results (70)
- Customer satisfaction Comparison (70)

2.2.3 Quality management and EQLIPSE

From the descriptions above it will be clear that while an IT-based system has much to offer the manager who is serious about pursuing quality, it cannot be a substitute for management action. Many aspects of quality management (developing good working relationships with suppliers would be an example) are based on human action. Referring back to the first diagram, however, we suggest that the following areas are particularly suited to IT-based support tools such as EQLIPSE:

1. Clear Purpose The organisation's mission statement and objectives can be held and communicated by IT-based systems. Documents such as

standards of service and service level agreements (an example is contained in Appendix 1 of Deliverable Report 1 1995) can be held, and links created to data on the performance of the organisation in relation to the published service standards. The Library's operational plan could helpfully be held in EQLIPSE alongside these documents, so that progress can be monitored on developmental issues.

2. Systematic Processes This is the focus of the ISO 9000 standard. The idea here is to hold documented procedures on computer, with hypertext links between them. For example, the circulation procedure may make reference to the procedure for registering new users, and it should be possible to link directly from one to the other. There is a question mark over linking from procedures to performance data (e.g. number of issues) because it is not clear that this kind of unstructured data is useful. The system should also hold operational data which managers may wish to interrogate alongside the procedures (e.g. fines regimes, opening hours, number of seats i.e. a library profile). Appendix 2 of Deliverable Report 1, 1995 contains a sample ISO 9000 procedure. Indeed, "*The effective academic library*"(Joint Funding Council..., 1995) recommends a number of qualitative issues to be taken into account when implementing performance measurement. Performance measurement *per se* within the project has been discussed in section 2.1 and in greater detail in Deliverable Report 1 1995. In particular, it may be noted that "*The effective academic library*" issues and their definitions appear as nos. 3a to 3g in the synthesised list of performance indicators included as Appendix 4 of Deliverable Report 1 (1995).

At the heart of the procedures there should be mechanisms for checking on customer satisfaction/dissatisfaction, preferably by encouraging input from customers. By collating complaints and suggestions the organisation can monitor its performance and identify key areas for improvement. The EQLIPSE system could both hold the individual comments and provide a summary of issues (perhaps by getting library staff to attach keywords to each) over time.

3. Resources and costs Tracking of costs is covered in Deliverable Report 1, but will contribute to the TQM model.

4. Benchmarking Librarians will be able to use the data displayed by EQLIPSE to check their library's performance against that of other libraries. Partly this can be achieved by setting levels of performance which will 'trigger' action (see Deliverable 2 for the technical development of this concept).

5. Supplier Awareness It is believed that this is addressed in adequate detail within Deliverable Report 1, section 3, covering for example delivery times by book suppliers.

6. Monitoring Performance This was the focus of task 1.2, and of the various external inputs (ISO, IFLA, PROLIB). The quality management perspective would suggest that EQLIPSE should include:

- provision to use a variety of customer satisfaction measures at both macro and micro levels. For example the work of Zeithaml et al. (Zeithaml, Parasuraman, & Berry 1990) on aspects of customer satisfaction is very important. The following extract from Brophy and Coulling (1996) explains this approach:

Zeithaml, Parasuraman and Berry identified ten "dimensions" of service quality which appeared to be common across all of the services examined. These dimensions were as follows:

1. Tangibles: is the service an attractive place to visit? Are the staff appropriately dressed? Do they use modern, up to date equipment?

2. Reliability: is my telephone call returned when they said it would be? Are errors made on my bank statement? Does the washing machine work (first time!) when its been repaired?

3. Responsiveness: when a problem occurs, is it quickly put right? Do they arrange to repair the washing machine at a time to suit me?

4. Competence: do front-line staff give the impression of knowing what they are doing? Similarly, does a repairer appear to know how to diagnose a fault and carry out a repair with confidence?

5. Courtesy: are staff pleasant, even when asked difficult (or what may appear to be 'silly') questions? Does the repairer wipe his or her shoes rather than trample mud all over my hall carpet? Do staff manage not to appear busy even when they are?

6. Credibility: Does the service enjoy a good reputation - do people speak well of it? Are charges consistent with the level of service provided? Do I get a credible and worthwhile guarantee with a repair, such that I can have confidence that any problems will be put right quickly and without further expense?

7. Security: Is it safe to use the service? For example, is my credit card safe from unauthorised use? Do I have confidence that the repair was properly carried out to an acceptable standard?

8. Access: If I have a problem, can I get access to a senior member of staff to help me sort out the cause? Do they answer the telephone when I ring? Is it easy to find the repair company's premises?

9. Communication: Is the service explained clearly and the options outlined comprehensively? Do they avoid using unnecessary jargon? Do they listen to me? If something unexpected occurs and the repair company cannot keep the appointment that they've made, do they contact me in good time to rearrange it?

10. Understanding the customer: If I'm a regular customer, does someone on the staff recognise me? Do they try to understand my individual needs? Do they try to arrange the repair visit to meet my convenience rather than their own?

Building on these ten dimensions of service quality, Zeithaml, Parasuraman and Berry were able to define service quality in terms of the difference between customers' expectations of the service and their perceptions of the service actually delivered and to suggest key factors which influence expectations, including "word-of-mouth communications, personal needs, past experience and external communications".

Zeithaml, Parasuraman and Berry went on to analyse the ten determinants in detail and to provide a set of five key issues which are sometimes known as the "rater" set from the internal letters of each heading.

1. Reliability
2. Assurance
3. Tangibles
4. Empathy
5. Responsiveness

The Rater dimensions are defined in the following way:

Reliability is the "ability to perform the promised service dependably and accurately"

Assurance is "knowledge and courtesy of employees and their ability to convey trust and confidence"

Tangibles are the "appearance of physical facilities, equipment, personnel and communication materials"

Empathy is the "caring, individualized attention the firm provides its customers"

Responsiveness is "willingness to help customers and provide prompt service".

There is also considerable interest in techniques such as the "mystery user" and the "walk through audit" as means of assessing quality. These are probably best handled through a review process (see below).

For EQLIPSE, the input of different assessments of satisfaction should be handled via the data collection and input mechanisms which were the focus of Workpackage 4.

7. Training and Education It is generally recognised that poor training often leads to quality problems. There is a general shift towards "competence based" approaches (i.e. ensuring that employees are competent to do tasks, rather than knowledgeable about them) especially for support staff. One approach to ensuring good quality management in this area is to maintain a competence matrix for all staff. These can then be combined to give an overall picture, by section or for the library as a whole. However, it is unlikely that this approach would apply across Europe, and it should not be incorporated in the EQLIPSE product at this stage for this reason. Rather, there should be the ability to hold descriptive documents related to staff training and staff competencies.

The Review process is extremely important to quality management. ISO 9000 contains explicit requirements for internal and external audit. During each audit "non-conformances" may be found and must be logged. These logs are then used to initiate action, and are checked at the next audit. This audit/check process should be incorporated into EQLIPSE. Provision for weighting aspects of a review (as in the Baldridge and European Quality Award approaches) should be provided. Note also the heavy emphasis on review in *The effective academic library* (Joint Funding Council ... 1995).

2.2.4 SUMMARY

It was concluded that the quality management requirements of libraries could best be met in EQLIPSE by

- providing text handling facilities, including hypertext, for key documents such as service standards, development plans and operational procedures. The library should also be able to hold a structured "profile" on the system;

- providing flexible input for a range of measures of customer satisfaction, with the ability to weight and combine them in user-defined ways and

handling the scoring of aspects of review similarly (along the lines of the Baldridge/EQA awards);

- handle customer complaints and comments, and provide the ability to summarise these as time series;

- the ability to log audit/review outcomes and to link subsequent actions;

- a facility to input threshold levels derived from comparative data from another EQLIPSE (or other) site in order to benchmark.

3. DESIGNING THE INITIAL FUNCTIONAL SPECIFICATION

The purpose of the EQLIPSE project was to develop an open interactive quality management and performance measurement system for libraries. This system was then implemented and validated in a range of libraries and with a range of library automation systems.

The purpose of Workpackage 2 (covering the first six months of the Project) was to review and analyse the technological base for the development of an EQLIPSE system and to derive a functional specification within the constraints and taking advantage of the opportunities which emerged from this examination. To this end the following were examined:

EIS (Executive Information Systems) and related software packages
Client/Server Library Automation Systems
Networking and communications issues and standards

Workpackage 2 ran in parallel with Workpackage 1. This parallel running was allowed by the fact that the examination of technological basis and networking/integration issues were not dependent on the libraries requirements analysis. Only the final task of Workpackage 2, the development of the initial functional specification required input from Workpackage 1.

Existing EIS/DSS/MIS systems and Client/Server Library Automation Systems (LAS) were examined with a view to determining the technological requirements for implementing a truly ‘open’ Quality Management (QM) and Performance Measurement (PM) system.

3.1 Open systems ideals

It is necessary first to establish what is meant by ‘Open’ in this context. Many discussions of ‘openness’ concentrate on operating system and communications protocol standards. This however is to ignore the fact that openness is an ideal and standards only the tools which make this ideal possible. In this context it is important to conceive of openness in the broadest sense possible.

The ideal of ‘Openness’ encompasses a range of goals.

DATA SHARING: The ability to exchange data and files between different hardware platforms, operating systems and applications. In the case of the EQLIPSE Prototype Systems (EPS) this reduces to the ability to readily accept data from a range of Library Automation Systems (LAS).

INTEROPERABILITY: The ability of different systems to request of the other system that an action be carried out, a service provided or data be supplied in a specified format. The EPS should be able not only to accept data from a range of LAS but should be able to request the data required in a standard manner.

INTERCONNECTIVITY: The ability of platforms and networks to connect and communicate. Data sharing might be allowed simply by common magnetic media and file formats. Interconnectivity would require that this among other things be carried out via a network.

PORTABILITY: The ability to run software across a range of hardware. This particular ideal is exemplified best by the UNIX operating system and the applications software which runs on it.

SCALABILITY: The ability to move software easily through different levels of hardware and network power and complexity.

FLEXIBILITY ACROSS ORGANISATIONS: The ability to satisfy a range of information requirements. In practice this normally means that the

system is not built around rigid data structures but stores the data definitions within itself as metadata and allows this metadata to be changed.

FLEXIBILITY AS REQUIREMENTS CHANGE: The ability to change as information requirements change. Again this is satisfied in practice through the use of flexible metadata.

INTERFACE STANDARDS: The ability to fit easily into the overall human/ technical system. In practise this is achieved through interface standards which avoid the task of learning a new interface for every piece of software used.

In order to see how these ideals of openness can be met in practice consideration will now be given to EIS (Executive/Enterprise Information Systems) and related software products.

3.2 EIS and related systems

This is an area made complex by acronyms and classes of software with overlapping sets of functionality. There are, at least, the following types of system:

> EIS : EXECUTIVE/ENTERPRISE INFORMATION SYSTEMS. These systems are aimed at higher level management and seek to mine the detailed organisational databases in order to provide information which is concise, timely and relevant to strategic decision making.
>
> DSS: DECISION SUPPORT SYSTEMS. These systems provide support to all levels of management in clarifying the issues surrounding decisions of all sorts. They are not usually linked to the organisation's databases.
>
> MIS: MANAGEMENT INFORMATION SYSTEMS. EIS and MIS are very close in the sense in which they are used. In the case of MIS however there is more emphasis on providing information to all levels of an organisation at a degree of detail appropriate to that level.
>
> QMS: QUALITY MANAGEMENT SYSTEMS. These systems automate the implementation of quality standards such as ISO 9000. They maintain standard documents and procedures and provide the ability to track and schedule all relevant activities.

The following are examples of some of these types of system which were reviewed as part of the EQLIPSE research, further details of which are included in the Project's second deliverable.

- Pilot Lightship
- The Optionist
- EIS Toolkit
- Libra

3.2.1 EIS type systems and 'openness'

From an examination of these systems it emerged that openness to variant and changing information needs and data environments is not simply a matter of compliance with technical standards. It is also a question of finding concepts that are generally applicable. The success of EIS and other tools across a range of organisations has as much to do with general concepts like ‘drill down’, ‘exception reporting’, ‘mission’, ‘objectives’, ‘factors’ and ‘weighting’ as it has to do with SQL compliance, hardware and operating system portability and Client/Server architectures.

3.2.2 EIS functionality areas and general concepts

Three principal concepts have been identified as underlying EIS functionality: data manipulation and presentation, clarification of decisions and clarification of strategic direction. The constituent functions of these concepts is examined in detail below:

DATA MANIPULATION AND PRESENTATION:

Time series analysis: allows values of a particular variable to be displayed as it varies over time in isolation or in comparison with other variables.

Drill down capability: allows data to be displayed for an entire organisation or for only a specific branch or region.

Exception reporting: when values for a particular variable show under or over achievement of a particular target this is automatically reported.

Data summary: this is essentially the opposite to ‘Drill Down’. When data is stored region by region and day by day then it should be possible to display the data as a weekly time series for the entire organisation.

CLARIFICATION OF DECISIONS:

Options: the different choices available to one in making a decision.
Factors: the criteria against which each decision must be judged.
Weighting: a figure indicating the relative importance of each factor.
Fudge Factor: an uncertainty range within which one would judge the value of a specific factor lies for a specific option.

CLARIFICATION OF STRATEGIC DIRECTION:

Mission: a statement of the overall direction and values of an organisation.
Goals: a number of more specific values and targets which flow from the mission.
Objectives: quantifiable targets each relating to a specific goal.

3.2.3 EIS and the technical basis for openness

Though the general concepts outlined above, as they have been implemented in EIS type systems, have done much in making these systems open to a range of environments, this would be of no use if there was not also the technical basis for this openness. This technical basis would in general rest in compliance with the following standards:

SQL: The query language which applies to the greatest number of DBMS. Ingres, Oracle, Sybase and Universe can all be included here. Pilot Lightship, EIS Toolkit and Comshare's Commander all provide access to such databases.

CLIENT/SERVER ARCHITECTURE: When this architecture is implemented with a standard query language such as SQL then interoperability between different EIS systems and different Database servers is allowed. This requires a communications protocol which allows the query to be sent in a recognisable form across the network. ODBC (Open DataBase Connectivity) developed by the Microsoft corporation of crucial importance hence. Ingres, Oracle, Sybase and Universe are now all ODBC compliant which means that relational tables of the same structure maintained under any of these RDBMS' may be queried from the same client.

STANDARD NETWORK PROTOCOLS: In order to fit easily into a range of pre-existing environments then the higher level protocols used must sit on the most popular of the lower level protocols. These would be TCP/IP and Ethernet.

IMPLEMENTATION ON A HARDWARE PORTABLE OPERATING SYSTEM: In general this means implementation on MS-DOS/Windows or UNIX.

WINDOWS STANDARD INTERFACE.

3.3 Client/server library automation systems

It can be seen from the above that the generally applicable concepts used by EIS type systems and their use of standards such as SQL, Client/Server architecture and TCP/IP/Ethernet are the basis of their openness. The EQLIPSE Prototype System (EPS) will be used specifically in the library context where in the vast majority of cases nearly all the data of relevance will be stored in an LAS. It is thus intended in this subsection to examine a number of Client/Server based LAS with respect to their technical basis and standards compliance.

3.3.1.1 Z39.50

This discussion will focus mainly on systems which have implemented client/server in the full sense of developing a range of modules (cataloguing, circulation, acquisitions etc.) as clients. It should be noted, however, that very many host-based library systems have implemented client/server architectures in a limited way by providing access to their bibliographic databases through the ANSI Z39/50 protocol. Included in this would be MDIS URICA, DYNIX and BLCMP. Z39/50 is an OSI application layer service definition and protocol specification for information retrieval.

It should be noted that this protocol has provided the most significant level of interoperability between library systems. This success has been due in large part to the fact that this protocol restricts itself to specifying only the format of the messages and data transfer (ISO 2709 MARC communications format is used for bibliographic data) between the client and server systems. How data is manipulated and stored at either end is up to the developers of those systems. Thus a user of HORIZON (Ameritech Library System's client/server product) can use the OPAC not only to search and place holds on items in their own library but also to search any available Z39/50 compliant LAS or bibliographic utility. Features like the placing of holds are automatically turned off when searching any non-HORIZON database.

3.3.1.2 Z39.50, ODBC AND THE EQLIPSE PROTOTYPE SYSTEM

It should be noted that the development of a Z39.50 interface was not carried out as part of the EQLIPSE project. This is as recommended by the first Commission review of the project.

In order to facilitate the speedy development of the prototype the interface was built using the ODBC standard instead. This allowed the prototype to interoperate with and retrieve data from the Horizon LAS. This interface was implemented in both LAN and Internet environments as follows

- Using IPX/SPX over a LAN to Horizon on a Windows NT system using Windows NT SQL server.

- Using TCP/IP over the Internet to Horizon on Sybase system running Sybase SQL server.

Even without the use of Z39.50 the implementation of the interface using ODBC provides a great degree of openness. This is to be seen not only in the variety of technical environments in which the interface was implemented but also in the fact that any LAS based on a RDBMS which is ODBC compliant should be able to interoperate with the EQLIPSE prototype with only minor modifications.

The disadvantage of ODBC is that it does require modification to the database structure of the target LAS. This may be unacceptable or unachievable in some cases and it is this that limits the openness of the ODBC option.

However the use of ODBC did facilitate the speedy development of the client/server interface for the EQLIPSE prototype. If all LAS are eventually ported to ODBC compliant RDBMS, as is the current trend, then it will become an open question whether Z39.50 will remain the preferred option for the implementation of an interface of the level of the EQLIPSE system.

3.3.2 Client/server LAS

The client/server architecture is a subset of a range of distributed processing models. It can be contrasted with modes of distributed processing such as master/slave where a central machine divides a computing task into independent functional units and distributes them around it's 'slaves' for processing. With client/server a server or servers await requests from a client or clients and acts only on these.

Client/server has itself a number of subsets which can be best understood if we divide out the different levels of processing which may be distributed across client and server. These are the following

Data Management
Application Logic
Presentation

We can then classify client/server architectures as follows:

DISTRIBUTED PRESENTATION: the presentation is split between client and server. The server handles some presentation and all application logic and data management. This is the most minimal form of client/server.

REMOTE PRESENTATION: all presentation is handled by the client. Application logic and data management are handled by the server.

DISTRIBUTED LOGIC: presentation and some application logic handled by the client. The remaining application logic and all data management are handled by the server.

REMOTE DATA MANAGEMENT: all presentation and application logic are handled by the client. Data management is handled by the server.

DISTRIBUTED DATABASE: the server or servers provide some data management but further data management is carried out by the clients. All application logic and presentation is carried out by the client.

The last two forms of client/server noted here are the only forms to take full advantage of the main benefits of client/server which are performance and

interoperability. With all application logic residing on the client network traffic and processing required from the server is minimised. This provides great performance advantages with more clients being able to connect to a server of given power on a network of given capacity. It also provides greater interoperability with client software being able to talk to any database of parallel structure.

The more minimal forms of client/server architecture do have the advantage that it is easier for such systems to provide a dumb terminal interface. The less logic that resides on a PC client then the easier it is to build a software module on the server that carries out such functions for a dumb terminal.

Horizon, Talis, and Genesis were among the Library Automated Systems which were evaluated and full details of this are included in the Project's second deliverable. The Consortium concluded that the technological requirements for implementing an open QM/PM system are that:

It must use the most general concepts possible in the design of the software.

It should hold its own performance measurement data in a SQL compliant DBMS.

It must be implemented in a full client/server architecture. The server should handle only data management with all application logic and presentation handled by the client. This will go a long way to ensuring interoperability with all LAS.

It must use an application level standard protocol which is compatible with at least the TCP/IP and Ethernet environments.

It must run on MS Windows.

It must provide a Windows standard interface.

3.4 Networking and integration issues

3.4.1 Introduction

The last section of this report considered a range of EIS-type software and a number of Client/Server Library Automation Systems. It was noted that openness will depend on the use of clear generally applicable concepts for the structuring of data, the implementation of full client/server architecture and compliance/compatibility with dominant DBMS and networking standards. This means in effect that the EQLIPSE Prototype System must be based around a SQL-compliant relational database, with client/server access to host LAS and data transfer protocols compatible with at least TCP/IP and Ethernet.

Hence, some of the major networking and integration issues have been addressed. There are, however, other more profound questions to do with networking and integration that still remain to be answered. The project is committed to the implementation of open systems standards, and consideration should now be given to the position of EQLIPSE with regard to the standards battles, security issues and other concerns to do with the implementation of open systems standards on wide area networks.

As already discussed, the concept of open systems is best understood as a set of ideals. The open systems standards which allow these ideals to be realised are only means to an end. Two things allow a standard to be ‘open’.

First of these is its coherent relation to other related standards. The OSI seven layer model is a good example here. By constraining protocols within well defined layers it allows any layer of communications technology (software or hardware) to be replaced with a more efficient version without disturbing the other layers. So long as the signals (primitives) passing between the layers remain the same the other layers can remain as they were.

The second is the degree to which the standard is implemented. A set of standards may be perfect for implementing open systems ideals and sharing data but this is useless if only a very limited number of users implement the standard.

3.4.2 Proprietary vs PAS vs official standards

The world of standards and open systems is currently in a state of rapid change, some chaos and great inventiveness. Some standards such TCP/IP at the network level and World Wide Web, Gopher and Z39/50 at the application level are dominant while in the longer perspective there are worries that the emerging *de facto* standards will be unable to provide the full openness that the Information Society will require. In the midst of all this some larger private and public organisations have preferred to remain isolated from the Internet and rely on *de facto* standards: a policy which greatly enhances their security but robs them of access to great information wealth. In Europe a major issue is whether to jump wholeheartedly on the Internet bandwagon or put faith in the more coherent but less popular OSI standard.

3.4.3 Security

The theory and practise of open systems has always been a problem for those concerned with security. UNIX, with it's device-independent file systems, its publicly available specifications and standard communications is probably the most vulnerable operating system in the world. How can it be simultaneously guaranteed that systems are both truly open and truly secure?

One major advance here has been the emergence of Client/Server protocols. These can allow a client to acquire data and services from the server without logging in to the server system. This means that the client cannot 'break out' to any system command level and cause damage. Furthermore the conversation between client and server can be restricted by the protocol used in such a way that no undesired request can be made of the server by the client. For example, if a user breaks out from an OPAC to the system command level then a delete command may be found. However, if the user were to be using a Z39/50 compliant client/server OPAC nothing like this would be possible. 'Delete' is not part of the Z39/50 language that client and server would talk to each other.

3.4.4 Intellectual property rights and charging issues

When all information is in the form of books, periodicals and other printed matter protecting the rights of the person who produced that knowledge to be rewarded for their work is not too great a problem. Royalties in the case of purchase, and public lending right in the case of borrowing, have been reliable mechanisms. When full text of articles and other information is available on publicly-accessible wide area networks then protection of these rights becomes much more difficult. Similarly, the provision of charged services over such networks is also a problem. The obvious strategy would be to use a link to credit card systems. However, no informed Internet user would like their credit card details travelling unattended or at least without being very strongly encrypted.

These are issues which must be dealt with if information and knowledge of real value is to be made available on the public networks and if products and services of real worth are to be bought and sold there.

3.4.5 Critical mass

It would not profit a company in the short or medium term to invest in connection to or provision of services on OSI-compliant wide area networks. There might be some reward in the long term if the standard later emerges as dominant, but earlier investment will not be a prerequisite for exploitation of this later dominance. In this environment some technologies, though the best of their type, may never attain the critical mass whereby investment in that technology is automatically attractive. Similarly, prices may never drop low enough for products based on it to attract a profitable market share.

In some cases a state-supported technology such as Minitel in France can be forced through the critical mass barrier with significant public investment. But before such an investment is made the public body making the investment must be very sure that the currently under-utilised technology is worthwhile in the long run.

3.5 EQLIPSE and open systems issues

3.5.1 Competing standards

A plethora of options rendered complex the choice of standards for the EQLIPSE system. Consideration had to be given to such competing technologies as TCP/IP, IPX and OSI; Ethernet and Token Ring; WWW, Gopher and Z39.50. Furthermore, the future of any current standard seems difficult to predict.

A valuable first step out of these difficulties is to reiterate what the EQLIPSE system seeks to do. EQLIPSE manages quality management procedures and documentation and links these to quantitative performance measurement data. It is at this point that client/server architecture and open system standards becomes relevant, but it is merely sought to transfer application level information from server to client. It is also at this point that the coherent layering of protocols is of assistance. TCP/IP can run equally well on the lower level Ethernet or Token Ring standards. Similarly, Horizon using Sybase client/server libraries can run equally well on TCP/IP or IPX or DECNET. Hence, an application level protocol for information transfer ideally needs to be defined for EQLIPSE which is uncoupled from the lower layers and can be implemented across a range of lower level protocols.

3.5.2 Modelling the application layer protocol on existing standards

The best standard on which to model the EQLIPSE Information Transfer Protocol is Z3950/SR. There are a number of reasons for this:

More LAS are compliant with this protocol than any other.
In the case of at least some of those systems (Dynix and Horizon) the link between Z39/50 use attribute and index/database searched is completely customisable.
Client source code is publicly available

3.5.3 Security issues

The choice of Z39/50 has both advantages and disadvantages in security terms. As noted above, the security advantage of a client/server information retrieval protocol is that it restricts the conversation between server and client. In the case of Z39/50 using attribute set BIB 1 only requests for bibliographic information are valid. The disadvantage is that Z39/50 serves multiple clients, via a single TCP port, none of whom login into the system or go through the related security procedures. This is acceptable when the information being sought by the client is of a nature that can safely be made generally accessible. Bibliographic information is just this sort of information. Performance measurement statistics, however, is very clearly not that sort of data. Hence, any Z39.50 client/server implementation of the EQLIPSE system must utilise existing and emerging Z39.50 security features.

3.5.4 Conclusion

In conclusion it can be said that the major issues in open systems standards are not of critical importance to EQLIPSE if like other systems it can constrain its information transfer standard and data format standards at the relevant level. For EQLIPSE this is the application level. Z39/50 and the non-MARC record formats specified in version 3 of the standard are protocols which substantially satisfy the needs of EQLIPSE in this area. However ODBC has been found most useful for the purposes of the development of the prototype and if the dominance of this standard consolidates then the question of what is the best standard to use will again become open.

3.6 The development of the prototype

The full-text of the initial functional specification is contained in the Project's second deliverable and was produced at the end of the first six month phase. The prototype itself was developed over months six to twelve which provided a suitable system to provide the specified Quality Management System (QMS) and Performance Measurement requirements. As stated in the Project's Technical Annex an IT application for quality management in libraries was identified. This involved investigating the very many QMS and related applications that were developed for use in business. A particular emphasis was given to packages designed for used in service organisations.

The package chosen as a result of this investigation was Quality Workbench, a commercially successful software package which facilitates compliance with ISO 9000. This software can be networked and provides an effective means of document control and relatively easy compliance with the standard. As this was a commercial product Quality Workbench was not evaluated in the same fashion as the EQLIPSE Performance Workbench prototype (i.e. using Bug Report/Recommended Enhancement forms etc.). Instead the functionality of the software was evaluated to determine whether it really met the needs of the libraries.

4. DATA COLLECTION

The Consortium's work for the first six months of the project determined the initial technical requirements of the partners but also specified the data which would need to be collected in order to progress the project onto the next phase. The EQLIPSE set of performance indicators specified in that initial phase numbered fifty-four indicators but as a result of the research was amended to fifty-two indicators (Table 1). These indicators were drawn from several key documents including the ISO draft standard *Information and documentation - Library performance indicators* (herein abbreviated as ISO), (ISO 1995); the PROLIB report *Library Performance Indicators & Library Management Models* (abbreviated as DM), (De Montfort University/European Commission 1994); Poll et al's (1996) *Measuring Quality: International Guidelines for Performance Measurement in Academic Libraries* (abbreviated as IFLA) and the UK's Joint Funding Council Report (1995) *The Effective Academic Library - A Framework for Evaluating the Performance of UK Academic Libraries* (abbreviated as EAL).

A benefit provided by the ISO 11620 draft standard is that it includes detailed descriptions of data collection methods for each of the indicators. Indicators drawn from other sources (e.g. the PROLIB document) do not always have detailed methods described and for these indicators the EQLIPSE team drew up its own specific data collection methods (e.g. for Misshelving).

Initially, the datasets (specified in Table 2) necessary to form the indicators were collected in the libraries of Dublin City University and the University of Central Lancashire. This six month phase of the Project allowed the Consortium to properly test the draft ISO 11620 standard as to its practicality and also the feasibility of collecting the datasets it specifies. Full details of this phase of the Project are contained in the fourth deliverable.

Table 1 List of indicators

1. ISO B1	User Satisfaction
2. ISO B21A	Percentage of target population reached
3. ISO B21B	Cost per user
4. ISO B21C	Library visits per capita
5. ISO B21D	Cost per library visit
6. ISO B22A	Titles availability
7. ISO B22B	Required titles availability
8. ISO B22C	Required titles extended availability
9. ISO B22D	In-library use per capita
10. IFLA 4b	In-house collection use
11. ISO B22E	Document use rate
12. DM F86	Proportion of documents on loan
13. ISO B22F	Percentage of required titles in stock
14. ISO B22G	Title search success rate
15. ISO B22H	Subject search success rate
16.	No. of documents in stock per capita
17. DM F63	Documents added to stock per year per capita
18. DM F72A	No. of documents published after ...(year)... in stock
19. DM F72B	No. of documents acquired after ...(year)... in stock
20. IFLA 3	Expert Checklist - A
21. ISO B221A	Median time of document retrieval from closed stacks
22. ISO B221B	Median time of document retrieval from open stacks
23. DM F93	Misshelving
24. ISO B222A	Collection turnover
25. ISO B222B	Loans per capita
26. ISO B222C	Documents on loan per capita
27. ISO B222D	Cost per loan
28. ISO B222E	Loans per member of staff
29. IFLA 4c	Percent of stock not used within a certain period of time
30. DM F85	In-library use per document in stock
31. EAL P3.3	Documents delivered per capita
32.DM H22	Proportion of interlibrary loans to total loans
33. DM H23	Inter-library loans per capita
34. ISO B223A	Speed of interlibrary lending
35. DM F98	Speed of document delivery from another site or service point
36. DM G12	Reference transactions per capita (OMPL p66)
37. ISO B23A	Correct answer fill rate
38. EAL P3.3	Information Skills Instruction per capita
39. DM E12	Remote uses of the library per capita
40. ISO B261A	Facilities availability
41. ISO B261B	Facilities use rate
42. ISO B262A	Seat Occupancy rate
43. IFLA 2	Opening hours compared to demand
44. DM C11	Library floor area per capita (EAL P5.3)
45. DM J22	Number of items of equipment in the library per capita
46. ISO B263A	Automated systems availability
47. ISO B311A	Median time of document acquisition
48. ISO B312A	Median time of document processing
49. ISO B313A	Cost per title catalogued
50. DM E13	Program/activity attendances per capita(OMPL p71)
51. DM B13	Number of staff per capita
52. DM B14	Number of professional staff per capita

Table 2 List of datasets

No. of members of population served
No. of active users
No. of active borrowers
No. of professional library staff
No. of non-professional library staff
No. of seats
No. of occupied seats
No. of hours library is open
Library floor area
No. of items of equipment in the library
No. of documents in stock
No. of documents in lending collection
No. of un-issued documents in lending collection
No. of library visits
No. of loans
No. of documents currently on loan
No. of documents currently used in-house
No. of in-house collection documents used
No. of in-library use of documents
No. of remote uses of the library
No. of ILL loans
No. of photocopies made
No. of users receiving library training
No. of users attending library programmes
No. of available facilities
No. of facilities in use
No. of reference transactions
No. of enquiries handled
No. of enquiries correctly answered
Payment for catalogue record acquired
Subscriptions to body providing records
Staff salaries
Staff time spent on original cataloguing
Staff time spent on downloading or amending records
No. of titles catalogued
Operating costs
Number of required titles in stock
Number of required titles
No. of titles found for a subject search in catalogue by user
No. of titles found for a subject search in catalogue by librarian
No. of titles searched for
No. of titles found by user
No. of titles in stock
No. of available titles in stock
No. of available required titles in sample
No. of required titles in sample
No. of required titles made available
No. of documents checked for misshelving
No. of documents misshelved
Publication year of document
Median time of document acquisition
Median time of document processing
No. of recommended titles
No. of recommended titles in library
Median time of document retrieval from open stack
Median time of document retrieval from closed stack
Number of ILL documents received within 7 days
Number of ILL documents received within 14 days
Number of ILL documents received within 21 days
Median time of document delivery from another site or service
No. of hours the automated system is not available during one year
Opening hours specified by users
Number of registered loans in specified collection
Number of documents in specified collection
MemPop*:
Postgraduate population
Undergraduate pop.
Distance Education pop.
Loans*:
Postgraduate loans
Undergraduate loans
Distance educ. loans

*These are examples of possible sub-divisions

4.1 Conclusions of data collection testing in two sites

4.1.1 Minimising the data collection

A number of conclusions arose from this phase. The testing demonstrated that some indicators were redundant because the activities measured were already covered by the ISO 11620 indicators. These indicators were:

Active Borrowers per Capita (DM D12)
Lending Collection Use (IFLA 4A)

Additional datasets were necessary in order to form all the indicators:

Number of registered loans in specified collection
Number of documents in specified collection

Data collection is a time consuming exercise but the work can be minimised by properly identifying the requirements of the library. Several datasets comprising the list of indicators are not essential to the formation of those indicators. For example, “Median time of Document Processing” could contain several datasets if the library concerned wished to collect data for each stage of the process. The crucial datasets, however, are the first and last of the entire process.

Similarly, the first dataset of “Median time of Document Acquisition” could be the Actual Date of Publication of Document if that dataset would provide useful information to the indicator. It is not compulsory, therefore, to collect data for all those datasets in Table 2 in order to form the indicators listed in Table 1.

4.1.2 Timescale

For many indicators the datasets are collected over a sample period. This period of sampling is the decision of the librarian or those responsible for the collection. It is not possible to list all of those datasets. For example, the dataset “No of loans” which appears in several indicators could be:

No. of loans (for the past year)
No. of loans (over the sample period, e.g. two weeks).

4.1.3 Sampling

As with the time period the size of the sample for the indicators will be the decision of those responsible for the data collection. There is no golden rule for choosing the size of a sample; to a large extent the size of the sample will depend on the margin of variance which the data collectors are prepared to accept.

To obtain a representative sample of the user population it would first be necessary to decide what level of detail would be needed in the responses. This "stratification" of the user groups (or any target group of data) is explained in most textbooks on sampling. Two of the most common types of sampling are briefly described here:

Simple random sampling.
With this method, every unit of the population is identified by a number. The sample is chosen from this group of numbers by using random number selection. Choosing these random numbers could be by selecting numbers from a hat but more common is the use of random number tables. These tables are often included in statistical textbooks. Using these tables properly guarantees a random selection of the population.

Systematic sampling
As before every unit of the population is identified by a number. The sample size is related to the population size (the sample interval). This ratio is rounded to the nearest integer. A random number is chosen between one and the sample interval. For example, if the sample interval is thirty and the random number is seven, then the numbers chosen are 7, 37, 67, 97 etc. until the sample size is reached.

If the entire user group is to be sampled it follows that if one user group represents twenty per cent of the total group, then that group should also form twenty per cent of the sample.

Actual library users might not of course reflect the total population and if a sample is to be done in house it is possible to carry out the exercise at sample times. This will at least help to target those users who can only use the library at specific times, perhaps in the evening or at weekends.

4.1.4 Unavailable datasets

Dublin City University Library was unable to collect some or all of the datasets for the following indicators, with explanations as to why:

In-library use per capita / In-library use per document in stock

This has been fully explained in section 3.9 of Deliverable Report 4 (Dublin City University, et al 1996, 29-30). It was not possible or practical to get a reliable measure for the in-library use of lending material.

Median time of document delivery from closed stacks

Dublin City University Library does not have any closed stacks.

Speed of document delivery from another site or service point

Dublin City University does not have any branch libraries or separate service points.

Remote uses of the library per capita

The current system set-up of Dublin City University Library does not provide the access or use logs necessary to form this indicator. This has been further explained in section 3.41 of Deliverable Report 4 (Dublin City University, et al 1996, 42).

Program/activity attendances per capita

Dublin City University Library does not host specific programs or activities which could be included in this indicator.

University of Central Lancashire Library was unable to collect the datasets for two indicators as they were not appropriate to the library (these are further explained in sections 4.37 and 4.41 of Deliverable Report 4 (1996, 69 & 71 respectively):

Speed of document delivery from another site or service point

Remote uses of the library per capita

Like Dublin City University Library, University of Central Lancashire Library was also unable to retrieve datasets for “Median time of document processing” from the automated system and therefore had to gather the data manually. This was implemented after the completion of the remainder of the data collection.

4.1.5 Problematic indicators

The measure of the in-library use of documents proved problematic in both test sites but for different reasons. Operational difficulties at the University of Central Lancashire Library at the time of data collection would have made the process too disruptive to normal library practice. At Dublin City University Library it was considered too time consuming to devise and especially to implement a mechanism for collecting a measure of the in-library use of lending material.

Other indicators proved problematic but for different reasons, such as the time necessary to collect the necessary datasets, or that the automated system did not generate the required data.

4.2 Retrieval from the automated system

In the Dublin City University Library collection exercise the automated system was used to retrieve at least one of the datasets comprising twenty-nine of the indicators. In the University of Central Lancashire the system was used for seventeen indicators. In both sites, however, it was the use of the system's catalogue which provided the data by a manual search.

In both sites the indicator "Median Time of Document Processing" proved impossible to retrieve from the automated system. This is one of the indicators which would most benefit the staff collecting the data if it were available from the system. Each document has at least two datasets and the possibility of many more, if this dataset were automated it would enable the data collectors to collect data for a far longer period than by a manual method. It would also enable to a greater extent the ability to "drill down" through the indicator, that is to examine each stage in the processing department to see where, if any, delays are occurring in the procedure.

Disappointingly, one of the potentially most interesting indicators was not possible to form in both test sites. "Remote uses of the library" requires functions of the library servers which at present neither site's server possesses.

4.3 Volunteers and users

In a large scale exercise such as those carried out in the two test sites many users will be approached by library staff. The extent of this contact could range from a single answer to a data collector's question to asking the user to participate in testing the effectiveness of the library's reference service which will require a considerable amount of their time.

In Dublin City University Library's collection exercise 350 users were asked to contribute to some extent to the data collection (the majority of these were involved in completing the user survey). Of these approximately 75 users had to spend more than the estimated five minutes needed to answer the questionnaire.

The University of Central Lancashire data collection exercise involved the participation of approximately 600 users, from among full-time students, part-time students and staff. The vast majority of these users were approached in the course of the two major surveys conducted during data collection; those for the user satisfaction survey and the opening hours survey. However, of all the users approached personally for contribution to the data collection, no single participation lasted longer than 10 minutes.

The effort expended in getting users to contribute more than just a few minutes of their time should not be under-estimated. If the users perceive the time needed as being lengthy (whether the data collectors consider it to be is irrelevant) they will be reluctant to contribute. Neither should users be badgered into participating.

4.4 Staff involvement

The EQLIPSE researchers in both test sites carried out most of the work involved in collecting the data.

In Dublin City University Library staff which were consulted or actually contributed to the data collection included the Director, sub-librarians, subject librarians, cataloguing staff, acquisitions staff, issue desk staff, inter-library lending staff and periodicals staff. Management Information Systems personnel had to be continually consulted throughout the process and their expertise on the regular statistics gathering in the library and knowledge of the Dynix library system was essential. Other university staff also contributed to the data collection. Some completed the user surveys while others submitted expert checklists.

In UCLancs library the Project Co-ordinator and the Project Research Assistant carried out the data collection in close liaison with library staff. It was necessary to consult with library personnel in all sections and at all levels, but involvement with some key postholders predominated. Project staff found it necessary to work closely with the Support Services Librarian for any datasets which required interrogation of the Dynix system cataloguing modules, or the IT Systems Administrator in his absence. Interrogation of the circulation module was carried out largely by the Assistant User Services Librarian.

The Acquisitions Librarian (Support Services) was required to make a heavy and time-consuming contribution to gather some data and the Quality Co-ordinator (Central Services) provided much essential guidance in the use of the data contained in the SCONUL annual statistical return.

Other University staff involved in the data collection outside the library include the University's planning office who contributed data on the numbers of students and staff. It was unnecessary to approach teaching staff directly for reading lists for the expert checklist indicator as Subject Librarians (Academic Services) already had a number of suitable lists. These were supplemented by the co-opting of lists into EQLIPSE which had already been supplied to CERLIM for another ongoing Libraries Programme project (SESAM).

4.5 Overall time in collecting data

It is very difficult to estimate the amount of time spent in collecting the datasets described in this report. For both test sites this was the first collecting exercise for many of the data described. Work began on integrating the necessary procedures in both test sites in November 1995 and the data was collected in January 1996. The amount of staff time in total is also difficult to estimate as several members of staff were affected. Suffice to say that Dublin City University Library had the EQLIPSE researcher working full time on the collection exercise. University of Central Lancashire Library had the EQLIPSE researcher full time and also a research assistant during the latter part of the collecting period which reflects the fact that it is a larger institution which would normally entail larger sample sizes and consequently more time needed for data collection, collation and analysis.

Much of the preparation work involved determining the statements needed to interrogate each sites' automated systems. It was also during the preparation that unforeseen circumstances arose, for example that not all documents were registered on the system and therefore had to be counted manually and also that the automated system did not generate the data it was assumed it did generate (as in the Speed of Processing Documents).

If the exercises were to be carried out on a regular basis much of the necessary preparation would already be implemented; the survey and sampling forms would already have been designed, the RECALL statements would have been determined, some datasets may not change at all (library floor area, number of seats etc.) and many staff would already be aware of the processes they would be asked to follow. It is probably impossible to state how long the collection exercise would take if it were run regularly but a very rough approximation could be a minimum three month period. This would allow for the necessary sampling periods and for the data collation. This figure could differ dramatically, however, in institutions of different sizes which would require larger sample sizes. Experience from larger libraries in the Consortium shows that a six month period may be necessary to collect all data.

Experience of Project staff at the University of Central Lancashire suggests that a regular collection period would not be less than one month - and this estimate assumes the immediate and full co-operation of all required library staff, and the freedom to conduct whatever collection procedures are necessary without notice. Project staff did not spend less than two months on data collection. It

should also be considered that this length of time represents two months in total spread out over a much longer period.

4.6 Summary

The data collection exercises in the libraries of Dublin City University and the University of Central Lancashire were carried out over a two/three week period in January 1996. The data generated by the collection exercise was then made available for the next stage of the project in which the prototype EQLIPSE software was tested in two live environments.

5. EVALUATING THE PROTOTYPE

The EQLIPSE prototype was developed twelve months into the project and was initially tested and evaluated in two of the Consortium's libraries, the University of Central Lancashire and Dublin City University. The goal of this phase (workpackage 5) was to test and evaluate the EQLIPSE prototype in a 'live' environment. The results of the testing of the prototype led to further debugging by the developers while the evaluation was reflected in either further development or will be reflected by way of recommendations in the final functional specification.

The substantive outcome of this workpackage was the corrected and enhanced EQLIPSE prototype. The purpose of this phase of the Project was to outline the implementation and results of the testing and enhancement process, provide an interim account of the functionality which is additional to that specified in deliverable 2 and anticipated the content of the final functional specification to form part of this report.

This phase also specified the functional and technical details of the Project's implementation of client/server and flat file interfaces. This specification includes the application layer data formats which have been used in common across both interfaces.

5.1 Specification of trials

In order that the goal of an open, powerful and user friendly performance management tool can be achieved, careful testing and extensive feedback from the user is required. In order to facilitate this process the following trial specifications were generated. Each system function is listed with the characteristics it ought to exhibit.

1. System Installation

- Simplicity.
- Speed.
- Robustness.
- Compliance with local standards i.e. local hardware and software.

2. User Interface

The user interface was evaluated and tested in a number of areas which are detailed below. A number of general principles were kept in mind while making this evaluation.

User Interfaces can be evaluated under two broad areas. These are presentation and dialogue. By presentation is meant the manner in which the system displays instructions, options and data to the user. By dialogue is meant the sequence of steps through which the user needs to go in order to have the software carry out an action. Command languages, icons and pull down menus, form filling and menus are examples of dialogue styles.

Characteristics ideally exhibited in each of these areas are

Presentation

- Clarity : Visual and Verbal

  Graphical elements such as icons should suggest their function and terminology used should never be more complicated than it needs to be.

- Uncluttered :

  The screen should never contain so much information that it is difficult to find the data or function you are looking for.

Dialogue

- Helpful : e.g. the next step or available options should be clear to the user. Errors messages should give all the information required. They should never have a general cryptic format such as ‘invalid data syntax’.

- Tolerant / Forgiving : One should be able to easily correct data entered in error or back out of a function. It should be possible to undo the last action. When significant, irreversible changes are about to be made the user ought be asked for confirmation.

- Robust : User errors should not be capable of crashing the application or the system.

2A. Data Input

- Simplicity
- Speed
- Robustness

2B. Metadata Input (i.e. definitions of new Data Elements, PI s etc.)

- Simplicity
- Speed
- Robustness

2C. Data / Metadata Modification

- Simplicity
- Speed
- Robustness

3. Data Display

- Speed (Response with larger data sets to be tested)
- Ease
- Reliability
- Usefulness of display formats.
- Clarity of display formats
- Variety of display formats.

4. Granularity

- Ability to examine task level PIs in detail i.e. to ‘drill down’.

5. Data Storage and Data manipulation

- Ability of database and software to input, store and display all data elements and PIs as selected in workpackages 1 and 4.
- Each data element and PI to be tested for display.

<u>Outputs from testing/evaluation</u>

- Evaluation reports.
- Bug reports e.g. current function not working correctly, system crashing under certain circumstances
- Recommended enhancements e.g. better way to carry out function or new function which ought to be provided within the scope of such a system.

5.2 Evaluation in two test sites (DCU and UCLancs)

The EQLIPSE prototype underwent rigorous testing in the libraries of Dublin City University and the University of Central Lancashire.

The following pages contain specimens of the forms used to report on evaluation, bugs and suggested enhancements during the evaluation process at University of Central Lancashire and Dublin City University.

EQLIPSE Project Workpackage 5 : Field Trials / Evaluation

Evaluation Form

Systems Function :

Give a rating to the function in the range 0 to 10 in the following categories. Add comments if necessary.

Category	**Rating**	**Comments**
Simplicity		
Speed		
Robustness		

Give a rating to the function in the range 0 to 10 in the following categories. Add comments if necessary. These categories may not apply to certain functions

Category	**Rating**	**Comments**
Local Standards Compliance		
Clarity of Display		
Usefulness of Display		
Variety of Display		

General Comments

Signed : **Date :**

EQLIPSE Project Workpackage 5 : Field Trials / Evaluation

Bug Report Form

Systems Function :

Exact steps carried out :

Exact data input if any :

Error message received if any :

Following the bug being encountered in what state was the machine left -
Please tick

Responsiveness

Responsive	
Unresponsive	
Automatic Reboot	

State of Machine

At the same point in the prototype	
Within windows	
At the DOS prompt	

Signed : **Date :**

EQLIPSE Project Workpackage 5 : Field Trials / Evaluation

Recommended Enhancement Form

Systems Function :

Description of enhancement suggested

Why is this enhancement required

Please give an example of how this would work

How should this be linked to the current prototype i.e. to what menu or toolbar.

Signed : **Date :**

Full details of the evaluation by the two test sites are available in the Project's fifth deliverable. The main outcome of this phase was the debugged and enhanced prototype which enabled the Project to move onto the next phase, integration of the EQLIPSE system into six libraries.

5.3 EQLIPSE - Integration with LAS

One objective of the EQLIPSE project was the implementation of client/server retrieval of data elements from library automation systems (LAS). However, the number of relevant data elements available from LAS is very small. Of the 137 data elements which comprise the PIs selected for use in the EQLIPSE project only 8 on average are available from a sample of LAS used by the EQLIPSE partners. This is largely due to the fact that many of the data elements are not the sort of data one would expect a LAS to maintain. Total target population, number of seats in library and floor area are examples of such data elements. For this reason most data for the field trials and evaluation was acquired and loaded manually.

The EQLIPSE prototype was also tested with data acquired from LAS non-manually. In the case of Horizon this was done via an SQL 'agent' operating on the EQLIPSE client machine requesting and receiving the data elements from the Horizon server via a network running TCP/IP. Use of SQL is as recommended by the first EQLIPSE Project Commission Review (Dublin, 20 February 1996).

This agent was written in Visual Basic. This is as per the EQLIPSE system itself. Embedded SQL was used to query the Horizon database. These queries and the responses to them can be transmitted via a LAN or the Internet.

In the case of Dynix the possibility of using a Z39.50 client agent to request and receive data elements from the LAS server was also investigated. In keeping with the Commission Review's recommendation the project consortium did not commit itself to developing such an agent. The development of a flat file interface using the EIFF (EQLIPSE Interface File Format) did take place. In order to maximise openness this format will be made available to all interested parties. In

order to maximise uniformity of user interface the flat file transfer facility used the same presentation and dialogue as the client / server interface.

5.3.1 Non-Dynix systems functionality

As part of the Consortium's commitment to developing an open system applicable to many library automated systems (LAS), the Project team engaged a consultant to investigate the data handling capabilities of other LAS. This report determined both the data which these LAS contained within the system and also whether the systems could be interrogated by SQL or were Z39.50 compliant. The future of the EQLIPSE prototype is dependent on its applicability to as many LAS within the European context as possible.

5.4 Quality Workbench

5.4.1 Quality Workbench in DCU

As part of the EQLIPSE project, Quality Workbench, an ISO 9000 compliant quality documentation software system, was obtained by DCU Library. This software is specifically designed to facilitate strict adherence to the ISO 9000 quality standard, a standard with which DCU Library does not comply, and nor does it intend to in the foreseeable future.

A Quality Committee was set up within DCU Library to investigate the possibility of obtaining accreditation for a national quality standard. As part of the EQLIPSE research, DCU Library staff sitting on this committee were involved in the evaluation of Quality Workbench and its suitability for DCU Library.

Initially, the EQLIPSE researcher received an evaluation copy of the software which allowed limited use of the software but did allow examination of the different functions and features of Quality Workbench. Based on this evaluation, DCU Library's Quality Committee were given a demonstration of the software. As a result of this the full working copy of Quality Workbench was obtained. A two day training session was provided by the suppliers, Dialogue Systems, which was held in DCU Library and attended by the EQLIPSE researcher and members of the library's Quality Committee. Feedback was obtained by interview with these library staff as well as other staff involved.

5.4.1. Feedback and recommendations

As Quality Workbench is already a commercially proven and successful package, the evaluation did not take the form of completing bug report forms and recommended enhancement forms. Instead, the various functions and features of the software were examined and tested as to their suitability for DCU Library.

Overall, feedback from library staff was positive who saw a definite use for specific features of the software within the library. As mentioned above, DCU Library does not yet have the documentation which would accompany compliance with a quality standard and therefore did not have the necessary documents which could have just been loaded into the system.

Further evaluation of the software continued into Workpackage 6 of the project but primarily, the following areas of the software were seen to be the most useful:

- document control
- personnel
- mailing facilities

Quality Workbench has many other features which, at the current stage of DCU Library, would not have a role in the library. The library does not adhere to a published to recognised standard and therefore does not yet have a use for the Nonconformity or Audits modules of the software. With the move towards a national quality standard, however, this could change.

The Customer Complaints and Customer modules of the software could have a use in DCU Library but they would probably require adapting. One of the problems is that certain terms are hard coded into the software and therefore the term “product” is used in the software, whereas the library would prefer to use the term “service”. The Customer module could be used, for example, in the Acquisitions department of the library but generally any complaints in this area are those of the library complaining to its suppliers and not the reverse.

DCU Library has a Suggestions Book in which users write comments or complaints which are responded to regularly by staff. It would be very useful if this could be automated. Ideally, these users could input their comments directly to the Quality Workbench system; the alternative at present would be for a staff member to transcribe these complaints from the Suggestions Book to Quality Workbench which would be a lengthy process.

5.4.2 Quality Workbench in UCLancs

EQLIPSE Project personnel and the Library Quality Co-ordinator attended a Quality Workbench training course in early May 1996, and the software was subsequently installed on the University of Central Lancashire LLRS administrative computing network shortly thereafter. The configuration chosen for the installation was that of a single concurrent user with authoring and editing rights, and an unlimited number of concurrent users with read-only access.

Since installation, Quality Workbench has been found, by EQLIPSE Project and quality staff alike, to be an exact fit to the document authorisation, circulation and auditing procedures required by ISO 9000 and previously discharged exclusively by paper systems. No significant bugs have been encountered since its installation.

Quality Workbench has been found to be ideally suited to the requirements of the University of Central Lancashire Library's quality procedures. Its document control, audits and non-conformities and customer complaints modules at once replace the cumbersome inconvenience and possibilities for error of the paper system which preceded them. It has been recommended that the product should be used operationally on a permanent basis.

5.4.3 Evaluation of Quality Workbench - summary

The use of Quality Workbench (QW) in libraries will depend on whether that library is ISO 9000 compliant or not. For those libraries which do comply with the standard the software will probably immediately solve their quality documentation control and needs. The difficulty is for those libraries which do not comply with the standard. QW is an excellent piece of software and fulfils its purpose of enabling compliance with ISO 9000. However, non-ISO 9000 environments may find its functionalities restrictive and unsatisfactory. These same points emerged when both pieces of software were further evaluated in the final phase of the project. This will be further discussed in section 8.4 of this report.

6. INTEGRATION IN LIBRARIES

6.1 Introduction

The previous phase had evaluated the EQLIPSE prototype system at two test sites and as a result had specified a number of enhancements and changes necessary to move on to the fourth and last phase, that of integrating the EQLIPSE system into six libraries. The trials in the six libraries included straightforward use of a standalone version of EQLIPSE with manual input of the necessary data. Not all of the partners purchased a full version of Quality Workbench but instead used an evaluation copy of the software. This evaluation copy allowed access to the full functionality of the software and was limited only by the number of records it permitted users to input. The Consortium deemed this an adequate method of properly assessing the software.

This section of the Final Report also summarises the conclusions reached by the Consortium as to the applicability of the ISO draft standard for performance measurement in libraries and the use of ISO 9000 compliant software in libraries.

6.2 Evaluation

To a large extent, the evaluation process carried out by the six libraries closely followed that of the earlier testing done in the two test sites. Although the sites were expected to implement the system with only limited assistance, as would be the case with a commercial product. The same Bug Report and Recommended Enhancement forms were used by associates to evaluate the software. The main objectives of this phase were to:

- lead to an updated EQLIPSE specification (Section 7 of this report) and
- to develop an Implementation Manual

The Implementation Manual forms the sixth deliverable of the Project and is publicly available. The manual draws on the evaluation by the test libraries and examines the managerial/organisational issues and the staff training needs associated with the EQLIPSE system. The manual also contains the data collection methods for each of the datasets specified in the EQLIPSE system. Summarising the findings of this phase of the work, the following managerial issues were identified:

EQLIPSE:
Library managers will have to ensure that they have appropriate hardware to run the EQLIPSE system. They must also ensure that staff have IT knowledge to load and use the software.

Performance Workbench:
From the work carried out by the EQLIPSE project team, experience has shown that for all but the smallest libraries managers need to allow at least one full time member of staff one month for the data collection exercise.

In order to build up a picture of library performance over time, it is recommended that data is added to the system regularly. Library managers will have to decide how often the data collection will be carried out, although monthly and annual periods have been found to be suitable for most purposes.

Sampling is used for collecting many datasets. A decision will have to be made as to the size of samples and the length of time sampling periods will last.

Some datasets may prove impossible to collect, or be too time consuming to collect. Decisions may have to be made as to which datasets (and hence which indicators) to leave out. It should be noted that EQLIPSE is flexible as to the inclusion or exclusion of performance indicators and datasets.

For some datasets users have to be involved. This may range from answering a single question to filling out a questionnaire, and for a measure such as user satisfaction may involve other methods such as structured interviews and focus groups. It will have to be decided how much time and effort it is realistic to ask of users, and be aware of this when designing data collection forms.

For some datasets other members of library staff have to be involved. Again it will have to be decided how much time and effort can be asked of other staff.

Quality Workbench:

Library managers will have to identify key personnel who will be allocated quality management responsibilities. Appropriate access levels and reporting structures will have to be input to the system for these personnel.

For each section within the library the personnel with quality management responsibilities will have to identify which procedures need to be input to the system. The procedures will need to be written or imported to the system.

Library managers will have to ensure access to the system for all staff, and organise training for all in the use of the Quality Workbench Viewer.

6.3 Feedback from partners

The following section summarises the research gathered from the integration of the prototype system into the partners' libraries. In addition to completing bug report and recommended enhancement forms, partners also completed a questionnaire which requested further information on the applicability of the ISO 11620 draft standard to their libraries.

6.3.1 Data collection

1. Which indicators were tested in your library?

The following indicators were tested by all six partners involved in the independent implementation trial:

- Loans per capita
- Loans per member of staff
- Proportion of interlibrary loans to total loans

The following indicator was tested only by one partner:

- No. of documents published after ...(year)...in stock

The remaining 50 performance indicators were tested by two or more libraries.

2. What staff did you employ in the data collection?

The data collection was mostly conducted by researchers (EQLIPSE) and professional librarians, even though student assistants and other staff were also involved in the collection procedures. SUL was the only one of the six partners to employ non-professionals.

3. What time (man-days) did you need for the data collection?

The time needed for the data collection ranges from 10 man-days to 6 man-months. Only 10 man-days were needed because of data being collected at the time for different projects on performance measurement running simultaneously. 6 months includes the time for revising and merging the collected data. Where data collection has been implemented for several years as in CBS, it is impossible to make even an estimate, since most staff members are involved in one way or another in the data collection. The time taken is highly variable and depends on: size of library; number of sites; number of indicators chosen; experience. Some datasets (such as 'in-library use') are extremely labour intensive.

4. What preparation was needed ? (e.g. instruction of staff, collection of data from central management of the institution etc.)

In order to prepare for the data collection appropriate library staff had to be contacted and asked for co-operation. Then meetings were held regularly to discuss problems and to find appropriate definitions for problematic datasets.

Any users, staff or student assistants had to be fully instructed.

Time had to be spent on the design of any forms required e.g. user survey questionnaires and expert checklists.

Data had to be obtained from a wide variety of sources (university administration office, annual statistical returns, automated system of the library, library staff, turnstile, surveys, studies).

Project information had to be disseminated among staff to keep them fully informed of activities.

5. Which indicators proved most valuable to management in your library?

- *User satisfaction*
- Cost per user
- Library visits per capita
- Titles availability
- In-library use per capita
- In-house collection use
- Document use rate
- Title search success rate
- Subject search success rate
- Expert checklist
- *Median time of document retrieval from closed stacks*
- Median time of document retrieval from open stacks

- *Misshelving*
- Collection turnover
- Loans per capita
- Cost per loan
- Documents delivered per capita
- Proportion of interlibrary loans to total loans
- *Speed of interlibrary lending*
- Reference transactions per capita
- Remote uses of the library per capita
- *Seat occupancy rate*
- *Opening hours compared to demand*
- *Median time of document processing*
- Cost per title catalogued
- Number of staff per capita
- Number of professional staff

The indicators in italics were rated as valuable to management by more than one partner. User satisfaction was agreed to be the most important of the performance indicators.

6. Where there any difficulties in the procedures of collecting that could be added to the description in D 6?

The 'per capita' factor is usually a problem for all types of libraries who do not have a clearly defined primary user group (e.g. national libraries, city libraries, etc.). There might also be problems in the compliance of national standard to ISO standard, the costs computation and the selection of indicators adequate to represent the institution. SUL emphasised that data collection was very time-consuming.

Especially: Did you encounter difficulties in defining costs? (e.g. Cost per user or Cost per loan)

Defining costs still seems to be a problem for most partners. Reasons for this are e.g. the different budgeting of library departments, the lack of an accurate cost accounting system, the separate accounting of staffing costs by a ministerial office, or the problem of including VAT. For the indicator Cost per title catalogued it might be difficult to obtain the datasets for 'cost per hour of labour' and 'cost of acquiring bibliographic records and associated data during the

sample period' because of the lengthy surveys needed to register the work processes involved.

7. Indicators for which no data could be collected because of:

Technical difficulties (i.e. the technical facilities are not available to collect the data)

- Cost per user
- Cost per library visit
- Titles availability
- Proportion of documents on loan (reason: change of library system)
- Title search success rate
- Subject search success rate
- Documents added to stock per year per capita
- *No. of documents published after...(year)...in stock*
- No. of documents acquired after...(year)...in stock
- Expert Checklist -A
- *Documents on loan per capita* (reason: library system not able to calculate the documents currently on loan)
- Cost per loan
- Active borrowers per capita
- Inter-library loans per capita
- Speed of interlibrary lending
- Reference transactions per capita
- Correct answer fill rate
- Remote uses of the library per capita

The indicators in italics were difficult to collect for more than one partner.

Organisational difficulties (i.e. due to organisational procedures it is difficult to collect the data)

- Percentage of target population reached
- Cost per user (reason: difficulties in defining costs because of different budgeting of library departments)
- Library visits per capita
- Required titles extended availability
- *In-library use per capita* (reason: for some types of libraries it is difficult to obtain reliable data on in-library use)
- *In-house collection use* (reason: for some types of libraries it is difficult to obtain reliable data on in-library use)
- *Document use rate*
- Percentage of required titles in stock
- No. of documents in stock per capita
- Documents added to stock per year per capita
- Median time of document retrieval from closed stacks
- Median time of document retrieval from open stacks
- Misshelving
- *Collection turnover*
- Cost per loan (reason: difficulties in defining costs because of different budgeting of library departments)
- Lending collection use
- Percent of stock not used within a certain period of time
- *In-library use per document in stock* (reason: for some types of libraries it is difficult to obtain reliable data on in-library use)
- Documents delivered per capita
- Speed of interlibrary lending
- Reference transactions per capita
- Correct answer fill rate
- Facilities use rate
- Opening hours compared to demand
- Library floor area per capita
- Number of items of equipment in the library per capita

- Median time of document acquisition
- Median time of document processing
- Cost per title catalogued
- Program/activity attendances per capita
- Number of staff per capita
- Number of professional staff per capita

SUL could not test indicators concerning processing speed until the new automated library system had been implemented.
The indicators in italics were difficult to collect for more than one partner.

Lack of time (i.e. insufficient staff time to carry out the necessary surveys etc.)

- *User satisfaction* (reason: user satisfaction surveys are generally very time consuming)
- Required titles availability
- Required titles extended availability
- In-library use per capita
- In-house collection use
- Percentage of required titles in stock
- Title search success rate
- Subject search success rate
- No. of documents published after...(year)...in stock
- In-library use per document in stock
- Documents delivered per capita
- Facilities availability
- Seat occupancy rate
- Automated systems availability
- Median time of document acquisition
- Median time of document processing
- Cost per title catalogued (reason: lengthy surveys needed to register work processes and to obtain time data (e.g. how much time is needed to catalogue a monograph) from which costs can be calculated)

The indicator in italics was difficult to collect for more than one partner. For some partners besides lack of time a lack of library staff was also responsible for difficulties with data collection.

Indicators not of interest for the library

- Library visits per capita
- Cost per library visit
- *Required titles extended availability* (reason: availability has already been measured several times for other indicators, e.g. Required titles availability, so there is no need for another indicator concerning this factor)
- Title search success rate
- Subject search success rate
- No. of documents in stock per capita
- No. of documents published after...(year)...in stock
- Median time of document retrieval from open stacks
- Misshelving (reason: systematic shelving of the collections in some library types; staff control of shelf arrangements once a day when reshelving the returned books)
- Speed of document delivery from another site or service point
- Reference transactions per capita
- Correct answer fill rate
- Remote uses of the library per capita
- Facilities availability
- Facilities use rate
- Seat occupancy rate
- *Opening hours compared to demand* (reason: no possibility for some libraries to extend opening hours, so user's demand was not asked for)
- Number of items of equipment in the library per capita
- Cost per title catalogued
- *Program/activity attendances per capita* (reason: attendances vary too much)

The indicators in italics were not of interest for more than one partner.

Circumstances of the indicator not existing in the library (e.g. no closed stacks or separate service points)

- Median time of document retrieval from closed stacks
- Median time of document retrieval from open stacks (reason: self-service library)
- Collection turnover
- Speed of document delivery from another site or service point
- Information skills instruction per capita
- Remote uses of the library per capita (reason: no remote uses of the library possible)

It should be noted that some indicators are not applicable to every type of library.

6.4 ISO 11620 - its applicability to libraries

The latest draft of the ISO 11620 standard on performance measurement contains twenty-nine performance indicators which it recommends for use in libraries. The final phase of the project not only allowed the Consortium to enhance and test the EQLIPSE software but also to properly evaluate the draft ISO standard on a pan-European basis.

The EQLIPSE Consortium endorses the draft ISO 11620 standard. The advantages provided by such a standard for libraries are several; it provides a set of indicators which have been tried and tested and therefore librarians can be assured that the data collection methods proposed are practical. It also demonstrates how the results of the performance indicators can be interpreted. Very importantly, it also allows for reliable benchmarking between libraries.

This is not to say that the indicators are immediately applicable to all libraries. There is some localisation work needed on each site to adapt the indicators to the specific library environment. Similarly, not all the indicators will be applicable to all libraries but the individual library can choose which are relevant.

A concern raised by the Consortium's partners was that not all aspects of library services are covered by the draft standard, particularly the networked

environment of libraries. The difficulty with this element of library work is that tried and tested performance measurement techniques have not yet been developed. It is precisely the role of the ISO draft standard to recommend only those indicators which have been proven to be applicable and practical in the library field. The recent work by McClure and Lopata (1996) and on-going work by the Centre for Research in Library and Information Management, University of Central Lancashire, UK, under its *Management Information for the Electronic Library Programme* (Brophy, 1995) could serve to progress this aspect of performance measurement in libraries. The EQLIPSE Consortium recommends that the ISO 11620 committee continues to develop the standard as this work is further tested and refined.

The principal benefit of the draft standard is that it provides a starting base for libraries. There has been much discussion of performance measurement and its potential benefits but there has been little practice. The draft standard provides a core set of performance indicators upon which librarians can rely, they do not have to develop their own indicators (as in the case of previous manuals, which requires a lot of effort) and they are also assisted in interpreting the results which they generate. It is necessary that a greater proportion of libraries in Europe begin to exploit the possibilities provided by performance measurement techniques. These techniques need first to be applied to the more traditional library services before moving on to the networked and electronic library environment.

6.5 Quality Workbench - ISO 9000 compliant software in libraries

Quality Workbench, a software package which facilitates compliance with ISO 9000, was evaluated in eight libraries. Only one of those libraries (the University of Central Lancashire) conforms to the ISO 9002 standard. In that library Quality Workbench was found to be ideally suited to the requirements of the Library's quality procedures. Its documentation control, audits and non-conformities and customer complaints modules at once replace the cumbersome inconvenience and possibilities for error of the paper system which preceded them. It has been recommended that the product should be used operationally on a permanent basis.

For those libraries which do not comply with the ISO 9000 standard the reaction to such software was mixed. Certain elements of the functionality were found to be of potential use but overall the use of ISO 9000 compliant software in a non-ISO compliant library environment was restrictive and unnecessary. No one element of the software's functionality was ideally suited but could be adapted. This suggests that the use of such ISO oriented quality software is unnecessary and unhelpful. The EQLIPSE partners believe it more important to properly identify the means and methods of implementing quality work within their libraries instead of attempting to work towards complying with ISO 9000, or attempting to fit their current quality policies into such software. Overall, the Project partners concluded that their libraries should choose a less rigid solution to their quality work.

In the same manner that performance measurement techniques have not been developed or practised in a systematic fashion in many libraries, many librarians are simply unsure as to the quality requirements of their libraries. There is clearly a need for further investigation into the quality requirements of libraries on a very practical level.

7. FINAL FUNCTIONAL SPECIFICATION

7.1 Introduction

The application concept that has emerged in the EQLIPSE consortium is of a system which is both open and integrated. It will be open in accepting data from a range of LAS and other sources via clearly defined data transfer formats. It will be integrated in providing useful links between quality management, with its documents and procedures, and performance measurement, with its quantitative measures. It is this combination of internal integration and external openness that makes the EQLIPSE concept unique in this field.

7.1.1 Purpose

The purpose of this section is to define the extended set of functionality which is derived from the initial functional specification, the prototype developed and tested during the project and the feed back from all partners responsible for testing. It should be noted that this specification does not specify the functionality of the final version of the prototype. The prototype implements only a large subset of the complete functionality specified here.

From consideration of all of the above, it can be concluded that the purposes satisfied by an ideal EQLIPSE system would be as follows -

To allow a library and information service manager to quickly and easily assess the quality of service provided in different functional areas over different periods of time through the monitoring of quantitative performance indicators and objectives.

To allow the data on which these quantitative measures are based to be easily entered or loaded to the system.

To allow relevant data to be obtained from external systems via both network client/server links and magnetic media.

To allow quality management documents and procedures to be created, modified, approved and released.

To allow useful links to be set up between such documents and quantitative data input / display functions.

7.1.2 Scope

It is envisaged that the EQLIPSE system will be applicable across the full range of library and information service ; academic, public and special. It will be useful to both those who have a large amount of quality management material and performance measurement data, and to those who have little. It may be used for quality management or performance measurement in isolation or both.

The performance measurement module may be supplied with a base set of pre-defined performance indicators or the user may define their own or a combination of the two may be used. In this way the system's scope should be broad and its life long.

7.1.3 Definitions - functional sequence

The sequence of definitions used here is designed to allow the reader get a clear view of the relationship between the terms used. It is followed by an alphabetic sequence which will be more useful for reference purposes.

QUALITY MANAGEMENT

EPS	EQLIPSE Prototype System
DOCUMENT	A document can be any information source relating to Quality Management in the library. It can include free text, graphics, sound or any other available multimedia element.
PROCEDURE	A PROCEDURE will be a document which also defines ACTIONs to be carried out at certain points in time. The required ACTIONs will be described. Any ancillary documents required such as forms will be attached.

ACTION	A specific activity described within a PROCEDURE. For example an annual survey of user satisfaction. All ACTIONs will be related to a frequency with which they are to be carried out and a date on which they were last carried out.
ACTION-DUE-REPORT	A report which lists all ACTIONs for which the difference between the current date and the date last done is greater than the frequency. This report may be printed at any time but it is recommended that it be generated monthly.
DAY-END-ROUTINE	A routine which may be run on the system at the end of each working day. This routine will check for actions due and email the responsible member of staff and will download available data from the LAS.

QUALITY MANAGEMENT / PERFORMANCE MEASUREMENT LINKS

HOTSPOT	A point in the test of a DOCUMENT or PROCEDURE which is linked to a QW or PW application function such as display of frequency and date last done for an action or PW data input / display functions. The function is activated by double clicking on this point in the text.

PERFORMANCE MEASUREMENT

OBJECTIVE	An overall target of the Library or Information Service whose level of satisfaction encompasses and is determined by a range of PIs.
PI	Performance Indicator. A quantity indicating the level of quality of service provision in a particular area. A PI should be single valued for any specific period of time. For example Library Floor Area per Capita.
WEIGHTING	A number between 0 and 1 which indicates the degree of relevance of any PI to any specific objective.
DATA-ELEMENT	A fundamental piece of data from which PI-MEASUREs would be calculated.
SUB-DATAELEMENT	A data-element in so far as it applies only within a particular user group, document collection or function. For example the data-element 'library use' could be analysed into undergraduate, postgraduate and distance education student library use. Alternatively it could be divided into short loan or main lending collection use.
LEVEL OF ACHIEVEMENT	The degree to which a OBJECTIVE has been achieved for a specific time period. Numerically this will be the sum of all relevant PIs for the time period multiplied by their weighting for the OBJECTIVE in question.
PI-MEASURE	The value of a specific PI for a specific time period or at a particular point in time.
DATA-ELEMENT-MEASURE	The value of a particular DATA-ELEMENT for a specific time period or at a particular instant in time. For example, average loan period can only be defined over a particular period of time while number of documents on loan only makes sense at a particular point in time.

SUB-DATAELEMENT-MEASURE	The value of a particular SUB-DATAELEMENT for a specific time period or at a particular instant in time.
DRILLDOWN	DRILLDOWN is the process of data analysis by which a higher level quantity or series of quantities such as 'title availability' is broken down into lower level quantities or series such as 'main lending titles availability' and 'short loan titles availability'.
THRESHOLD	A value relating to a PI or OBJECTIVE which when missed or exceeded is cause for concern to the user. A THRESHOLD is either a MAX or a MIN. When the value of a PI-MEASURE or an OBJECTIVE's LEVEL OF ACHIEVEMENT falls below a MIN THRESHOLD then the user needs to be warned. When the value of a PI-MEASURE or an OBJECTIVE's LEVEL OF ACHIEVEMENT goes above a MAX THRESHOLD then the user needs to be warned. Such events are called threshold violations.
EXCEPTION-REPORT	A report which, for a specified time period, details all threshold violations which have occurred.

7.1.3.1 Definitions - alphabetic sequence

ACTION	A specific activity described within a PROCEDURE. For example an annual survey of user satisfaction. All ACTIONs will be related to a frequency with which they are to be carried out and a date on which they were last carried out.
ACTION-DUE-REPORT	A report which lists all ACTIONs for which the difference between the current date and the date last done is greater than the frequency..
DATA-ELEMENT	A fundamental piece of data from which PI-MEASUREs would be calculated.
DATA-ELEMENT-MEASURE	The value of a particular DATA-ELEMENT for a specific time period or at a particular instant in time. For example, average loan period can only be defined over a particular period of time while number of documents on loan only makes sense at a particular point in time.
DOCUMENT	A document can be any information source relating to Quality Management in the library. It can include free text, graphics, sound or any other available multimedia element.
DRILLDOWN	DRILLDOWN is the process of data analysis by which a higher level quantity or series of quantities such as 'title availability' is broken down into lower level quantities or series such as 'main lending titles availability' and 'short loan titles availability'.
EPS	EQLIPSE Prototype System
EXCEPTION-REPORT	A report which, for a specified time period, details all threshold violations which have occurred.
HOTSPOT	A point in the test of a DOCUMENT or PROCEDURE which is linked to a QW or PW application function such as display of frequency and date last done for an action or PW data input / display functions. The function is activated by double clicking on this point in the text.

LEVEL OF ACHIEVEMENT	The degree to which an OBJECTIVE has been achieved for a specific time period. Numerically this will be the sum of all relevant PIs for the time period multiplied by their weighting for the OBJECTIVE in question.
OBJECTIVE	An overall target of the Library or Information Service whose level of satisfaction encompasses and is determined by a range of PIs.
PI	Performance Indicator. A quantity indicating the level of quality of service provision in a particular area. A PI should be single valued for any specific period of time. For example Library Floor Area per Capita.
PI-MEASURE	The value of a specific PI for a specific time period or at a particular point in time.
PM	Performance Measurement
PROCEDURE	A PROCEDURE will be a document which also defines ACTIONs to be carried out at certain points in time. The required ACTIONs will be described. Any ancillary documents required such as forms will be attached.
QM	Quality Management
SUB-DATAELEMENT	A data-element in so far as it applies only within a particular user group, document collection or function. For example the data-element 'library use' could be analysed into undergraduate, postgraduate and distance education student library use. Alternatively it could be divided into short loan or main lending collection use.
SUB-DATAELEMENT-MEASURE	The value of a particular SUB-DATAELEMENT for a specific time period or at a particular instant in time.

THRESHOLD	A value relating to a PI or OBJECTIVE which when missed or exceeded is cause for concern to the user. A THRESHOLD is either a MAX or a MIN. When the value of a PI-MEASURE or an OBJECTIVE's LEVEL OF ACHIEVEMENT falls below a MIN THRESHOLD then the user needs to be warned. When the value of a PI-MEASURE or an OBJECTIVE's LEVEL OF ACHIEVEMENT goes above a MAX THRESHOLD then the user needs to be warned.
WEIGHTING	A number between 0 and 1 which indicates the degree of relevance of any PI to any specific objective.

7.2 General description

The first section above outlined the overall purposes and functions of the EQLIPSE system. This section will give a general overview of how this is to be achieved.

7.2.1 Application structure

FIG 1. GENERAL STRUCTURE

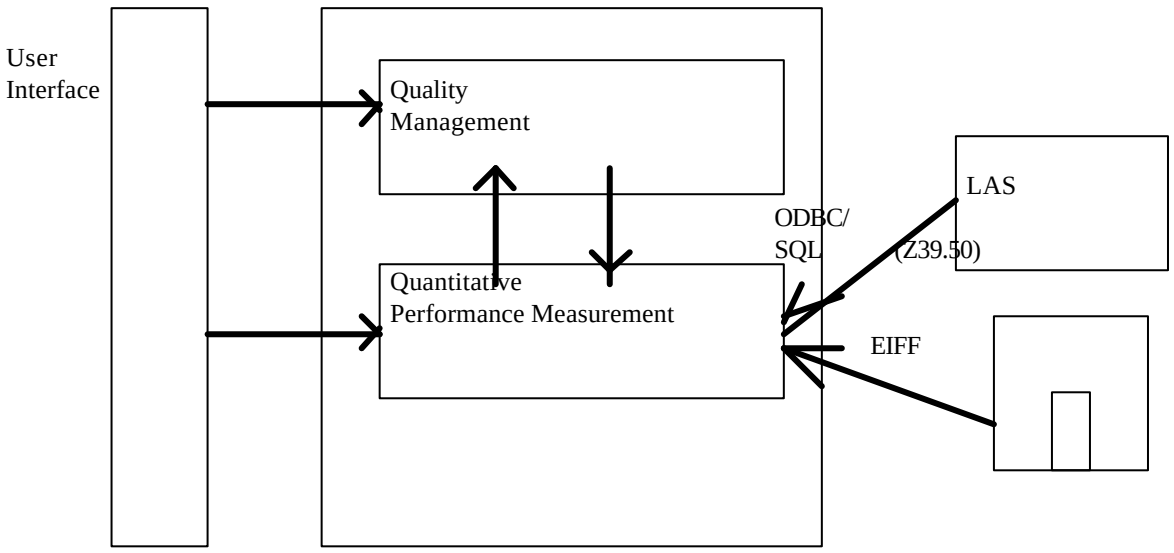
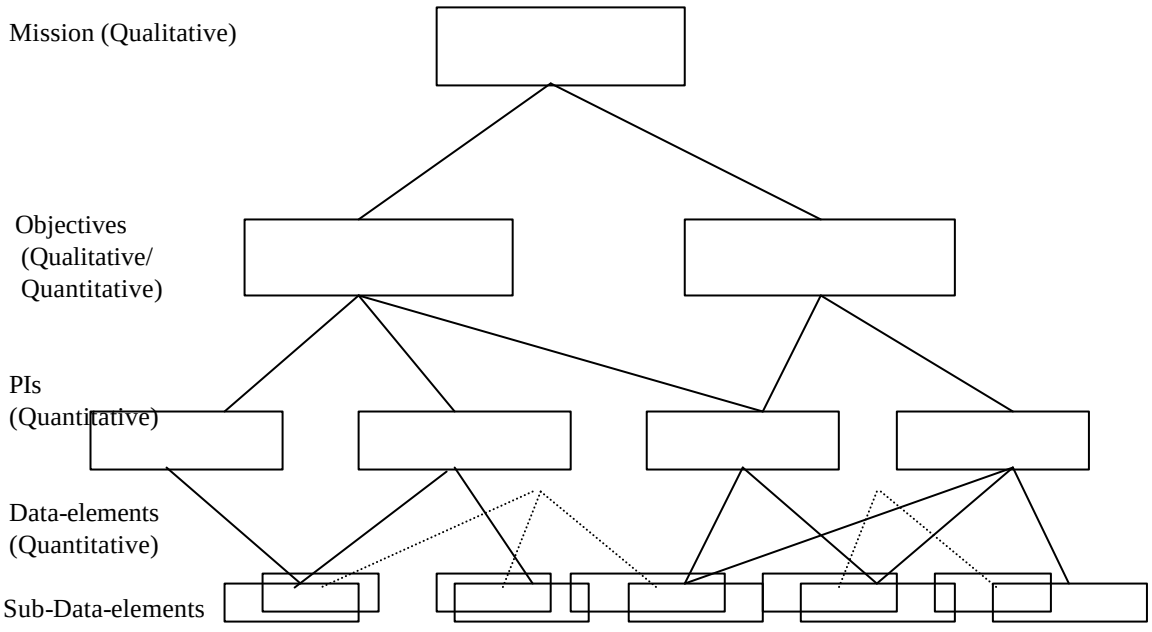


FIG. 2 DATA HIERARCHY : QUANTITATIVE PERFORMANCE MEASUREMENT



(Quantitative)

The user of the EQLIPSE system will be able to access either or both modules of the system via a Windows standard interface. This interface will use clear presentation and simple dialogue. It will be intuitive, quick to master and easy to use.

When the user accesses the system via the quality management module then they are given controlled access to a set of documents and procedures. Functionality provided will include creation, modification, maintenance of amendment history, authorisation and release of documents and procedures. The user will be able to link to the performance measurement module via user definable hotspots. Once work in this module has been completed a single keystroke will return the user to the document.

The performance workbench will allow input, analysis and display of quantitative performance measurement data. As all higher levels of the data hierarchy (see fig. 1 above) are based on the lower levels, data input only has to occur at the two lowest levels i.e. the data-element and sub-data-element measure levels.

External interfacing of the EQLIPSE system will occur from within both the performance measurement and quality management modules. Interfacing, in the PM module, will comprise the transfer of available data-element or sub-data-element measures from external systems, LAS or others, to the ACCESS database on which the performance measurement module is based. The transfer will be achievable by a number of means

- ODBC SQL
- Z39.50
- Flat File transfer by any medium including diskette, other magnetic media, LAN and FTP/Internet.

In order that the transfer can be carried out common keys must be used in both the source and target system. These are specified below in 7.5 EQLIPSE Interface File Format.

External interfacing of the QM module will be in two areas. Firstly the system will allow the user to use their word processor of choice for the input and editing of

documents and procedures. Secondly the module will be interfaced to mail systems so that action required messages, documents for authorisation and other communications can reach users via existing channels.

7.2.2 Operational / communications environment

The following comprises the operational / communications environment recommended for the EQLIPSE system -

1. MS Windows
2. IPX or TCP/IP as options for base communications protocols.
3. ODBC SQL or Z39.50 as application layer protocol for networked data transfer.
4. EIFF (EQLIPSE Interface File Format) as data transfer format in flat file data transfer.

7.3 Applications scenarios

The following two scenarios are outlined here to clarify the exhaustive listing of functions which follow.

7.3.1 Service level agreement

A library service level agreement is a detailed document which specifies a set of service levels that the library agrees to provide to its users. Linked with each service level are other details such as a monitoring mechanism, an information location and person responsible. For example one service level agreed might be that the library will provide quiet study areas. For this the monitoring mechanism might be an annual survey of customer satisfaction and the person responsible a named member of library staff. The monitoring mechanism, the annual survey in this case, is an ACTION in EPS terms. This makes the Service Level Agreement a PROCEDURE (any document with linked actions).

In order to maintain this in the EPS the librarian would first enter text into the QM module of the EPS. Points specifying ACTIONS would be linked to one or more “hotspots”. In the case of the annual survey one such hotspot would display the actual form used for the annual survey. Another would display a window which

would allow modification of the frequency and the date last done. A further hotspot might link to the PM module of the system allowing the user to enter the values from the latest survey or check the values from earlier surveys.

Other points in the service level agreement may link to the PM module for the purposes of data display only. This would be the case for example where the data is extracted from the LAS rather than entered to the EPS manually. An example here would be an agreement to get books purchased to the library shelves, on average, within thirty days of receipt. In this case processing times would be data which could be extracted from the LAS by the EPS and manual entry would not be necessary.

The Service Level Agreement would be part of a set of QM DOCUMENTS and PROCEDUREs. These would all be accessible via a user modifiable hierarchy and hypertext links.

Within the PM module the quantities of interest in this case might be at four levels

- Objective : PROVISION OF QUIET STUDY FACILITIES

- PIs : PERCENTAGE SATISFIED WITH NOISE LEVELS IN QUIET STUDY AREAS and PERCENTAGE SATISFIED WITH NUMBER OF QUIET STUDY PLACES

- Data-elements :
  NUMBER SATISFIED WITH NOISE LEVELS
  NUMBER SATISFIED WITH NUMBER OF PLACES
  TOTAL NUMBER

- Sub-Data-elements :
  NUMBER OF POSTGRADUATES SATISFIED WITH NOISE LEVELS
  NUMBER OF POSTGRADUATES SATISFIED WITH NUMBER OF PLACES
  TOTAL NUMBER OF POSTGRADUATES

  NUMBER OF GRADUATES SATAISFIED WITH NOISE LEVELS

NUMBER OF GRADUATES SATISFIED WITH NUMBER OF PLACES
TOTAL NUMBER OF GRADUATES

The objective could be defined as a weighted sum of the two relevant PIs. This would allow an overall level of satisfaction to be monitored while also allowing for analysis of the sources of dissatisfaction , whether from noise levels or inadequate numbers of places, and what parts of the user community this dissatisfaction springs, in this case the undergraduates or postgraduates.

7.3.2 Customer comments / complaints procedures

The following explanatory scenario is based on the outline of Customer Comments Procedures in the EQLIPSE deliverable report 1 LIBRARY REQUIREMENTS ANALYSIS.

The Customer Complaints Procedure describes the processing of all written suggestions and complaints submitted by library users. It comprises a Purpose, Scope, Reference, Definitions and Procedure. The procedure is in this case expressed as a flow chart. This entire document is also a 'PROCEDURE' in EQLIPSE terms as it has ACTIONs associated with it. Examples of such actions would be the preparation of an annual analyses of verbal complaints and suggestions forms. As per all ACTIONs in the EQLIPSE system these have an associated defined frequency (every twelve months) and date last done. This allows the execution of the ACTIONs to be triggered by the ACTION DUE REPORT or by email automatically generated by the DAY END ROUTINE. Any ACTION for which the date last done is longer ago than the specified frequency is flagged in this way.

Within the QM module the PROCEDURE will also be attached to required documents such as the suggestions form and acknowledgement slip.

The procedure may be used simply within the QM module or it may be linked to appropriate quantitative measures within the PM module. For example the annual analyses of complaints and suggestions may generate the following number of complaints per class of user. This would allow the following hierarchy of quantitative measures to be generated -

- Objective : POSITIVE USER INVOLVEMENT

- PIs : PERCENTAGE OF USERS WHO HAVE COMPLAINED IN THE LAST YEAR and PERCENTAGE OF USERS WHO HAVE MADE SUGGESTIONS IN THE LAST YEAR

- Data-elements : NUMBER OF USERS WHO HAVE COMPLAINED, NUMBER OF USERS WHO HAVE MADE SUGGESTIONS and TOTAL NUMBER OF USERS.

- Sub-Data-elements : NUMBER OF UNDERGRADUATE USERS WHO HAVE COMPLAINED, NUMBER OF UNDERGRADUATE USERS WHO HAVE MADE SUGGESTIONS, NUMBER OF POSTGRADUATE USERS WHO HAVE COMPLAINED, NUMBER OF POSTGRADUATE USERS WHO HAVE MADE SUGGESTIONS, TOTAL NUMBER OF UNDERGRADUATE USERS, TOTAL NUMBER OF POSTGRADUATE USERS.

The objective POSITIVE USER INVOLVEMENT could be formulated as the PERCENTAGE OF USERS WHO HAVE MADE SUGGESTIONS minus the PERCENTAGE OF USERS WHO HAVE COMPLAINED. This would generate a figure between -100 to +100 which would express the level of POSITIVE USER INVOLVEMENT. Further analysis could be provided by examining levels of suggestions and complaints overall and for different sections of the user base whether undergraduate or postgraduate.

Links from the QM to the PM modules would consist in hotspots which would allow the user to move quickly from the procedure definition to the input/display of new complaint and suggestion data.

7.4 Functions

7.4.1 Quantitative functions

A: ADDITION/ DELETION / MODIFICATION OF DATA DEFINITIONS.

1. Allow the input/deletion/modification of DATA-ELEMENT names and definitions.

2. Allow the input/deletion/modification of SUB-DATA-ELEMENT names and definitions.

3. Allow the input/deletion/modification of PI names and definitions.

4. Allow the input/deletion/modification of OBJECTIVE names and OBJECTIVE definitions.

5. Provide a way of defining/modifying the relationship between the PIs and the DATA-ELEMENTS used to calculate them. Each PI may be calculated from a number of data elements according to specific formulae.

6. Provide a way of defining/modifying the relationship between each OBJECTIVE and the PIs encompassed by it. Each PI will be related to any relevant OBJECTIVE with a particular weighting. A PI need not be related to any OBJECTIVE but may be maintained in the EPS as a standalone.

7. Allow the input/deletion/modification of THRESHOLDS for OBJECTIVEs and PIs. Each THRESHOLD will have a name, a definition and a flag to indicate whether it is a MAX or a MIN definition.

B: ADDITION / DELETION / MODIFICATION OF DATA.

1. Allow the input of DATA-ELEMENT-MEASURES by:

Manual Input
Transfer via magnetic media
By network transfer from a range of library automation systems.

2. Allow the input of SUB-DATA-ELEMENT-MEASURES by:

Manual Input
Transfer via magnetic media
By network transfer from a range of library automation systems.

3. Allow the modification/deletion of the same DATA-ELEMENT-MEASURES online.

4. Allow the modification/deletion of the same SUB-DATA-ELEMENT-MEASURES online.

C : DATA ANALYSIS AND DISPLAY.

1. For each time period PI-MEASURES will be calculated from the DATA-ELEMENT-MEASURES input.

2. For each time period LEVELS OF ACHIEVEMENT will be calculated for each defined OBJECTIVE from the relevant PI-MEASURES.

3. Where all the relevant DATA-ELEMENT-MEASURES are not available to calculate a PI-MEASURE then the PI-MEASURE will be displayed as undefined for that period.

4. Where all the relevant PI-MEASURES are not available to calculate a LEVEL OF ACHIEVEMENT for an OBJECTIVE then the LEVEL OF ACHIEVEMENT will be displayed as undefined for that period.

5. Provide a graphical display of DATA-ELEMENT-MEASURES for a specific period.

6. Provide a graphical display of PI-MEASURES for a specific period

7. Provide a graphical display of the level to which a OBJECTIVE or OBJECTIVEs have been achieved for a specific time period.

8. Provide a graphical display of the trends in DATA-ELEMENT-MEASURES over a range of periods.

9. Provide a graphical display of the trends in PI-MEASURES over a range of periods.

10. Provide a graphical display of the trends in the level of achievement of a OBJECTIVE or OBJECTIVEs over a range of time periods.

11. For any defined period of time provide an exception report which will show all OBJECTIVEs or PIs which have fallen below minimum THRESHOLDs or have gone above maximum THRESHOLDs.

D : DRILLDOWN FACILITIITES

1. Where SUB-DATAELEMENT-MEASURES exist for a specific DATA-ELEMENT it will be possible to get a graphical display, for a time period or range of time periods, of the following

    * The overall DATAELEMENT-MEASURE
    * Each SUB-DATAELEMENT-MEASURE

2. Where SUB-DATAELEMENT-MEASUREs exist for all DATA-ELEMENTS used in a specific PI definition then it will be possible to get a graphical display, for a time period or range of time periods, of the following

    * The overall PI-MEASURE
    * Each SUB-PI-MEASURE

3. Where SUB-PI -MEASUREs exist for all PIs used in a specific OBJECTIVE definition then it will be possible to get a graphical display, for a time period or range of time periods, of the following

    * The overall LEVEL-OF-ACHIEVEMENT
    * Each SUB-LEVEL-OF-ACHIEVEMENT

4. In general drilldown at all three levels will be provided by a set of buttons below the relevant graph. One button will produce the overall view while each button repopulates the graph with the sub levels of the data.

E : BENCHMARKING FACILITIES

The benchmarking facilities will be based on simultaneous access to two databases. One database will be known as the HOME DATABASE. The other will be known as the BENCHMARK DATABASE. The HOME DATABASE will be normally that of the library in which the system is being used. The BENCHMARK DATABASE will be the one against which it is being measured. In terms of the application, however, the HOME DATABASE will simply be that opened first while the BENCHMARK DATABASE will be that opened using an 'Open Benchmark Database' option. This will allow any available database of PM data to be benchmarked against any other.

The benchmarking facilities will comprise the following functions

1.It will be possible to open a second EQLIPSE database of PM data using an 'Open Benchmark Database' option.

With both databases open the following facilities will become available. They will allow comparison of LEVELS OF ACHIEVEMENT, PI-MEASURES, DATA-ELEMENT-MEASURES and SUB-DATA-ELEMENT-MEASURES.

2.SUPERIMPOSED GRAPHING : The graphs for common MEASURES may be viewed superimposed for any time period specified for which data is available. Graph curves for each database will be distinguished by colour and labelling.

3. COMPARISON OF AVERAGES : A table will show the average values for any pair of MEASURES and the percentage divergence between them. Coloured highlighting will point up any percentage divergence greater than a pre-specified amount.

4. DIVERGENCE GRAPH : A line graph will show the variation in divergence between pairs of MEASURES for any specified time period for which data is available.

7.4.2 Qualitative functions

A. Allow the input/modification/deletion of DOCUMENTS.

B. Allow the input/modification/deletion of PROCEDURES.

C. Allow the linking of procedures to specific ACTIONS.

D. Allow a frequency and date last carried out to be linked to each ACTION.

E. Allow the date last carried out to be updated each time an ACTION is completed.

F. Provide hierarchical access via brief and detailed contents. Each entry in contents will link directly to a DOCUMENT or PROCEDURE or to another more detailed contents.

G. Provide free text searching of the DOCUMENTs and PROCEDUREs.

H. Allow hypertext links between DOCUMENTs and PROCEDUREs to be defined.

I. Allow “hotspots” to be set up in documents and procedures which kick off data input or data display functions in the quantitative module.

J. Allow the on demand generation of an ACTION DUE REPORT.

7.4.3 Client /server integration and dataload functions

This section specifies in greater detail the client / server and dataload functionality required in the final system. For a monthly dataload the following steps will be followed.

1. Choose the dataload option from the EQLIPSE main menu bar.

2. You will be given two options

   A. Networked client/server load
   B. Flat file transfer

3. Choose A or B

4. You will be give four options

   A. Load all available Datasets and Subdatasets.
   B. Load all unqualified Datasets and Subdatasets.
   C. Load all unqualified Datasets and Subdatasets, and load qualified Datasets and Subdatsets individually.
   D. Load all Datasets and Subdatasets individually.

5. Option A will load all data and return you to the main menu. Choose this option if you want to load all data.

6. Option B will load only absolutely reliable, i.e. unqualified data. Choose this option if you want to load all such data without individually flagging each Dataset and Subdataset. This option completely ignores qualified data.

7. Option C will load all unqualified data but let the user go through each qualified Dataset and Subdataset and view attached notes. The user may flag each to be loaded or not as is seen fit. At the end of the selection process all unqualified Datasets and Subdatasets and all flagged qualified Datasets and Subdatasets are loaded and the user is returned to the main menu bar.

8. Option D will let the user go through each Dataset and Subdataset whether qualified or unqualified. The user views attached notes and flags each to be loaded or not as is seen fit. At the end of the selection process all flagged Datasets and Subdatasets are loaded and the user is returned to the main menu bar.

7.5 EQLIPSE Interface File Format (EIFF)

The flat file transfer is functionally equivalent to the client / server and it is recommended that it be extended in the same ways.

The format of the file is as follows.

1. Record delimiter is ASCII(13):ASCII(10)
2. Fields are comma delimited.
3. Non-numeric data except field descriptors are in double quotes.
4. The first record is always five fields containing the field descriptors.

   type,subtype,qualifier,amount,notes

5. The last record contains library name, month and year in the first three fields. The fourth field is null.

   e.g. "Dublin City University","MAY",1996,""

6. The intervening records will contain the dataset vales for the month indicated by the last record. They will contain

   Field 1 : Dataset Acronym (See attached list)
   Field 2 : Sub-Dataset Acronym
   Field 3 : Qualifying Indicator ('Y' or 'N')
   Field 4 : Numeric Value of dataset for month.
   Field 5: Notes

Dataset and subdataset acronyms have to be the same as that loaded in the EQLIPSE database on the client PC. Otherwise the data cannot be transferred correctly.

The Qualifying indicator is set to 'Y' for data which may not be reliable in the LAS. For example the number of patrons loaded may, in many cases, not be regarded as a good indicator of number of members of population served. The indicator is then used at the client end to indicate if there is any intrinsic unreliability in the data. Notes are also displayed at the client end.

7.6 Z39.50 - draft interface specification

This sections gives a draft outline of a possible EQLIPSE Z39.50 interface. This specification relies heavily on Version 3 features. Much client and server software do not as yet support these features. These features, however, provide developers with the advantage that for new databases, such as the sets of quantitative measures analysed by EQLIPSE, no new code need be written. A version 3 compliant server can pass to a similarly compliant client all the details required for it to search a database of which it has no prior semantic knowledge. These details will include database names and attribute types and values. The Z39.50 client software can then use these details to configure itself on the fly.

Features Utilised

Explain : The explain facility is based on the use of a special database called the Explain database. This database contains a wide range of information about the Z39.50 accessible resources available on that server. These include a list of available databases, attribute sets and records syntax. A client can access the contents of this database using the standard search and present operations. The syntax of records and attribute set for the explain database form part of the Z39.50 standard. Once this database has been accessed the client can then dynamically configure itself to access other available databases. The EQLIPSE Dataset database will be detailed in this explain database. This will allow an EQLIPSE client system to use unmodified Z39.50 Version 3 interface software.

Init - ID / Authentication : A Z39.50 session always begins with the INIT service. The client send an InitRequest to the server. This specifies protocol versions, required services and maximum record and message sizes. The InitRequest may also include a userID and authentication string. The server responds, using an InitResponse acknowledging the Z39.50 version to be used, specifying which of the requested services are available and indicating whether or not the InitRequest has been accepted. Invalid userID and/or authentication string comprise one reason why the request may be rejected. Very many Z39.50 servers support only bibliographic databases. For such databases security is often of little performance. This is not the case for the library specific performance measurement data of interest to EQLIPSE. Hence for these databases the use of the ID/Authentication feature of the Init service is crucial.

Scan : This service allows version 3 clients to scan and select terms from an index. This means that searchers do not need to work their way through search term variants and synonyms in order to find the term as used in the database. For EQLIPSE clients accessing databases other than their home system this will be especially important. Dataset and subdataset keys may vary from those used on their own system. In order to effectively load these to a local EQLIPSE database keys must be lined up. The Scan service will allow these keys to be determined, and the local database appropriately configured, in advance of the load.

Non-MARC Record Formats : Up till version 3 of Z39.50 all record presented by server to client required mapping to a set of MARC tags and subfields. This was certainly appropriate for records with a rich semantics, such as bibliographic records. It was less appropriate, however, for records of simpler structure or containing large amounts of text. For this reason the GRS1 (General Record Syntax 1) and SUTRS (Simple Unstructured Text Record Syntax) were introduced. The simple syntax and structure of dataset and subdataset records as used by EQLIPSE will be more appropriately supported by one of these structures.

Attribute Set - Stat 1

Attribute Types

Attribute Type	*Value*
Use	1
Relation	2
Structure	3

Use Attributes

Use	*Value*
Dataset Key	1
SubDataset Key	2
Date Calculated	3

Relation Attributes

Relation	*Value*
less than	1
less than or equal	2
equal	3
greater or equal	4
greater than	5
not equal	6

Structure Attributes

Structure	*Value*
key	1
date	2

Client Requirements

1. The EQLIPSE client must support user authentication. IdPass and IDAuthentication will be required as part of the InitRequest.

2. The client must support the Stat-1 Attribute set or be dynamically configurable via the version 3 explain feature.

3. The client must support non-MARC records syntax.

4. It is desirable that the client also support the scan service so that databases on foreign system may be successfully accessed.

Server Requirements

In order to support access from an EQLIPSE client the following requirements must be fulfilled by a server.

1. Two databases must exist : Datasets.Current and Dataset.History.

2. The server must support user authentication as part of the Init service.

3. The server must support the Stat-1 Attribute set or be dynamically configurable via the version 3 explain feature.

4. The server must support non-MARC record syntax's.

5. It is desirable that the server also support the scan service so that databases on foreign system may be successfully accessed.

Server Database Structures

Data Element	Type	Format	Example
Dataset name	Character	Variable length Acronym / Mnemonic	MemPop
Subdataset name	Character	Variable length Acronym / Mnemonic	PostGrad
Date Calculated	Date	dd/mm/yy	04/12/75
Value	Numeric	Variable length integer, 2 places of decimal	3457.00

8. CONCLUSIONS

The research project achieved the stated specific objectives of the project.

The research showed conclusively that the commercial software Quality Workbench would, in all respects, fulfil the requirements of an ISO 9000 compliant library.

The project was able to identify the needs of libraries in performance indicators, and in doing so was able to conform to the draft ISO 11620.

An open functional specification was also completed. A prototype EQLIPSE system with two modules, one for quality management (Quality Workbench) and one for performance measurement (Performance Workbench) is feasible and can be integrated into a mainstream open, client-server based library IT system. The prototype has been tested in two operational sites and experience of operability and validity obtained.

The prototype was tested and validated by partners and associate partners bearing in mind variety of type, environment, levels etc. An implementation manual was produced.

The project also undertook to "relate these [the key issues] to ongoing standard development (in both technical and performance measurement areas) and provide recommendations for further actions in this area": this has been done.

The project demonstrated that the EQLIPSE prototype is operationally successful and has considerable potential and possibilities. Experience obtained through a variety and mix of different libraries supports the validity of this statement. However, there are a number of key issues which need to be considered and/or addressed, as described later in this chapter.

The project team undertook a variety of dissemination activities, including the establishment of a Web presence and a series of presentations.

8.1 ISO 9000 compliance

The project specifically undertook to address quality issues within the parameters of being ISO 9000 compliant. In that respect Quality Workbench software would provide a comprehensive answer to any library which was ISO 9000 certified. Nonetheless it became clear that any library not ISO compliant would find Quality Workbench inflexible and therefore difficult to utilise. It is possible that an ISO framework will become the norm in the future and that the Quality Workbench approach would be first class in those circumstances. However, a key issue at this stage of evolution would be that many types of libraries are unable or unwilling, for various reasons, to embrace this ISO approach. Reasons for this may include, for example, lack of resources, lack of confidence, disinterest, concern as to its applicability. In such circumstances it would be important to encourage libraries to implement quality management whether or not they move towards an ISO 9000 compliant route. In effect, there is a need to find an incremental approach which will appeal to such institutions, provide a user friendly approach, permit a speedy learning curve and an easier understanding of concepts. This matter will be revisited later in this section.

8.2 Product integrity

The copyright owners of commercial software could be unwilling to invest time or permit their software to be customised to suit libraries as indeed was the case with Quality Workbench.

The more successful the product the less likely would the library market (which is relatively small) be in persuading such companies to customise their product. This might suggest that the library market would have to focus on smaller companies who would welcome the opportunity. In such circumstances the European libraries market might provide a useful market opportunity. The potential attraction for a non-compliant ISO 9000 library would be high.

8.3 ISO 11620/Performance Workbench

The adoption of ISO 11620 as a framework for performance indicators was successful. An issue for the future would be that ISO 11620 has been developed on the basis of incorporating performance indicators which are tried and tested and have gained credibility. The pressing issue will arise with the advent of new

indicators in the area of electronic information provision and networking. Any intended product will need to address this issue to have any semblance of credibility.

8.4 Training and awareness

It is clear that many libraries remain unfamiliar with the concepts of performance measurement and quality management. Awareness raising in relation to the concepts is needed alongside specific training in data collection and the use of performance indicators. The CAMILE concerted action (see Appendix 1) will be influential in the broader context, while the EQLIPSE system is designed to facilitate successful usage at the micro level.

8.5 Integration

The design of a system which is both integrated internally and with a variety of external technical and organisational environments has been at the heart of the EQLIPSE project. Thus integration at the technical level takes two forms ; that between quality management and performance measurement functions and that between the system and external sources of data.

8.5.1 Integration of Quality Management and Performance Measurement

The project was able to demonstrate that technical linkage between the two modules was attainable but the key issue is that at present both pieces of software would be self-contained if only because the commercial company would not permit an integrated approach. However it was concluded by the project that the integration of QM and PM modules would be desirable. The form that this linkage would take is specified in detail in the full functional specification. In short the linkage was conceived of being implemented via hotspots which allow the user to move directly from QM documents and procedures to the data input, analysis and display functions of the PM module. For example, a user viewing a library service level agreement would be able to move directly from the procedures specifying how to carry out a user satisfaction survey to the points in the PM module which allow either new data to be input or earlier data to be viewed and graphed. With the right document and procedure management software such functionality would be easy to implement and easy for the user to modify. It would be of great utility and flexibility. No ISO9000 package was found

which could provide this flexibility. It is recommended that the further design and development of such links be an area for further research.

8.5.2 Integration of EQLIPSE and external systems

The final usefulness of an EQLIPSE system will depend on the benefits accruing from its use exceeding the cost of data collection and system implementation. This balance will be greatly aided by the ability to load data from external systems such as LAS and access control systems which may gather much of the required data automatically. EQLIPSE facilitates this by allowing data to be loaded directly in the following ways -

1. Through a client / server link to the Horizon LAS. This utilises ODBC over IPX/SPX or TCP/IP.

2. By flat file transfer using the EQLIPSE Interface File Format (EIFF). Any system capable of outputting a flat file to a magnetic medium accessible from the EQLIPSE system will be able to use this route.

3. Through a client / server link to any LAS or other system based on an RDBMS which supports ODBC. The LAS database will require some extra tables added and software modifications to allow the updating of these tables before this route can be Implemented.

Options 1 and 2 have been implemented and tested. Option 3 has not.

8.6 The future

Both modules of the EQLIPSE prototype have been verified and found useful in real working environments. The QM module of the current prototype, namely Quality WorkBench, is of most relevance in an ISO9000 compliant environment. Since many libraries have not, as yet, adopted a quality standard and may, indeed, not adopt ISO9000 there is a great need to specify and develop a product whose QM functionality is applicable across a range of libraries and continues to be applicable as individual libraries' needs and practice change over time. The final functional specification with its emphasis on generic

concepts of documents, procedures and actions has begun the process of designing such an open product. This needs to be pursued further.

It was possible for the PM module, which was designed and developed within the project, to embody this openness to variant requirements in a way that was not possible in the off-the-shelf Quality WorkBench. The PM module, known as Performance WorkBench, can be supplied with or without pre-defined sets of datasets and performance indicators. Furthermore users can add to, delete or modify datasets, performance indicators and their definitions and relationships as they see fit for their particular organisation. An issue which requires exploring here is the definition, in the European context, of a set of datasets and performance indicators which will be applicable within emerging electronic library services and which would sit alongside those already defined by ISO 11620, PROLIB-PI, etc.

The evidence of the project suggests that an integration of the QM and PM functions is both achievable and desirable. A beginning has been made in the definition of such integration in the final functional specification included in this report. Hence further substantial research should be defined to revise the prototype to ensure an integrated approach for non-compliant ISO libraries. Notwithstanding, the work detailed in this project could be advanced to exploitation, should ISO compliance be a prerequisite.

Finally it is to be remarked that the set of performance indicators which were selected for use in this project were found in many cases to require a significant data gathering exercise. An important issue which remains to be addressed is whether in all these cases the cost of the data gathering exercise can be justified when measured against the benefits derived from decisions informed by the data. It may be that future initiatives ought to pragmatically to concentrate on data which can be automatically gathered and place less emphasis with high data gathering cost.

The project team noted that the existing ISO 11620 framework does not support the development of the electronic library in a networked environment and that work is needed to define appropriate performance measures for this new situation. European libraries are well placed to take a lead in this development.

It is therefore recommended that:

1. The present EQLIPSE prototype be revisited to allow the effective linking of quality management and performance measurement functionality and the accommodation of the needs of both ISO9000 and non-ISO9000 compliant communities alike.

2. A study of viable performance indicators, in the area of networking /electronic information provision be carried out as a matter of urgency, and the EQLIPSE approach extended to encompass this area.

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Appendix

EQLIPSE - INFORMATION DISSEMINATION

Project Reports

Centre for Research in Library and Information Management, University of Central Lancashire & Dublin City University.
Implementing an open interactive quality management and performance measurement system: Library requirements analysis. Deliverable Report 1.
September 1995.

Dynix (Ireland) Ltd.
Initial Functional Specification
Deliverable Report 2.
September 1995.

Prototype EQLIPSE system.
Demonstrated to the Commission Review 20/2/96

Dublin City University Library, Centre for Research in Library and Information Management, University of Central Lancashire, & Universitats und Landesbibliothek Munster.
Data tools and data collection. Deliverable Report 4.
January 1996.

Centre for Research in Library and Information Management, University of Central Lancashire & Dynix (Ireland) Ltd
Implementing an open interactive quality management & performance measurement system: Demonstration trials report. Deliverable Report 5.
December 1996.

Centre for Research in Library and Information Management, University of Central Lancashire & Dublin City University.
Implementation manual
Deliverable Report 6.
March 1997.

Dublin City University Library
Deliverable Report 7
March 1997.

All the above reports are available from Centre for Research in Library and Information Management (CERLIM), University of Central Lancashire, Preston, PR1 2HE, UK.

Electronic Dissemination

EQLIPSE project summary and Deliverable 4:

Dublin City University Library, Centre for Research in Library and Information Management, University of Central Lancashire, & Universitats und Landesbibliothek Munster.
Data tools and data collection. Deliverable Report 4.
January 1996.

are available on Dublin City University's web server at
http://www.dcu.ie/library/eqlipse/index.html and
http://www.dcu.ie/library/eqlipse/dr1txt.htm respectively.

These pages are also retrievable through the major search engines on the Web including, AltaVista, Infoseek, and Yahoo.

Deliverable Report 1 *Implementing an open interactive quality management and performance measurement system: Library requirements analysis* and Deliverable Report 2 are currently being mounted on the University of Central Lancashire's web server. There are hypertext links between the Web pages of the University of Central Lancashire and Dublin City University.

A project description and other information on EQLIPSE is also contained on the Web pages of Stockholms Universitetsbibliotek. The URL for these pages is:
http://www.sub.su.se/henrik/projekt.htm

Conferences, Seminars and Talks

October 1995. DECIMAL Workshop, Manchester Metropolitan University. Talk given on EQLIPSE project. (Jack OFarrell)

4th International Symposium of the Greek Academic Libraries, University of Crete. Presentation given on EQLIPSE project. (Panos Moutzoyrellis)

16 March 1995. EU, Libraries and Library Market seminar, Stockholm, Sweden. Presentation given on EQLIPSE project. (Henrik Aslund)

27 March 1995. Presentation of EQLIPSE Project at Conference on Results and Perspectives of European Libraries Programme held in Rome. (Franco Toni)

3 April 1995. The Healthcare Libraries Conference, Stockholm, Sweden. Paper given on EQLIPSE project. (Henrik Aslund)

10 April 1995. CEC Concertation Meeting on the projects EQLIPSE, MINSTREL, DECIMAL and DECIDE held in Luxembourg. Presentations given on EQLIPSE project. (Peter Brophy, James Twomey)

4 May 1995. The Annual Meeting of the Swedish Association of University and Research Librarians, Linkoping, Sweden. Paper given on EQLIPSE project. (Henrik Aslund & Margareta Torngren).

30 May 1995. Measure for Better Management Conference, Stockholm, Sweden. Paper given on EQLIPSE project. (Henrik Aslund)

15 June 1995. The Swedish-Baltic Library Management Project, Riga, Latvia. Paper given on EQLIPSE project. (Henrik Aslund)

31 August - 4 September 1995. Presentation of Seminar paper “Quality management in libraries” at 1st Northumbria conference on performance measurement in libraries and information services. Held in Newcastle. (Peter Brophy)

11 March 1996. Presentation of EQLIPSE at meeting of Committee on Organisation and Management of Deutsches Bibliotheksinstitut, Berlin at Muenster. (Roswitha Poll, Peter te Boekhorst)

20 March 1996. Report on aims and state of art of EQLIPSE Project at Course "Tools and methods for estimating performance indicators in public libraries" held in Milan. (Franco Toni)

May 1996. Regional Meeting of newly qualified librarians from the north of the UK. Talk given on EQLIPSE project. (Peter Wynne)

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June 1996. Demonstrations of the project prototype were given at Centre for Research in Library and Information Management (CERLIM), University of Central Lancashire, UK Open Day. (Zoe Clarke, Peter Wynne)

5 June 1996. Information day organised by the Swedish Focal Point, Ume, Sweden. Paper given on EQLIPSE project. (Henrik Aslund)

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14 March 1997 - Presentation on EQLIPSE to staff and students of the Department of Library and Information Studies, University College Dublin. (Jack OFarrell)

24 March 1997 - Demonstrations and discussions of the EQLIPSE project at the CERLIM Open Day, University of Central Lancashire. (Zoe Clarke)

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CAMILE

A major vehicle for the dissemination of information on the results of the EQLIPSE project is through CAMILE - a concerted action on management information for Europe.

In addition to the results of the EQLIPSE project, CAMILE will promote and spread the combined results of three other existing EU Libraries Programme projects, namely DECIDE, DECIMAL, and MINSTREL, to potential user groups across Europe.

> **DECIDE** - Decision Support Models: A decision support system for European academic and public libraries.
> **Project co-ordinator:** Carpenter Davies Associates, Oxford, UK.
>
> **DECIMAL** - Decision-making in Libraries: Decision research for the development of integrated library systems.
> **Project co-ordinator:** Manchester Metropolitan University, UK.
>
> **MINSTREL** - Management Information Software Tool - Research in libraries.
> **Project co-ordinator:** Division of Learning Development, De Montfort University, UK.

The aim of this Concerted Action is to develop and pilot a series of workshops for practitioners throughout the library community in Europe to disseminate the work of these four projects. This will enable the exchange of information, ideas, and good practice between experts, and help them to consider and develop common approaches, identify areas for standardisation, and demonstrate the application of different software solutions.

CAMILE will seek to:

- ◊ build consensus on the issues and activities relating to library and information management, including performance measurement and the assessment of quality using both quantitative and qualitative techniques;

- ◊ provide a framework for technical and theoretical discussion, the formation of common policies and the development of standards;

◊ bring together activities and ideas at national, European and international levels, leading to the identification of areas requiring further research;

◊ provide a forum whereby information on common issues and challenges can be relayed back to the appropriate European Commission programmes;

◊ add value to the investment in Call for Proposals 1993 projects through the sharing of research results and related technical discussion between experts;

◊ demonstrate decision-support technologies resulting from currently funded projects.

CAMILE will be co-ordinated by De Montfort University's Division of Learning Development (UK) on behalf of the co-ordinators of each of the projects.