

**A COST-EFFECTIVE STUDY OF OWNERSHIP VERSUS ACCESS:
A CASE STUDY FOR ST. PATRICK'S COLLEGE, MAYNOOTH**

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ABSTRACT

This study takes a cost-effective approach to the examination of the alternative methods of article supply, to ascertain not only the cheapest service but also to rank the alternatives according to their effectiveness or performance. Three alternative methods of article supply are considered: subscribing to a periodical title (ownership), individual article supply (IAS) provided by two electronic document delivery services, ContentsFirst/ArticlesFirst of OCLC FirstSearch and UnCover, and traditional article supply through the British Library Document Supply Centre. A comparison of the alternatives is made to identify their differences. The elements and measures of a cost-effective analysis are discussed and in particular cost-per-use, which is derived for all the alternatives.

The operational costs of the alternatives are obtained by taking a management accounting approach and are examined in relation to the provision of the services within the library of St. Patrick's College, Maynooth. The cost-per-use of owning a periodical title is calculated based on the operational costs of the Periodicals Department of the College, its subscription price and a lifetime use determined by examination of the current requests for articles made through the Inter-Library Loans Department of the library. The cost-per-use for the other services are also obtained based on their operational costs and document delivery charges.

The result of this study shows that based on the cost-per-use of all the alternatives, access should continue to be the method of article supply for all but one title currently taken as ILLs in Maynooth College. In Maynooth, article supply by mail should continue to be provided by the BLDSC but consideration should be given to providing fax delivery through UnCover. ContentsFirst/ArticlesFirst and the other databases on FirstSearch do provide good title coverage, multi-user and end-user user and predictable costs but as yet does not provide the perfect EDD solution in terms of either Internet access or document delivery.

The results can be used by other libraries but may need to be adapted to suit local circumstances, where priorities and costs may be different to those of St. Patrick's College, Maynooth. The results and methodology can be used to alert libraries to the cost differential of the different methods of article supply, possible advantages and disadvantages of EDD services studied and can provide an aid to the evaluation and selection of services.

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CHAPTER ONE

INTRODUCTION

1.1. BACKGROUND

Academic Libraries in the 1980's and 1990's have been faced with the problem of rising periodical prices and declining library budgets in real terms. Libraries have been forced to cancel titles in their periodical collections and so users have experienced a reduction in the services provided by libraries. This problem has been exacerbated by the growth in the volume of published periodical literature. The decline in library budgets, increased subscription prices and the growth in research material has meant that a gap has emerged between the range of titles libraries would like to hold and what they can afford to hold.

1.1.2. SERIAL PRICES AND LIBRARY BUDGETS

Prices have risen by much more than the rate of inflation over the last decade and a half, this has given rise to a vicious circle of cancellations, price rises, more cancellations, etc., as libraries have struggled with tight serial budgets and publishers have sought to sustain their revenues.

A study carried out by Dr Peter Mann, of Loughborough University, analysed the Blackwells Periodicals Price Index and compared it to the UK Retail Price Index. He found that in the nine year period from 1981/82 to 1988/89 that the average prices of a periodical rose from £64.00 to £136.99, an increase of 114 per cent, and that the Retail Price Index rose by only 41.1 per cent. At the same time, UK University Library expenditure rose by 49.7, which although slightly above the Retail Price Index fell much below the increase in serial prices (Burch, 1991, p 1). In the Republic of Ireland the picture was similar for that period, figures from the Consortium of National and

University Libraries (1993) show that University Library expenditure rose by 57.8 per cent and periodical expenditure by 50 per cent. However, the increase in library expenditure was less than the Consumer Price Index (All Items) which rose by 65.7 per cent and also fell significantly below the increase in serial prices (Ireland Central Statistics Office Statistical abstract)

The decline of serial budgets in real terms has continued in the 1990's, cancellations of periodicals have become the norm in Irish university libraries. The Library of St Patrick's College, Maynooth (Maynooth College) has carried out cancellation exercises in 1990, 1992 and 1994, other universities such as University College Galway, Trinity College and University College Dublin have also had to cancel titles throughout the 1990's. The situation has been made worse in the Republic of Ireland by the impact of Value Added Tax (VAT) on periodicals. VAT is paid in the Republic on European Union (EU) supplied periodicals, as a result of the implementation of the Single European Act (SEA). Periodicals are currently zero VAT rated in the U.K. but carry a VAT rate of 21% for specialised periodicals and a rate of 12.5% for general periodicals such as newspapers in the Republic. Although VAT was liable on periodicals prior to the implementation of SEA in 1993 through collection by the Customs and Excise, in practice VAT was not paid. This situation still applies to non-EU supplied journals including those supplied from the United States. VAT is now either added onto invoices received from subscription agents or direct suppliers by the libraries themselves (if the library is registered for VAT) or added onto the invoices by the subscription agents before being sent to libraries for payment, the complexity of VAT application under the SEA means that in effect there are various interpretations on who should actually apply VAT. The impact of, in most cases, an extra 21% on periodicals supplied from the EU has added a further burden to already severely strained library budgets.

1.1.3. GROWTH IN PERIODICAL LITERATURE

Serials have continued to be the preferred vehicle through which academics communicate the results of their new research and as a means of assessing past scholarship. This is especially true in the sciences where the main purpose of publication has been to announce and lay claim to a new discovery. The increase in the number of academics involved in research and the fragmentation of disciplines has contributed to the growth in periodical literature but other forces have been at play which are not a product of just disinterested intellectual enquiry. In the United States, and now with the recent abolition of the tenure system in the United Kingdom, academics are in the position where they either *publish or perish*. Other pressures include the need to demonstrate a research record in order to secure employment and promotion in a competitive employment market and to obtain grants from research awarding bodies (Boden, 1991). Boden goes on to explain that recent changes in the UK Universities Funding Council (UFC) rules in connection with regular staff appraisal means that faculty members will be quizzed on their research and research plans (p 16). The situation in the Republic of Ireland is not too dissimilar, although the tenure system has not yet been abolished, there is pressure to publish because of the tight employment market, to secure promotion and obtain grants. Also in recent years Universities have been requested to publish President's Reports which include details of staff publications.

1.2. COLLECTION MANAGEMENT AND RECENT DEVELOPMENTS

Traditionally libraries have sought to acquire periodical titles relevant to the academic interests of their institutions and to keep them on their shelves. For the reasons already discussed this policy has been severely undermined. This has led libraries to re-think their collection maintenance policy and to think in terms of 'access' to periodical titles.

rather than the acquisition of all relevant titles. The phase 'just-in-case' (ownership) has been coined which refers to the traditional policy of holding a title which may be required and 'just-in-time' (access), which refers to the acquisition of the article when it is requested by a user. In the past, if a library did not hold a particular title in its collections it could either apply directly to a library which did, or to institutions such as the British Library Document Supply Centre (BLDSC), for photocopies of articles required. Since the early 1990's another alternative has become available, that of Electronic Document Delivery (EDD) Services. These services provide electronic access to current awareness/alerting services (CAS) which reproduce the contents pages of the periodical titles which they hold and, once articles have been identified, document delivery through their Individual Article Supply (IAS). Electronic document delivery services which can provide an article 'just-in-case' may become the net beneficiaries of this shift of policy from ownership to access.

1.2.1. ELECTRONIC DOCUMENT DELIVERY SERVICES

There are a number of EDD services currently available to choose from which provide varying levels of CAS and IAS with different methods of access, delivery and subscription. The current EDD situation is somewhat complex, with companies like ADONIS, BLDSC (British Library Document Supply Centre), UMI (University Microfilms Inc) and ISI (Institute for Scientific Information) not only providing an EDD service themselves but selling their CAS and IAS services to other companies, companies like EBSCO buying in CAS services, making them remotely available and supplying documents, OCLC FirstSearch, UnCover, and Swets providing the CAS services, making them remotely available but using various document suppliers, and other information providers such as Research Libraries Group (RLG), PICA and BIDS, providing the remote access platform but with other companies actually providing CAS and IAS services.

ADONIS is an example of a CD-ROM based document delivery service, specialising in biomedical and pharmaceutical journals. It has also been mounted on EBSCO's Current Citations database and is used by the BLDSC to provide articles. CitaDel, the Research Libraries Group's EDD service provides access to popular databases such as UMI's Periodical Abstracts, Newspapers Abstracts, ABI/INFORM and Dissertation Abstracts; Engineering Information's Ei Page One and more specialised databases such as the Index to Hispanic Legislation. It recently added the BLDSC's Inside Information, with document delivery, to its databases. Bath Information Data Services (BIDS), the information provider to higher education and research communities in the UK and Europe, provides access to many datasets and databases including EMBASE, Ei Compendex Plus and Ei One Page, and also ISI's current contents, UnCover and BLDSC's Inside Information with the BLDSC and UnCover providing on-line document delivery. PICA is a co-operative of nineteen major Dutch libraries providing an EDD service called RAPDOC with CAS supplied by Swets and IAS by the Dutch libraries (Costers and Koopman, 1993).

One of the biggest commercial EDD services is provided by OCLC's reference service FirstSearch which is an on-line user interface to more than eighty databases, including WorldCat, OCLC's Online Union Catalogue (Mitchell, 1994). FirstSearch contains two databases which provide an EDD service to 13,000 cross-disciplinary titles, ContentsFirst, the database which contains the table of contents of journals and ArticlesFirst, the database from which articles are ordered from various suppliers. UnCover is another large EDD service with over 16,000 cross-disciplinary titles on its database, it provides the CAS and various back-up libraries document delivery by fax only. SwetsScan developed by the international subscription agent Swets & Zeitlinger, is a service similar to UnCover and FirstSearch's ContentsFirst, it provides access to the table of contents of 13,000 cross-disciplinary journals and document delivery is provided by the BLDSC through SwetsDoc. SwetScan is available not only by remote access but on magnetic tape and diskette.

Most of the services listed above share some of the characteristics which Brown (1993, p 33) describes as the unofficial standards for EDD services. These characteristics are

- Current awareness/alerting (CAS).
- Comprehensive coverage of a minimum of 10,000 titles
- Document backup support (IAS) Documents are supplied either by the EDD service itself or from backup sources such as national libraries
- Access to a network
- Easy search engine It is essential that the search process is easy and that it is not necessary to use complex Boolean searching to locate or order articles
- Online ordering Articles can be ordered online when required and paid for by credit card or deducted from an established account
- Document delivery is quick and can be achieved in 24 hours
- Royalty payment

An outline of some of the major players in EDD will be given below, with the exception of ADONIS they all satisfy Brown's unofficial standards. ADONIS has been selected for review because it differs from the other services in that it is a CD-ROM based system. EBSCO has been selected because it is an example of a company which buys in the CAS but provides remote access and document delivery and the BLDS because it sells its CAS and provides document delivery to other companies. Finally, UnCover and OCLC's FirstSearch have been chosen because they are the two biggest EDD services with their own CAS and with various suppliers.

1.2.1.1. ADONIS

ADONIS was launched in 1991 as a CD-ROM based document delivery system, accessible on-site by PC and CD-ROM drive. It differs from other services in that in

order to carry out this type of service a local infrastructure has to be maintained with the associated costs that this entails and it has a title coverage under 10,000. It was originally conceived by a consortium of science publishers as a way to develop and market an EDD system using the most effective technologies and at the same time "*protect interests with the regard to ownership of copyright*" (Pilling, 1994) The CDs are loaded onto jukeboxes and since the introduction of new software in 1995 it has been possible to network ADONIS for distributed access (Compier and Campbell, 1995) The current title coverage is around 650 biomedical and pharmaceutical journals from the 68 participating publishers. Subscribers receive a weekly disc, carrying around 10,000 pages of articles and an index to the title and author of those articles. It can be searched by author, article title keywords, journal title, ISSN, publication year, volume or issue number, and article pagination (Leach and Tribble, 1993) The original articles are stored on the CD-ROM in digital, bit-mapped form and when a article is located by a users it can be printed out. Costs include an annual subscription to the CD-ROM service plus copyright fees for each article printed and the cost of the jukeboxes. This does not make ADONIS a cheap option but it may, as Compier and Campbell (1992) suggest, provide the document delivery solution for a library requiring a tailor-made product to match its library's needs.

1.2.1.2. EBSCO

EBSCO provides a CAS to more than 10,000 journals through its Current Citations database, which is itself compiled from BLDSC's Inside Information and the ADONIS database. Current Citations is available in a variety of ways as Current Citations Online over the networks, Current Citations/EBSCO CD-ROM on CD-ROM and Database Licensing on magnetic tape. Current Citations can be searched by several criteria, including. keyword, author, article title, journal article, volume and issue number, ISSN and SICI (serial item contribution identifier) The annual subscription price to Current Citations Online is currently US \$900.00, which includes one access password and user support. There are other pricing structures for multiple passwords

and networking In 1994 EBSCO acquired Dynamic Information, a document delivery service and it became EBSCODoc EBSCODoc resources include an in-house collection of more than 30,000 titles and a world-wide network of staffed source locations Orders for documents can be sent to EBSCODoc by fax, electronic mail, through various on-line vendors such as OCLC FirstSearch and through EBSCONET (EBSCO's Online host)

1.2.1.3. BLDSC (BRITISH LIBRARY DOCUMENT SUPPLY CENTRE)

The BLDSC is one of the largest organisations in the world devoted to Inter Library Loan and document supply. It has developed a CAS called Inside Information, the electronically captured contents of 10,000 of its most heavily requested journal titles Keyword is the default search index but it can also be searched by the first four authors, article title, journal title, DSC shelf mark and ISSN Inside Information is available as a monthly CD-ROM, as an ASCII text on magnetic tape or as file transmission to a customer's network Articles which are required as a product of using these formats cannot be ordered by the user directly from the BLDSC but have to be ordered in the traditional manner using an intermediary such as an Inter Library Loan Department. However, Inside Information with document delivery is now available commercially from two sources as an EDD service. to UK academic institutions on JANET through BIDS and from the Research Libraries Group's CitaDel As already stated Inside Information is also available from EBSCO but with EBSCODoc and not the BLDSC as the main supplier Finally, BLDSC is a document supplier to OCLC FirstSearch's ArticlesFirst and articles from nearly 30,000 journals can be ordered from the BLDSC via ArticlesFirst

ADONIS is now used by the BLDSC to expedite a quicker response to article requests The BLSDC has in place a system called Automatch which matches incoming electronic requests against its database of holdings. In the normal course of events the required item is retrieved from the shelf and photocopied However, if the

item is on the ADONIS database, Automatch will direct the request to the ADONIS workstation and the article will be printed without human intervention (Braid, 1993)

1.2.1.4. UNCOVER AND OCLC'S FIRSTSEARCH

UnCover, supplied by the UnCover company was formed in 1993 as a joint venture between CARL Systems Inc. (now the CARL Corporation) and Blackwell Ltd. OCLC introduced its end user reference service FirstSearch in 1992 so that it could expand its traditional inter-library loan service and offer direct document ordering to library users (Mitchell, 1994). FirstSearch and UnCover satisfy all the unofficial EDD service standards outlined Brown. They both have a coverage well over 10,000 titles and have good document delivery backup. UnCover's title coverage is currently around 16,000 titles and the FirstSearch's databases ContentsFirst/ArticlesFirst cover around 13,000. UnCover supplies documents from its own network of libraries, these are libraries which originally belonged to the Colorado Alliance of Research Libraries (CARL) but now include the University of Hawaii, the University of Maryland, University of California (Los Angeles), the National Library of Australia and IRIS, a consortium of Irish Libraries (Hing, 1995). Documents ordered from FirstSearch are supplied from five outside suppliers, BLDSC, EBSCOdoc, UMI InfoStore, ISI's Genuine Article and INDIVIDUAL. They can both be assessed via the Internet, JANET, commercial communication networks and direct dial via a modem. Each service offers a menu approach for end-users with FirstSearch also offering Boolean and command level searching. They both claim document delivery by fax within 24 hours and supply articles which are copyright cleared with copyright fees paid.

1.3. THE EDD SERVICES SELECTED FOR STUDY

Although any of the EDD services which have been discussed could have potentially been the focus of this study, the two biggest commercial EDD services currently

available to libraries, UnCover and FirstSearch's ContentsFirst and ArticlesFirst (ContentsFirst/ArticlesFirst) have been selected. FirstSearch and UnCover have been chosen for study because they not only satisfy all the unofficial standards given by Brown but they have proved sufficiently attractive to Irish Libraries to be selected as their EDD services. The Library of St. Patrick's College currently subscribes to FirstSearch and UnCover was the database selected by Irish libraries to form part of IRIS, an on-line and document supply service to Irish libraries and business launched in 1994. They have also been selected because they are both easily accessible, UnCover provides free access to its service over the Internet and this author has access to FirstSearch from Maynooth College. In order to put the selection of these two EDD services into perspective an outline of Maynooth's involvement with OCLC FirstSearch and the Irish Libraries with UnCover is given below.

1.3.1. OCLC'S FIRSTSEARCH AND MAYNOOTH COLLEGE

Maynooth has been a subscriber to FirstSearch since March 1994. Its selection was based on a evaluation carried out by eighty-two academic institutions in the UK during the Summer of 1993, its subsequent availability there through CHEST, and CHEST (Ireland) (Neligan, 1994, p.2). It was seen by the library as a substitute for cancelled periodicals and cancelled indexing and abstracting services. However, it was not chosen just for the presence of the ContentsFirst and ArticlesFirst databases but for other databases available through FirstSearch. Neligan, the Deputy Librarian of Maynooth, saw it as a way of expanding the library's reference service and introducing an end-user service for the first time, which would be available throughout the campus. She acknowledges that the subscription is expensive but she expects a decrease in mediated on-line searching done through DIALOG to compensate for some of the cost and views CD-ROM alternatives as very expensive when cost of networking and equipment is added. CHEST (Ireland) offers five subscription options, each option being priced according to the combination of databases within it. Maynooth subscribes

to Option B which includes ContentsFirst, ArticlesFirst and also FastDoc, a sub-set of those two databases and the following databases

- 1) WorldCat, OCLC's own catalogue with over thirty-two million records of book and non-book material Neligan states that this has proved to be one of the most popular databases with both library staff and users (Neligan, 1994, p 2) Prior to the Library's subscription to FirstSearch it had been downloading catalogue records from OCLC, it continues to do this and these records are held on WorldCat
- 2) ERIC (1966 onwards), this American education database contains over 850,000 references to reports and journal articles which include information from RIE (Resources in Education) and CIJE (Current Index to Journals in Education) Prior to this the library had subscribed to the CD-ROM edition of ERIC which was cancelled when it became available through FirstSearch
- 3) MEDLINE(1985 onwards), it covers over 3,500 journals in all areas of medicine which are indexed and there are abstracts for most entries This database is of interest to the Biology Department of Maynooth College which had previously only been available through DIALOG and therefore not directly accessible to staff and students
- 4) GPO, the monthly catalogue of the US government This is of limited interest to Library users in Maynooth college

Over and above the databases covered by Option B, it is possible to take out subscriptions or pay for blocks of searches to the other databases on FirstSearch The library has taken out a subscription to the MLA Bibliography (1963 onwards) and pays for blocks of searches to access INSPEC (1987 onwards) The MLA Bibliography covers over one million citations from 4,000 journals, books, essays,

dissertations, proceedings and bibliographies published world-wide in the fields of folklore, languages, linguistics and literature INSPEC, available only to the Departments of Physics and Computer Science, covers scientific and technical journals and conference proceedings in physics, computing and control, electrical engineering and electronics In the future the Library hopes to make more databases from FirstSearch available to its users such as ABI/Inform, ECONLIT and GEOBASE.

1.3.2. IRIS

IRIS was a project originally envisaged by the Committee on Library Co-operation in Ireland as a way of creating a transparent link between Irish library catalogues using modern networking technology (Irish Library News, 1994, p.1). The Irish Libraries involved in the planning and development of IRIS were Dublin City University, Forbairt, Trinity College Dublin, University College Dublin, University College Galway and the University of Limerick. The emphasis of the project changed when the European Commission became interested and saw it as a way of making Irish libraries and their documents more accessible to SME (small and medium-sized enterprises) Funding for the extension of the project was provided under the European Union's Telematique programme The inclusion of the UnCover database within IRIS was seen as a further enhancement which would allow subscribers a gateway to the UnCover database and document delivery Irish Library News (1994, p 1) lists the services offered by IRIS as.

- Access to the holdings of major Irish libraries in a single search
- Access to a table of contents (UnCover)
- Ordering of items
- Items dispatched in less than 24 hours, throughout the working week
- Completely distance independent

Access to IRIS is via X 25, Eirpac or the Internet (Gavin, 1995) The user costs of the service for libraries is based on an initial registration charge and the purchase in advance of additional blocks of connect time IRIS loan items are delivered by post, documents by post and fax and IRIS/UnCover documents by fax There is an additional costs for IRIS loans and document delivery. IRIS/UnCover document delivery costs are the same as any other gateway to UnCover If there is an IRIS library location for an IRIS/UnCover document, this is indicated and the user can choose to order the document through IRIS at the standard IRIS price

1.4. OBJECTIVE OF THIS STUDY

Inherent in this rethinking of collection management policy is the idea that changing from 'just-in-case' (ownership) to 'just-in-time' (access) will bring about savings for libraries, that the cost of acquiring articles from a journal will be less than subscribing to a title If this is not the case then the cancellation of a title has not achieved its objective of saving the library money Conversely, if the library does not hold a title that is in heavy demand and it is costing more in document delivery charges than in subscription charges, then there is an argument that it should be subscribed to This study will take a look at the costs involved in three different methods of article supply The three methods to be compared will be

- Subscribing to a periodical title and holding it within a Periodicals collection The articles are supplied from the collection when required by a user.
- Using Individual Article Supply (IAS) of Electronic Document Delivery Services. Two services will be examined, the document delivery services of ContentsFirst/ArticlesFirst on the OCLC FirstSearch database and UnCover

- Providing an library loans service that obtains photocopies of articles from the British Library Document Supply Centre and other institutions through the medium of British Library forms

In developing a methodology for comparing these three different methods of article supply, four main issues have to be addressed

- The alternatives being compared are not identical and do not provide the same services
- A method to cost and evaluate these alternatives has to be chosen.
- The costs which are to be included or excluded in the cost analysis have to be selected
- A method has to be chosen that will predict the use of a periodical title over its life time so that a cost-per-use of holding a periodical title can be compared with the cost-per-use of the other methods of article supply

Each of these four major problem areas will be examined and the reasons for selecting particular approaches will be explained. In comparing the different methods of article supply the actual choice of the method used will be dependent on the particular periodical title under review and it is possible that a library could be using a mixture of all or some of the methods under consideration to supply articles

1.4.1. THE ALTERNATIVES

A comparison between the alternatives is made difficult by the fact that they are not identical, although they are all able to provide article supply which can be costed, the differences between them may ultimately have a bearing on which alternative is selected

1.4.1.1. OWNERSHIP

Ideally holding a particular title or titles of interest to a user or group of users is what is preferred. Ownership provides a level of convenience to those users who wish to browse their own collection for likely looking sources and if an article is required, access to the material is available immediately for consultation (unless of course the material is missing, on loan or at binding!). There is also the prestige accorded to the institution in holding a 'substantial' periodicals collection and the range and extent of the periodicals collection in a subject discipline is part of the support material which is examined when programmes are being accredited by professional bodies.

1.4.1.2. ELECTRONIC DOCUMENT DELIVERY

Electronic Document Delivery services provides access electronically to periodical titles and articles. The medium itself may be an off-putting feature to users not happy or familiar with it. Unlike ownership, the title coverage is much larger and the likelihood of retrieving a greater number of relevant articles that much greater. These services, through their Current Alerting Services (CAS), provide the contents pages to each periodical title on their databases and thereby allowing not only the ability to order, but also identify, useful articles. The contents pages provided by CAS can serve as an electronic substitute to owning a periodical, that is, it is possible to keep up-to-date with a title of interest without subscribing to it. The facility to browse is more limited than with ownership, contents pages and even abstracts may not give the full flavour of the article which 'browsing' affords. Once an article has been identified it is possible for the user to order it immediately if required, and depending on the degree of urgency, to select a method of delivery which is suitable to the user's requirements. Unlike ownership, EDD services can be accessed simultaneously by multiple users and within an academic institution this could mean anywhere on the campus.

1.4.1.3. BRITISH LIBRARY DOCUMENT SUPPLY CENTRE SERVICE

The British Library Document Supply Centre (BLDSC) supplies articles from its own collection and through other back-up libraries. Thus its potential periodical title coverage is much larger than the other alternatives. It is possible to request documents by post, fax or through electronic means and documents can be supplied by post, courier or fax. Unlike EDD the user does not have direct access to the service but has to apply for an article through an intermediary, usually an Inter-Library Loan department. Articles are supplied but there is no facility to browse a collection as with ownership or peruse the contents pages of an EDD service.

1.4.1.4. SUMMARY OF THE CHARACTERISTICS OF THE ALTERNATIVES

Table 1.1. provides a summary of the characteristics of the different methods of document supply previously discussed. It indicates the possible range of benefits associated with these methods within an academic institution. For example, under the characteristic availability, ownership of a periodical entails, in the first instance, that a user must come to the library to locate an article, networking of an EDD service makes it available throughout the campus and an article supplied by the BLDSC has to be requested by the user through the Inter-Library Loans department. Under the characteristic title coverage, coverage under ownership is limited to the size of the collection, it is more extensive for an EDD service with the possibility of infinite growth and the BLDSC has access to an infinite number of periodical titles.

	<u>Ownership</u>	<u>EDD</u>	<u>BLDSC</u>
Characteristics:			
Article Supply	Yes	Yes	Yes
Availability	Library Only	Campus Wide	Thro' ILL Department only
Browsing	Yes	Limited	No
CAS	No	Yes	No
Cost	Annual Subscription	Per Article	Per Article
Ownership	Each Issue	Article Only	Article Only
Title Coverage	Limited to Collection	Extensive/ Infinite	Infinite

Table 1.1. Characteristics of the alternative methods of article supply

1.4.2. THE LIBRARY

The library of St. Patrick's College, Maynooth (Maynooth College) will be used as a source of information for the study and any conclusions drawn will be related directly to that library but it is hoped that any methods described in the study could be adapted to suit local circumstances. The College was originally founded as a seminary in 1795 but is now composed of three institutions, a Roman Catholic Seminary, a Pontifical University and a Recognised College of the National University of Ireland. The library currently serves around 3,800 undergraduates, 500 postgraduates and 400 academic and administrative staff and supports academic research programmes. These

borrowers come from the Seminary, the Faculty of Theology, Canon Law and Philosophy of the Pontifical University and from the Faculty of Arts, Science, Philosophy and Celtic Studies of the Recognised College. The College has two libraries, the Russell Library containing mainly pre-1850 material, and the Main Library, the John Paul II Library, opened in 1984. The library started using the URICA integrated library automation system in 1990 and all departments with the exception of the Inter-Library Loans Department now use its modules.

1.4.3. THE TIMESCALE

Finally, the planning time framework against which the alternative will be considered is the short term. This is for two reasons. The changes taking place in serial publishing makes it difficult to predict in what form or forms periodicals will appear in the next century, and secondly, if funding allows, a library extension is to be built in Maynooth in the year 2,000. These will both have an impact on the periodicals collection in the year 2,000 and beyond.

1.4.4. DEFINITION OF A PERIODICAL

The term periodical and serial is used interchangeably throughout this study and for the purposes of this study the definition given to a periodical by the American Library Association will be used to cover both. It is

'A serial appearing or intended to appear indefinitely at regular or stated intervals, generally more frequently than annually, each issue of which is numbered or dated consecutively and normally contains separate articles, stories or other writings.

(Young, 1983, p. 116)

Excluded from this study are other serial publications such as newspapers, annual reports, indexes, abstracts and directories.

1.5. OTHER DEVELOPMENTS

This present study is an examination of some of the commercial EDD services currently available and is not directly concerned with the more experimental projects involved in electronic document delivery and electronic publishing. There have been a number of projects that have explored the technical, economic, organisational and human implications of electronic document delivery and electronic journals such as FOU DRE (Menil, 1993), INIST (Lupovici, 1993), TULIP (Zijlstra, 1994), CORE (McKnight, 1993) and Red Sage (Brown, 1993). These projects are interesting because they do provide a glimpse of possible future document delivery mechanisms and of the changing relationships of those involved in the traditional information chain, authors, publishers, vendors, libraries and end-users. Brown (1993) predicts that the position of EDD services as document delivery vendors, who at present act as intermediaries in the traditional information chain, will be challenged as publishers become more involved in electronic publishing. Electronic publishing makes it possible to transmit information over the networks directly from publisher to the end-user, bypassing all intermediaries including the library. Although the publisher will be in a position to deliver information directly to the end-user it seems likely that they will be a place for intermediaries in the information chain in the foreseeable future but the relationships within the information chain will change. There are a number of other possible scenarios, including author to user, author to publisher to user, author to publishers to document delivery vendors to user, author to publisher to library database to user etc.

There is what Donovan (1995, p 30) calls an 'evolution, not revolution, in serial publication' taking place at the moment as the traditional (paper) academic publishers become involved in electronic publishing. In the past publishers have been slow to invest in electronic and network publishing because of the fear that it would

not be cost-effective and would have a detrimental effect on the financial situation of the printed journal (Van Marle, 1994) However, the publishers hands have been forced by the growth in the use of EDD services which, although the answer to libraries suffering from financial problems, is posing a threat to the commercial viability of the journals on which these services depend The reduced revenue brought about by journal cancellations is not being recouped from article royalties and the very existence of journal titles which support the EDD services are being undermined (Brown, 1993) Journal publishers are beginning to look towards the electronic journal as a possible solution to this financial conundrum and have begun to experiment with parallel publishing, that is the publication of both a print and an electronic version of a journal title. They will then be in a position to gage what the possible take-up for the electronic version will be and the revenue it could possible generate (Donovan, 1995)

If 1993 was the year that saw the launch of many new EDD services, 1996 is the year of the electronic journal, when a number of large publishers are launching electronic versions of their printed journals The Institute of Physics Publishing (IOPP) is making its 31 journals titles freely available on the World Wide Web (WWW) in Spring 1996 to institutions who already subscribes to the printed versions Libraries have to register with the IOPP, provide an IP address and download Adobe Acrobat software or PostScript viewer Ghostview software to enable full-text, maths and graphics viewing Chapman and Hall is also providing electronic access to their titles on the WWW in Spring 1996 but there is a 15% supplement for those already subscribing to the printed version and Adobe Acrobat software is also be needed for viewing Carfax Publishing Company is making 20 titles available over the Internet via, CatchWord, a global electronic publishing services company Customers can either opt for the printed version or the electronic access at the standard subscription price or pay a supplementary charge for both printed and electronic versions Again software has to be installed to view the electronic version, in this case the software is CatchWord RealPage

At the beginning of 1996 another experiment was also launched in the UK involving three publishers and higher education institutions (HEIs) in a pilot site licence initiative (Bekhradnia, 1995). The aim of this initiative is to break the vicious circle of serial price rises and cancellations and at the same time tackle the problem of copyright restrictions on the use of journal articles. The three publishers involved are the Institute of Physics Publishing, Academic Press and a consortium of Blackwell Publishing and Blackwell Science. Under this initiative the HEFCE (Higher Education Funding Council for England) has purchased licences on behalf of the HEIs in the UK (the Site) from the publishers based on the total subscriptions previously received by them from all HEIs. It is hoped that this arrangement will benefit the publishers by guaranteeing them a stable income that will break the price rise and cancellations cycle and benefit the institutions by allowing them to purchase all the journals of the publishers concerned at a substantial discount. The institutions will be able to make free use of the journals in the same way as they have done in the past but with the additional facility of being able to photocopy freely within the UK higher education sector. The journals will be available not only in paper format but will also become available in electronic format within a year of the launch of the initiative.

These experiments and others in parallel publishing, including making journal titles available in the CD-ROM format, will not only test the possible financial implications of the electronic journal for publishers but may help resolve other problem areas associated with electronic publishing such as their acceptability to potential users, the technical difficulties associated with providing full-text, halftone and graphic viewing and the copyright implications. As Van Marle (1994, p 21) succinctly puts it *'electronic publishing should continue to provide academics with all the advantages of the printed journal plus some additional advantages without any significant new disadvantages'*

1.6. STRUCTURE OF THE STUDY

Chapter two will examine the different analytical techniques which can be used to evaluate and costs the alternatives of article supply based on a review of the literature. The elements and measures of a cost-effective analysis will be discussed and in particular the measure of cost-per-use, will be derived for all alternatives and will provide a cost-effective monetary value for comparing the alternatives. Finally, the process of calculating costs and deciding which costs to include in the study will be explored.

Chapter three will look at the first alternative, that is owning a periodical title, and will establish the annual cost-per-title for ownership, which will not only include its subscription but all the operational costs involved in making a periodical available to staff and students. The operational costs of owning a periodical will be identified based on the processes and tasks involved in running the Periodicals Department of Maynooth College. Other measures of effectiveness of will also be considered based on the criteria outlined in chapter two. Having established the cost-per-title of ownership, the possible use that a title might receive will be estimated by an examination of the article requests made through the Inter-Library Loans Department of Maynooth College to obtain a list of the most heavily requested periodical titles and a lifetime use for each of those titles. The cost-per-use will then be obtained by dividing the cost-per-title of a periodical title by its use. The cost-per-use of each title will be used later in the study as a comparison with the cost-per-use of the other alternatives and will be one of the criteria for selecting one of the alternatives.

Chapter four will ascertain all the costs involved in obtaining photocopies or faxes of articles from the BLDSC and other institutions through the Inter-Library Loans

Department of Maynooth College The operational costs of the ILL Department will be identified and in a process similar to that used in costing the Periodicals Department, a cost-per-article will be derived which in this case is also its cost-per-use Other measures of effectiveness will also be considered based on the criteria outlined in chapter two

In chapter five, the cost of individual article supply will be examined in relation to the two EDD services FirstSearch and UnCover in the context of the services being provided in Maynooth College All the possible cost components including the subscription to the services, telecommunication charges, staff and equipment will be considered and using the relevant and irrelevant criteria a cost-per-use will be calculated. As with the other two alternatives other measures of effectiveness will also be considered

Chapter six will draw conclusions based on the research carried out by comparing the cost-per-use for each alternative and the other measures of effectiveness, so that one alternative or a mix of alternatives will emerge as the most cost-effective choice for Maynooth College. In addition a more general formulae for deciding between alternatives will be discussed, applicable to a range of institutions

CHAPTER TWO

METHODOLOGY

2.1. METHOD TO COST AND EVALUATE THE ALTERNATIVES

In order to compare the alternatives an analytical technique has to be chosen that will help to evaluate and cost these alternatives. The analytical technique which has been selected by this study and which has been used previously by similar studies is cost-effective analysis (Milne and Tiffany, 1991a, Lancaster, 1971). It is an analytic tool which helps a decision-maker to identify a preferred choice amongst possible alternatives (Quade, 1967, p. 1). However, defining what precisely cost-effectiveness analysis (CEA) is not straightforward as it has been defined in many ways. Cost-effectiveness analysis has been defined as.

Achieving a goal with the minimum of expenditure

(Dictionary of Finance, 1993, p. 67)

Taking this definition of CEA, all alternative courses of action are costed and the one which provides the cheapest way of achieving the specified objective is chosen. This is a broad definition of CEA which concentrates on the costing element of the analysis and equates effectiveness with the most efficient use of limited resources, in this case cash, to achieve the objective. Milne and Tiffany in their cost-effectiveness study of serials, which compared the cost of subscribing to a serial with the cost of cancelling and providing the articles for users from inter-library loans using a cost-per-use criterion, appear to have applied this definition of CEA without explicitly stating the fact. However, they did qualify the results they received from the costing exercise by adding a second criterion to decide which periodicals would be cancelled, that is, the

amount of use a periodical title received. This second criterion set a limit to the number of inter-library loans their library was willing to provide for a title per year so that the inconvenience suffered by their users in the delay awaiting inter-library loans would be minimised. This illustrates the problem with a broad definition of CEA, too much emphasis can be placed on costs to the detriment of other important factors such as 'inconvenience'. Lancaster uses a much narrower definition of effectiveness by equating effectiveness with performance and when the alternatives are being considered, it is not only the cost of providing the service but how well each alternative satisfies the demands placed upon it that is important (Lancaster, 1971, p 12). In other words, not only have the alternatives to be costed but some way of measuring the performance of each alternative has to be included.

2.1.2. COST-EFFECTIVENESS ANALYSIS AND PERFORMANCE

The essential role of CEA is then to cost the alternatives and at the same time evaluate the performance (effectiveness) of these alternatives. When considering the performance of each alternative we are also bringing into consideration the user's perspective, if too much emphasis is placed on the cost aspects of alternatives then the user's view point can be ignored (Hewgill, 1984). The user is not particularly interested in how much the service costs but in the quality of the service received and whether it can 'deliver the goods'. How do we then evaluate the performance of the alternatives? Lancaster has suggested some ways of evaluating performance, these include coverage, response time of a system and the amount of effort required by the user (in this study called 'user friendliness') (Lancaster, 1971, p 13). Other criteria which could be included in the context of this study are delivery reliability, their speed of supply and the quality of the copies provided.

2.1.2.1 COVERAGE

The coverage criteria could include looking at the titles each alternative contains in the following way

- Does the service contain the title or titles which are likely to be requested?
- When did the service begin?

2.1.2.2. RESPONSE TIME (ISSUES) OF THE SYSTEM

The response time of the different services relates to the time lapse between the publication of an issue of a title and its appearance on the contents pages of a EDD service or receipt of an issue if the title is purchased. In other words, is there a difference in the time taken to actually receive a copy and its appearance on the pages of a EDD service?

The phrase 'response time' is used in a different context later on in this study, to differentiate between them the 'response time (issues)' will be used when discussing it in this context

2.1.2.3. USER FRIENDLINESS

The effort needed to go to a periodicals collection and obtain an issue for perusal or photocopy is obviously different from that required to use a EDD service. One would have to compare the ease of retrieval of material when locally owned with that of the ease of retrieval through EDD

2.1.2.4. DELIVERY RELIABILITY AND THEIR SPEED OF SUPPLY

The delivery reliability relates to the success rate of document delivery, that is how many articles requested are actually delivered? If an article is available locally the speed of getting access to the material should be greater than by inter-library loan or even electronic document delivery, where unless an article is available on-line or through e-mail, some delay will be incurred. Delays can also be incurred locally if the

material is not actually on the library shelf at the time the user requires it and in that case, it may be quicker to acquire an article by document delivery

2.1.2.5. QUALITY OF THE COPIES PROVIDED

Articles which are photocopied are generally of good quality unless photocopied carelessly, so that articles photocopied and supplied by mail should generally be good in quality. This is not the case with faxed articles, although the speed at which articles are supplied can be increased by faxing material this effects the quality of copies provided. This applies specifically to group 3 facsimile transmission where the quality of the faxed page, which is based on the resolution of scanning, is not high enough to capture the fine detail such as sub-and superscripts in formulae and minute detail in diagrams and photographs which form some of the content of scientific, technical and medical (STM) articles (Braid, 1993). This problem can be overcome by the use of group 4 facsimile transmission which is capable of higher resolution than group 3 facsimile. However, in order to use group 4 machines a digital communications network is needed such as Integrated Services Digital Network (ISDN) but this has been slow to develop. Another alternative is the use of the PC based transmission system called ARIEL, developed by the Research Libraries Group (RLG), in which articles are scanned onto a PC and then transmitted over ordinary telephone lines (Online Libraries and Microcomputers, 1991). The ARIEL software is capable of a high resolution which accommodates not only text but pictures, charts and graphs and can be delivered over the Internet directly to the user's workstation. The use of group 3 is ubiquitous and so one would expect the quality of the non-text content of articles to be poor.

2.1.3. ELEMENTS OF COST-EFFECTIVENESS ANALYSIS

How do we go about doing a CEA? The following elements of analysis are based on Quade's (p.4-5)

- The objective or objectives CEA is usually carried out in order to help choose a course of action. In the context of this study, the objective is to find the cheapest way of supplying articles for the use of staff and student of St. Patrick's College, Maynooth.
- The alternatives Alternatives are selected for examination which it is hoped are the means whereby the objective will be achieved. It is not necessary that they perform the exact function or that they are obvious substitutes. The alternatives under investigation in this study are obvious substitutes but as already discussed are not identical, therefore they do not perform the exact functions.
- The costs To determine the costs of each of the alternatives under consideration.
- A criterion This provides a rule or standard by which to rank the alternatives and hence make a selection amongst the alternatives. One criterion being used by this study is cost-per-use, that is, to relate the actual cost of subscribing to a title to the use it receives and to compare it to the cost-per-use of using the other document delivery alternatives. The other is performance or effectiveness, some way of ranking this is also required.
- To draw conclusions To draw conclusions as to the alternative to be adopted.

Although the issue of performance will not be ignored, the initial emphasis of this study will be on the cost of each alternative but it is recognised that because the alternatives are not identical, there may be differences in the level of performance. The performance differences of the alternatives will be discussed and highlighted throughout this study and although they may not be specifically measured, costed or quantified, these differences may become an aid in the final decision-making process, especially if the costed alternatives are close.

2.2 COST-BENEFIT ANALYSIS

Cost-benefit analysis (CBA) is another method which can be used to compare alternatives. CBA was specially developed for use in the public sector and is usually associated with the long-term assessment of the costs and benefits of alternatives. It attempts to take into account all the costs and benefits accruing to investment projects by defining those costs and benefits in much broader terms than in CEA (Drury, 1992). CBA does not concentrate exclusively on the direct impact that the project will have upon the party providing the resources but will also assesses the effects on other sections of the community. The result of this emphasis on all significant costs and benefits is that there is a major problem in trying to evaluate certain types of benefits and costs. The broader costs and benefits considerations could include the measurement of such phenomena as time lost or gained, the increase or decrease in life-expectation and changes in the noise level. To illustrate this point, when the benefits were calculated for the Victoria underground line in London, not only was the revenue from ticket sales taken into account but attempts were made to set a monetary value on the reductions in travelling time to users. Similarly, when calculating the costs of a new airport, not only were the costs of purchasing the land included in the calculations but the losses in welfare resulting from aircraft noise and aesthetic damage done to the local scenery.

How can this be directly related to the study at hand? Is a CBA a more appropriate approach to this study rather than a CEA? The fundamental problem is one of actually distinguishing CEA from some forms of CBA. Williams points out that

. it is unlikely that any but the most low-level CBA will, in the foreseeable future, succeed in evaluating all inputs and outputs in commensurable terms, the distinction between actual CBA and actual CEA will only be a matter of degree (and, on occasion, perhaps only a matter of intent) (Williams, 1973, p 33)

In similar studies carried out by Sridhar (1988) and Milne and Tiffany (1991a) on the cost-per-use of periodical titles, the former was described as a cost benefit analysis and the latter as a cost-effectiveness analysis but both appear to have used a similar approach. Although it can at times be difficult to distinguish between CBA and CEA, Williams concludes:

that CBA accepts, and pushes further, the scientists' preoccupation with quantification already central to OR, and pushes much further down the path already trodden by CEA towards evaluation of inputs and outputs in money terms, tending at the same time to enlarge the scope of the inputs and outputs that are brought within the area of systematic comparison (Williams, 1973, p 35)

The two essential features identified by Williams as constituents of an *ideal* CBA are then, the quantification in monetary terms of inputs and outputs and the scope of those inputs and outputs. This study will not attempt to quantify all inputs and outputs in monetary terms because of the difficulties inherent in assigning a monetary value to the types of costs and benefits which are part of this study. Should we attempt, for example to put a monetary value on the 'benefit' of quicker access to information through local ownership compared with the 'cost' incurred by the delay through inter-library loan or electronic document delivery. As Williams points out user cost can be related to the time the user spends in getting access to the information. (Williams, 1968). Although, it may be possible to say, for example, that a standard mailed inter-library loan provides slower access than if the material is available locally, the problems remains how to put a monetary value on this time delay incurred by the user. Equally, if we take into account the wider benefits of having a periodicals collection, can we put a monetary value on the 'prestige' factor to the institution of having a 'substantial' periodicals collection.

The other feature of the *ideal* CBA is an increase in the scope of inputs and outputs, which means in effect that all the costs and benefits to the 'community' of each alternative have to be identified. This increase in scope brings with it the problem of having to determine the cut-off point at which the broad effects to community are no longer to be considered. A study can lose its impact if too narrow or too broad a view is taken and the cut-off point eliminates or emphasises some of the less direct benefits and costs (Brooks, 1975). When some of the alternatives are being evaluated using the performance criteria in the current study, some of their benefits and costs will be elicited and in that sense it will not be too dissimilar to a CBA and the 'community' is directly analogous to the 'institution' in this analysis. However, it is possible to argue that the present CEA will be deficient because the cut-off point is premature and it will not include all the possible costs and benefits accruing to the institution and outside of it.

2.3. CEA AND CBA

In conclusion, this study is being called a CEA and not a CBA, although it is acknowledged that it is sometimes difficult to differentiate between a CEA and a CBA. However, the distinguishing feature of both types of analysis is that costs considerations alone should not be the only basis for deciding between alternatives but other issues such as their *effectiveness* or *benefits* have to be included. Although it is acknowledged that this study may lack some of the punch of an *ideal* CBA, it is hoped that some of these other issues will be highlighted.

2.4. COST-PER-USE

The basic criterion that will be used to rank the alternatives will be cost-per-use, this combines costs with effectiveness, equates effectiveness with utility and gives cost-effectiveness a monetary value that makes ranking the alternatives easier. When a title is subscribed to the cost of that subscription covers the repeated use of articles from that years issue. If a title is never used costs have been needlessly incurred but if articles are used, the level of that use will determine its cost-effectiveness. In order to link the costs of owning a periodical with its use a cost-per-use approach will be taken as used by Milne and Tiffany in their study of the library at the Memorial University of Newfoundland, Canada (Milne and Tiffany, 1991a, Milne and Tiffany, 1991b). Milne and Tiffany in their study related cost specifically to the annual subscription price and in so doing underestimated the total costs involved in owning a title. In this study other costs involved in ownership will be included, that is the costs incurred in keeping a title within a periodicals collection. They estimated the total number of uses that the issues purchased by the annual subscription price would receive by calculating "*how many uses a year's issues of a serial would receive from the time they were first put on the shelf until the time the last issue occurred at some indefinite moment in the future*" (p 11). They refers to this total number of uses as the serial's *lifetime use*. They then calculated the cost-per-use of a serial by dividing the current annual subscription price by "*the estimated total number of uses that the issues purchased by this year's subscription will receive over their lifetime*" (p 14)

They obtained this lifetime use by tagging five back years of issues and extrapolating from the number of uses received by multiplying by an adjustment factor calculated from the half-life listings in the SCI Journal of Citations Reports. Journal Half-life Listing, Section 2 (Milne and Tiffany, 1991a, p 11). Other surveys have measured use by the analysis of circulation or reshelving statistics (Millson-Martula, 1988). There

are problems in conducting these types of survey in that the methodology can produce statistics that both over value or under value use, they can be labour intensive and costly to conduct. The tagging method, for example, involves users placing a tick mark on the tags but suffers from the problem that users may overtick. Reshelving statistics can also be unreliable because users may themselves reshelve periodicals even when requested not to do so (Wenger and Childress, 1977). This study will obtain its lifetime use figure from ILL statistics of Maynooth College for the years 1990-1994. A user can potentially request articles for ILL for any back issues of a journal title, so that the requests for a title in a given year reflects a pattern of the possible lifetime usage that a year's issues of a journal title could receive. The cost-per-use will then be obtained by dividing all the costs of ownership by a title's lifetime usage as ascertained through its ILL requests. It is recognised that one of the possible disadvantages of this approach is that it will underestimate the true demand for articles because users may not take the trouble to request or wait for ILLs.

One of reasons for previous use studies such as Milne and Tiffany's (1991a) has been for the purpose of cancellation. The emphasis of this study by investigating the level of inter-library loan requests to obtain a cost-per-use is not cancellation but possible subscription, if the cost-per-use of ownership is less than the cost-per-use of access. However, in the likelihood of the cost-per-use of ownership being greater than the cost-per-use of access for a title, the cost-per-use of the different document delivery services will also be compared to see which of them is the cheapest. When one uses either a EDD service or the BLDSC costs are only incurred when the article is requested, that is 'used', so that the cost of an article can be directly related to its use. The cost-per-use of these document delivery services will be obtained by adding together not only the actual cost of an article but any other costs incurred in providing the article e.g. costs involved in running an ILL department.

It should be stressed that although cost-per-use will be used to rank alternatives, other non-monetary indicators of effectiveness discussed earlier such as coverage, will also be used rank the alternatives

2.5. COSTS

Costs are an essential part of this study but what costs are to be included? Costs have to be considered in relations to the objectives to be achieved and the environment in which the study is being conducted. In this study the objective is to find the most cost-effective way of supplying articles by looking at some available alternatives. The environment is that of the Library of St Patrick's College, where a Periodicals collection exists, an Inter-library loan service is available and the College is connected through the Internet to FirstSearch and UnCover

2.5.1. WHY COST?

The collection of library cost data may be undertaken for various reasons and understanding the purpose of a cost study will make it clear why the data is needed, what data needs to be extracted and how this will impinge on the way it will be collected. Cost data may be collected for the following reasons to provide information that will be used to set a price for services; to give the funding authority the necessary information that will provide a clear picture of how the money is spent and what financial support is needed, and as an aid to making informed management decisions (Virgo, 1987) It is with the latter consideration that this study is concerned There are many different types of management decision that have to be made and each will have an impact on the cost data that is actually needed Cost data may be used in special costing exercises to examine the comparative costs of current operations with the estimated costs of alternative methods, to gauge the efficiency of a service, to evaluate the performance of employees or to evaluate the financial impact on the library of providing a particular service

2.5.2. CALCULATING COSTS

There is extensive amount of literature concerned with the process of how these costs are calculated (Abels, Kantor and Saracevic, 1996; Ford, 1973, Hayes, 1980, Hayes, 1996, Hayes and Becker, 1984, Kantor, 1989, Magson, 1973, Mason, 1972); Shillinglaw, 1989; Smith, 1991; Smith and Schofield, 1971). It is usual when conducting a cost study to carry out a cost accounting analysis to estimate the total cost of the provision of the particular service or services under investigation. In the library context, the cost accounting process has been used to estimate the full or total costs of providing a library service and for specific services within it. Costing specific services often leads to the calculation of a unit cost for the provision of these services by simply dividing the costs of the services for a period by the number of units produced in that period. In the case of the analysis of the alternative costs of article supply, a special costing exercise is being conducted and a management accounting approach is more appropriate than cost accounting one. Management accounting is concerned with providing information to people in an organisation for use in the decision making process and is often applied to decisions that are not routinely made as in the case of special studies. These special studies require only those costs that are relevant to the specific alternative courses under examination. Therefore, costs have to be classified according to whether they are relevant or irrelevant to a particular decision (Drury, 1992). Drury calls this the 'decision-relevant approach' (p 236)

2.5.2.1. RELEVANT AND IRRELEVANT COSTS

In order to find out which costs are relevant or irrelevant to this special study it is necessary to take a look at elements which make up the total costs of each alternative in order that they can be categorised. The total cost is composed of two elements, *direct costs* and *indirect costs*. This can be written as:

Direct Cost + Indirect Cost = Total Cost (Virgo, 1987, p 80)

The direct costs are those that are directly attributable to the service. These might include the personnel, materials and equipment directly involved in the provision of the service. The indirect costs are not attributable to any particular service and need to be arbitrarily assigned. They include such things as the security service; the administration staff i.e. the library secretary; the heat, electricity and rent of a building. Certain categories of costs may have both a direct and indirect element. For example, telephone calls will be a direct cost if they are traceable to the service but the cost of telephone equipment and maintenance is more likely to be an indirect cost which will need to be apportioned to all services in the library.

Much has been written about the problems involved in determining total costs, these include: the allocation of the indirect costs (also referred to as overheads); the indirect costs that should be included; the calculation of building and equipment costs and staffing costs. For example, there are several ways in which indirect costs can be allocated, one of the most common is to allocate the costs proportionally either to the direct costs (Hayes, 1980) or to apportion them on a pro-rata basis between the services e.g. if the acquisitions department account for 25% of the non-administration staff, 25% of the administration staff is charged to the acquisition department (Ford, 1973). The allocation of other indirect costs varies e.g. heating by the cubic capacity of a room; rent, rates, electricity by on the basis of the floor space occupied by each service; telephones by the number of phones (Ford; Clements, 1984). These are indirect costs that are generated within the library but there are other indirect costs which are incurred when services are provided by other departments within the organisation. Hayes makes the point that when a library service is costed these costs are not always considered, that these services may be provided 'free of charge' to the library (Hayes, 1980). However, these costs should be included in the full cost of providing library services as they are coming from another budget and do represent a cost to the institution.

Other indirect costs which it is argued should also be included are building and equipment costs which would normally be distributed over their expected lifetime. This process is called *recording depreciation expense* and involves "assigning the costs of a long-term asset to future fiscal periods based on assumed estimated wear or obsolescence of that asset" (Smith, 1991, p.13). This means in practice that the annual depreciation figure for each asset will be based upon its purchase price or accepted appraisal price and its expected life span e.g. if the expected life span of computer equipment is taken to be five years, then the annual total depreciation figure can be arrived at by dividing the total cost of the computer equipment by five. This process becomes more difficult when the cost of a library building or periodical shelving has to be depreciated. Staffing costs are not just the gross salaries of the library staff involved in the service, the employer's pension contribution, employer's PRSI and any other employer's contribution must be included to arrive at true total staff costs.

However, some of the problems associated with cost accounting can be minimised when one is taking a management accounting approach and looking for only the relevant costs for each alternative. This becomes clearer if rather than viewing costs as direct and indirect another categorisation is used, namely fixed and variable costs. A fixed cost is one that does not change as the level of service changes and it also provides the capacity to carry out the service or services (Shillinglaw, 1989). For example, if articles are supplied through EDD or through the BLDSC and a 'core collection' is still maintained, computers will still be needed to accession periodicals in that collection, and would be considered as fixed costs. In this category fall many costs that would also be considered as indirect costs such as heating and electricity. A variable cost is one that does change as the volume of the services provided changes. For example, the total costs of the periodicals department will rise if more books are purchased but heating and electricity costs will only increase if more processing time is

involved. It is necessary to distinguish those costs which are fixed and those which are variable in order that the fixed costs can be eliminated from the cost analysis. This is done by examining each alternative and categorising the costs within each alternative first as either direct or indirect and then within those categories as either variable or fixed. The total variable costs can then be calculated and an average variable cost obtained for each alternative by dividing the total variable costs by the number of units, e.g. the number of periodical titles or inter-library loans.

2.5.3. THE COLLECTION OF COST DATA

Before collecting the cost data it is important to have a clear idea of the unit of measurement and the specific cost centres which are being considered. Virgo defines the unit of measurement as '*the unit of product or service for which the cost is to be determined*' (p 80). This could be the cost of providing an inter-library loan, processing a book or providing an article from a periodicals collection. The specific cost centres relate to the functions in the library and can be broken down into what Virgo calls *direct mission or programme centres* and *support services*. The direct mission or programme centres provide direct services to the users, e.g. circulation, and support services provides the back-up which enables the direct mission centres to operate, e.g. acquisition and cataloguing services.

The next step is the actual collection and recording of the cost data. This involves the identification of the processes and tasks, and their sources of expense i.e. material, labour and equipment. From this will emerge a picture of the direct costs and indirect costs. A major source of direct costs will be that of the salaries of the staff involved in the processes and tasks. It is usual in most cost studies to obtain a unit labour cost by identifying the amount of labour time that has been expended in the performance of the processes and tasks and to relate it to the volume of material handled. Several approaches are used such as traditional work study techniques, activity sampling and diary recording by individuals of secondary tasks. The latter technique was developed

by the Library Management Research Unit at Cambridge, England specifically for use in a library environment (Smith and Schofield, 1971) However, in applying the *decision relevant approach*, it is possible in some cases that labour cost will be considered fixed and as such be an irrelevant cost Normally the next step in the process is the allocation of indirect costs The procedure of the allocation of indirect costs has already been described However, in this study the next step will be to determine whether the direct costs and indirect costs are either variable or fixed. If a cost is fixed it can be regarded as an irrelevant cost and eliminated. Only relevant costs need to be considered If any indirect cost turns out to be also a variable cost, it will then need to be allocated in the way described earlier. Finally, the cost data will need to be analysed and a unit cost calculated.

CHAPTER THREE

OWNERSHIP AND COST-PER-USE

3.1. INTRODUCTION

This chapter will try to establish the cost-per-title per annum of owning a periodical title, which includes not only its subscription price but all the other costs involved in making a periodical available to staff and students. The operational costs of the Periodicals Department in Maynooth will be identified by this author, based on five years experience of running the Department. The binding costs of Binding Department in Maynooth will be based on interview with relevant personnel and reports produced by that Department. The processes and tasks involved in owning a periodical will be identified and labour, material, and equipment costs associated with their operation. These will be listed as either direct or indirect costs, variable or fixed, variable costs will be divided by the number of periodical titles currently taken and finally, all relevant cost will be added together to obtain a cost-per-title. The effectiveness of ownership within a periodicals collection will also be examined.

Having established the cost-per-title of ownership, the possible use that a title might receive over its lifetime will be estimated using ILL requests made to the Inter-Library Loan Department of Maynooth College from 1990-1994 and then by dividing the cost-per-title of ownership with its use to obtain a cost-per-use.

3.2. PROCESSES AND TASKS

The Periodicals Department of Maynooth College operates both as a support service and a direct mission centre. As a support service it processes periodical titles, passes invoices, shelves periodicals and keeps the shelves in good order, etc. Its direct

mission functions includes retrieving journals from the various Stores and answering bibliographic and directional enquiries from staff and students. Most tasks associated with the maintenance of the periodicals collection are performed by the Periodicals staff but invoices are processed both in and outside of the Department, the invoices details for each title are recorded in the Periodicals Department, then passed to the Acquisitions Department of the Library for further processing and finally to the Accounts Department of the College for payment. The only other major process performed outside of the Periodicals Department is that of binding which is carried out in the Binding Department.

There are approximately 4,350 periodical titles listed on the URICA catalogue, of which 2,009 are current. The current titles are received as donations and as copyright material, which comprise 50% (1019) of those titles, exchange material comprises 5% (95) and subscriptions 45% (905). Periodical records are downloaded from the OCLC database and amended by Periodicals staff to suit local requirements. The periodical records appear on the College's OPAC and information is added to these records in the Serials Module of URICA, so that they can be accessioned, claimed and the invoices processed on URICA. The invoice process has not been fully computerised as yet, it began with the commencement of the financial year 1995/96 and is still ongoing, so that for an interim period invoices are being entered both manually, on the Kardex and in the Module. Invoices are also entered on an Excel spreadsheet to enable various computations to be undertaken such as expenditure by Departments and predictions of future expenditure. The periodicals collection is shelved in three locations, on open access in the Main Library and in two closed access stores, the Pugin Store and the St. Mary's Store. The material in the Stores comprise about 20% of all periodical titles and can be requested by students and staff for consultation in the Main Library. The Support Service Processes and Tasks of the Periodicals Department are listed in **Tables 3.1a, 3.1b and 3.2.**

Processes and Tasks: Ongoing Maintenance

Processes	Tasks
Post	Opening, distribution of other post to Departments
Accessioning	Accessioning on URICA, amending accessioned records, stamping
Shelving	Counting issues for daily statistics, shelving daily post
Invoices	Checking invoices and contacting agents if problems, recording details on the Kardex, URICA and Excel
Boxing	Incomplete volumes boxed, labelled and reshelved, retyping of labels
Claiming	Running claims weekly on URICA, checking claims before sending, reclaim issues not sent, amend records when response received to claims, close-down titles when issue no longer being received
Re-shelving	Counting and re-shelving used issues.
Record changes	Modifying old records and creating new records for a change of title, amending records when frequencies change, amending records when suppliers change
Shelf checks & tidying	Checking that the titles are in alphabetic order, checking boxes to see if contents are correct; keeping the shelves tidy moving the titles around to make room for title expansion
Regulation of stock	Moving back numbers to the Stores and weeding stock
Stores	Keeping the Stores tidy; moving the titles around to make room for title expansion
Financial Management	Producing various financial reports on requests from the Librarian
Special Assignments	These can be assigned at any time and have included adding VAT to records, putting titles up on the Serials Module, matching the barcodes of periodical records to catalogue records; adding ISSNs to records
Courses/Conferences	Attending courses and conferences to keep up-to-date on new developments

Table 3.1a Support Service Processes and Tasks of the Periodicals Department

Processes and Tasks: New title	
Processes	Tasks
Ordering	Checking order details supplied by lecturers and staff, requesting quotes from subscription agents, ordering titles on-line, chasing titles that have not arrived supplying bibliographic details to lecturers and staff
Catalogue Record	Downloading OCLC record, amending downloaded record
Financial Record	Creating a record on Excel and Kardex
Serials Record	Creating a serials record on URICA
Shelf Tags	Typing two shelf tags and adding to current and bound shelves
Notifying lecturers and staff	Typing and sending of notifications of arrival of new title

Table 3.1b Support Service Processes and Tasks of the Periodicals Department

Processes	Tasks
Obtaining stored material	Obtaining materials on closed access, these include newspaper, journals in the Pugin Store and reference material in the St Mary's Store
Enquiries	Any enquiries connected with periodicals including directional and bibliographic, interpretation of reading lists, using the OPAC to find periodical titles, etc
Other Enquiries	All types of enquiry come to the Periodical staff, if reference staff are available enquiries are referred to them, if not, they are dealt with by Periodicals Staff

Table 3.2 Direct Mission Centre Processes and Tasks of the Periodicals Department

3.3. COSTS

3.3.1. LABOUR COSTS - DIRECT

The labour costs associated with the processes and tasks outlined are all direct costs which can be traced to the performance of the functions of the Periodicals Department as both a Support Service and Direct Mission Centre. The staff currently consists of two job-sharing Assistant Librarians (working 35 hours per week in total), two Library Assistants (working 28 hours per week in total), part-time Library Assistant (working 7 hours per week for 9 months of the year) and a Summer student worker (for approximately 6 weeks). The labour costs for the purpose of this study will be regarded as fixed, that is, it will be assumed that for at least the next five years that the idea of a 'core collection' will be maintained, that subscriptions, copyright, donations and exchanges will continue to be received and that with this being the case, a Periodicals Department will continue to exist in its present form. It is acknowledged that it is likely that more subscription cancellations may take place in the future but it is unlikely that there will be a substantial decrease in the number of subscriptions and that all the other three categories will continue to grow. The staff of Periodicals Department would be expected to absorb any minor increases or decreases in their workload. However, if there were to be a substantial reduction in the workload brought about in the future, for example by electronic publishing, then a proportionate reduction in staff could be expected. However, under this study labour costs are fixed and this makes them an irrelevant cost.

3.3.2. LABOUR COSTS - INDIRECT

The following is a list of indirect labour costs that cannot be easily traced to the Periodicals Department but do have an impact on the Department. These are

- Librarian
- Deputy Librarian

- Secretary
- Systems Librarian
- Systems Technician
- Acquisitions Department
- Computer Centre Staff
- Security Staff
- Cleaning Staff

These labour costs will be treated as fixed costs and therefore as an irrelevant cost. All the people performing the various functions above exist not only to service the Periodicals Department but other Departments in the Library, any minor or even major changes in the Periodicals Department may have little or no impact on their workload. The Acquisitions Department for example, which process the periodical invoices, would find very little change to their workload if the number of periodicals titles increased or decreased as subscription agents do not send individual invoices for each subscription title but group them together on a small number of invoices.

3.3.3. MATERIAL COSTS - DIRECT AND INDIRECT

Telephone calls are direct costs which can be traced back to the Periodicals Department by the number of calls made from its extension and will be considered variable because the number of calls made does depend on the volume of periodical titles being currently received. Most telephone calls will be made to chase missing issues, query invoices, check bibliographic details and to request quotes for possible new subscriptions. The telephone accounts were acquired from the Acquisitions Department for the financial year 1994/95 to obtain an annual cost. The accounts are divided into two sections, non-local and local, non-local are made mostly to the Department's Blackwell's subscription agents and direct suppliers in England and therefore mainly apply to those subscriptions, local calls are more difficult to trace because they contain calls made to the subscription agent Swets in England but paid at

a local rate (the Department rings a number in Dublin and then Swets pays for telephone call between Dublin to England) and other calls mainly connected with copyright and donated material. In order to obtain a telephone cost-per-title the costs of the calls were apportioned between all the current titles excluding exchanges (all queries regarding exchanges are made by post). The breakdown of the 1994/95 telephone calls when apportioned is given in **Table 3.3**.

1994/95	Cost:	Number of titles:	Cost-per-title:
Local calls	£94 43	302 Swets subscriptions and (23% of calls = £21 72)	7 pence
		1019 Donations and copyright (77% of calls = £72 71)	7 pence
Non-local	£96 83	603 Blackwell and direct subscriptions	16 pence

Table 3.3 Breakdown of the 1994/94 telephone calls

In order to make future calculations easier an average cost-per-title for all subscriptions will be used, which is 11 5 pence

Other material costs are stationery and postage, these are indirect costs as they cannot be directly assigned to the Periodicals Department as no separate account is kept for each department. They are also variable costs because the amount of stationery and postage used does depend on the volume of periodical titles being currently received. Current titles were used rather than the total number of periodical titles held because the majority of stationery and postage expenditure is related to current titles. The stationery and postage expenditures for 1994/95 were obtained from the Acquisitions Department of the Library, totalled, apportioned by dividing the total costs of stationery and postage by the number of Library departments (10), given in **Table 3.4** and then dividing by the number of current titles (2009). The results of

this procedure are given in **Table 3.5** Although dividing the stationery and postage by the number of departments may be regarded as rather arbitrary as some departments do use more stationery and postage, it was felt that there was insufficient information to do it in any other way

Acquisitions	Inter-Library Loans	Reader Services
Binding	Librarian/Deputy Librarian	Russell Library
Cataloguing	Periodicals	Systems
College Collection and Rare Books	Russell Library	

Table 3.4 Library departments

	Expenditure 1994/95	Average cost Department	Average cost-per-title
Stationery	£2,167 22	£216 72	11 pence
Postage	£6,277 81	£627 78	31 pence

Table 3.5 Stationery and Postage expenditure

3.3.4. EQUIPMENT - DIRECT

Included under this heading is the equipment and furniture used directly by the Periodicals Department in its operations This covers equipment such as computers, printers, typewriter, CD-ROM drive, cabinets, the Kardex, tables, chairs, trolleys and periodical shelving All this equipment and furniture with the exception of periodical shelving, can be considered fixed as it provides the capacity to carry out the functions of the Department and does not change as the level of service changes unless there were to be a excessive reduction or expansion in the number of titles being currently received Periodical shelving poses a different kind of problem, ceased titles need shelving space and current titles keep on growing and have to be accommodated. The

problem of the recurring expense and the need to find extra space to house a growing collection cannot be underestimated. In the case of the Maynooth Library, the Periodicals Department has already shelved all space available to it within the Main Library and in the two Stores. There is no room for expansion within any of these locations but there is enough shelf storage space to accommodate the collection for the next five years without any radical change of collection management policy. A new library extension is proposed for the year 2000 and if this is built it will provide extra space for shelving periodicals. However, for the purposes of this study, only the shelf provision for the next five years is being considered and therefore, periodical shelving will be considered as fixed. All equipment will therefore be considered irrelevant for the purposes of this study.

3.3.5. INDIRECT COSTS

The following is a list of all indirect costs (except labour) that cannot be easily traced to the Periodicals Department but do have an impact on the Department. These are

- Heating
- Electricity
- Maintenance
- Cost of Building
- Computer Systems (URICA)
- Security

These indirect costs will be treated as fixed costs because again they provide the capacity to carry out a library service and do not change as the level of the service with the Periodicals Department changes. They will also be considered as irrelevant costs.

3.3.6. BINDING DEPARTMENT

Binding is carried out by the Library Bindery and by an outside bookbinder. It is library policy to bind most periodicals and this applies in particular to titles taken as a subscription. The ratio of in-house binding to outside binding is approximately 70/30, therefore, the bulk of the binding is done in-house. The output of the Binding Department and the outside bookbinders is directly related to the number of titles currently taken, a reduction or an increase in the number of the current titles taken will effect the number of volumes bound. Therefore, binding is both a direct and a variable cost. Details of binding costs were obtained from personnel in the Binding Department who carried out their own costing exercise on the Library Bindery in 1995.

A breakdown of the in-house binding costs is not provided due to the confidential nature of some of its contents. Their labour costs are based on the piece-work rate, materials costs such as glue, board, drill bits, elastic and buckram were totalled and a figure for indirect costs was arrived at by taking 10% of the total labour and material costs. They found the average cost of in-house binding to be £5.25 per item bound. The average cost from the outside binder in 1995 was £17.30 per item bound when invoices for that year were totalled and divided by the number of volumes bound. If this is recalculated using the 70/30 ratio, then the average cost was £8.89 per item bound in 1995. A complication arises when calculating binding costs as a title's yearly issues may be bound in more than one volume depending on its size and frequency of issues. The binding sample cards were examined to find out the number of volumes needed to bind each title annually. The science journals sent to the outside binder tend to be heavier and produce more issues annually than those sent to the in-house binder, so that on average the number of volumes needed to bind each title annually was 1.67 for the in-house binder and 2.85 for the outside binder. Using the 70/30 ratio, the average number of volumes needed to bind each title annual is approximately 2. The binding sample cards were also examined for the Arts, Theology and Social Science material and was found to be on average one volume for each title annually. Therefore,

two average binding cost-per-title costings have been assigned, one for science and one for 'other' material as follows

$$\text{Average binding cost-per-title (science)} = \text{£}8.89 \times 2 = \text{£}17.78$$

$$\text{Average binding cost-per-title (other)} = \text{£}8.89$$

3.3.7. SUMMARY OF COSTS

The irrelevant costs are.

- Labour costs (direct and indirect)
- Equipment (direct)
- Other indirect costs

The relevant costs are.

Costs	Cost-per-title
• Telephone	11.5 pence
• Stationery	11 pence
• Postage	31 pence
• Binding (science)	£17.78
• Binding (other)	£8.89
• Annual subscription to periodical	Varies

Therefore, total annual cost-per-title equals

$$\text{Cost-per-title} = \text{telephone} + \text{stationery} + \text{postage} + \text{binding} + \text{annual subscription}$$

$$\text{Cost-per-title (science)} = \text{£}18.32 + \text{annual subscription}$$

$$\text{Cost-per-title (other)} = \text{£}9.43 + \text{annual subscription}$$

$$\text{Cost-per-title (unbound)} = \text{£}0.54 + \text{annual subscription}$$

3.4. EFFECTIVENESS

There are many aspects of ownership, already outlined, which make it attractive to users and their institutions, such as the ability to browse, convenience, the quality of the articles, the need to hold certain titles for accreditation and their prestige value. This gives ownership a degree of effectiveness not afforded by other the alternatives. A brief examination will be made of its effectiveness in relation to the Maynooth periodicals collection in the areas discussed under methodology in section 2.1.2.

3.4.1. COVERAGE

The title coverage of the Maynooth periodicals collection is small compared with the other alternatives but it has the advantage of being directly relevant to the subjects taught at the College. However, this limited coverage means that articles not held in the collection will have to be acquired from somewhere.

3.4.2. RESPONSE TIME (ISSUES) OF THE SYSTEM

The response time (issues) of ownership compared with that of FirstSearch and UnCover is dealt with in section 5.4.3. and will not be addressed here. In that section the currency of nine different titles will be examined to see if there is any significant difference between an issue being received in the Periodicals Department of Maynooth College by subscription, by ArticlesFirst and by UnCover.

3.4.3. USER FRIENDLINESS

The user friendliness of the periodicals collection will be examined with reference to the ease of finding a title on the OPAC and retrieving the title from the shelves. Periodicals are listed on the OPAC under title and share the menu option as book titles and can be found on the OPAC by a keyword or exact title search. They are shelved mainly on the second floor of the Main Library and arranged alphabetically within the four broad subject locations of Arts, Social Science, Theology and Science. The Main

Library is situated within easy reach of all the users on the campus. The catalogue informs users in which location a title is held and the Library's holdings for each title. This simple arrangement has the advantage of being easily understood by users and if the user knows the periodical title he/she requires, easy to retrieve material. If users have a problem locating a periodical title, they can ask for assistance from the personnel in Periodicals Department office, which is located next to the periodicals collections and is open during office hours. This arrangement doesn't lend itself so easily to finding periodicals by subject and the subject headings which in the past were assigned by the Periodical staff are based on the College departments, so that finding periodicals on more specific topics is not always easy. However, since 1995 new titles being processed have received downloaded records from OCLC with Library of Congress subject headings, so that subject access has improved at least to the recently acquired titles.

3.4.4. DELIVERY RELIABILITY AND THEIR SPEED OF DELIVERY

In most cases when an article is required it can be found quickly on the shelves but there are of course times when a particular issue or bound volume cannot be located. There are many reasons for non-location which include issues are away for binding, issues missing from the shelves because they are being used, hidden or miss-shelved, or are on-loan to postgraduates or staff. The system is not perfect but when an article is found it does provide a quick and convenient service.

3.4.5. QUALITY OF COPIES PROVIDED

When the user is consulting an article from the original periodical source in a periodicals collection the quality of the reproduction is as good as it is going to get. Photocopying either by the user, the BLDS or an EDD service may affect an article's copy quality and in the case of a faxed copy the quality may be further reduced.

3.5. COST-PER-USE

The costs involved in owning a periodical title have been examined and now this section will try to estimate the possible use that a title might receive over its lifetime and then by combining the cost of owning a periodical with its use to obtain a cost-per-use. Milne and Tiffany as already stated, obtained this lifetime use by tagging five back years of issues and extrapolating from the number of uses received by multiplying by an adjustment factor calculated from the half-life listings in the SCI Journal of Citations Reports. Journal Half-life Listing, Section 2 (Milne and Tiffany, 1991a, p 11). This study will obtain its lifetime use figure from ILL statistics for the years 1990-1994. A user can potentially request articles from ILL for any back issues of a journal title, so that the requests for a title in a given year reflects its possible lifetime usage. This is clearly illustrated by reference to **Appendix A**, which shows the ILL requests for 1994 and lists journal titles with the number of article requested by their year of publication. Taking the title Cancer Research as an example, three articles were requested from 1994 issues, three from 1993, two from 1992, one from 1990, one from 1989, one from 1975-1984, and one from 1900-1974. This could represent a possible request pattern for issues published in 1994 and the sum total of all these requests its lifetime use.

As can be seen from **Appendix A** the demand for articles requested through the ILL Department were examined for the year 1994 in great detail. Articles requested in the years 1990-93 were also examined but not in so much details, this was done to establish that titles with a large number of requests in 1994 were not just once-off titles of interest but had been consistently requested in other years. A list was then compiled of the top requested titles with their annual subscription prices. The cost-per-use was then derived for each title by adding the annual subscription cost to the other costs obtained in Chapter Three and then dividing that figure by the number of requests for articles, that is the title's lifetime use. This process will now be examined in detail.

3.6. ILL REQUESTS

The ILL Department of Maynooth College uses the Lancaster University inter-library loans management system. The system can be used to produce a print-out of the Inter-Library Loan Applications for given periods which include details of the requester, his/her faculty or Department and the bibliographic details of each item requested. It can also print a List of Citations for each year which provides one line of information for each request, in the case of monographs this is the author(s) and for journals, the journal name and the number of requests for that title. The List of Citations was found not to be that user friendly, quite often the complete journal title were not present or a title may have been abbreviated inconsistently, this made title recognition difficult and necessitated totalling article requests for some titles manually. The List of Citations for the year 1994 was used first to obtain a list of journal titles, titles with only one request were ignored because of their low request level and to reduce the list of journal titles to a manageable size. These titles were then entered on a Works spreadsheet and the Inter-Library Loan Applications for 1994 were then analysed. This listing of applications was used because it represented the most recent complete year of ILL requests available. It would have been desirable to obtain Inter-Library Loan Applications for other years but the 1994 print-out was so large and consequently time consuming to analyse that it made further analysis of other years impossible.

Appendix A represents a detailed picture of the contents of the Inter-Library Loan Applications for 1994 and includes from left to right the periodical title, Department, Faculty or course and status of the requester (u=undergraduate, p=postgraduate and those with no designation are staff), and the year of publication of each article. The requests for articles published in the years prior to 1990 were grouped together (shown as -1990), the years 1900-1974 were also grouped together (shown as -1974), as were 1975-1983 (shown as -1983) and each year from 1984 to 1994 were listed

separately. It was felt that as articles are requested more frequently early on after their publication date, as has been shown in the various *Journal Citation Reports*, that this was a realistic breakdown.

Having compiled the list, the number of requests for individual titles were then totalled to obtain the number of articles requested per title. This is given in **Appendix A**. **Table 3.6** gives a further breakdown showing the level of article requests and the total number of titles with that level of requests, including in this are 778 single titles from the 1994 List of Citations but excluded from **Appendix A**. It shows the general low level of repeated requests for articles from a specific title, 94% of the titles had only three requests or less in 1994, with only 3% having five requests or more. These statistics overwhelmingly indicate that in the vast majority of cases providing access rather than ownership is the appropriate response to article requests.

Level of article requests	Number of titles	total titles (%)	Cumulative(%)
1 only	778	79%	79%
2	100	10%	89%
3	52	5%	94%
4	22	3%	97%
5 or more	33	3%	100%
	985	100%	

Table 3.6 Level of repeat requests and the number of titles

In order to establish that the high demand for some titles was not just once-off the List of Citations for the years 1990 to 1993 were also analysed. Each List was checked against the 1994 titles list to find titles with high requests, concentrating on matching titles which had four or more article requests in 1994. Titles which did not occur on

the 1994 listing but had requests for four or more articles on the other Lists were noted. The selection of the threshold four was used as a guideline but was not necessarily strictly adhered to for each year, in some cases the demand for requests fell to zero in one year but with other years equal to or above the four threshold. This resulted in a list of twenty-one titles as shown in **Appendix B** at the end of this chapter. This table includes an average request (i.e. lifetime use) rate calculated for the years 1990-94, a 1995 subscription price for each title obtained from Blackwell's Catalogue of Periodicals and Continuations (prices have been converted from Sterling to Pounds and VAT added if applicable), subscription cost plus VAT for each title, total costs including the subscription cost, the cost-per-use by dividing total costs by the average yearly request rate, and the commencement date of publication for each title (Start Date)

The commencement date is an important consideration when calculating the possible lifetime use, the longer the run of back issues the greater the pool of back issues and therefore, the possibility of more article requests. However, the influence of long back runs is diminished by the fact that the use of articles published in a given year declines over time and this is indicated by a title's half-life. Milne and Tiffany, using the half-life listing for scientific journals calculated that by the time articles are nine years old they would have received 64% of their lifetime use (Milne and Tiffany, 1991a, p.13). All the titles listed in **Appendix B** are scientific journals and have been published for at least twenty years, so that the possibility of underestimation of use is there but it is likely to be small, so in these circumstances no adjustment was made.

The total costs were obtained by adding the other costs relating to ownership listed in section 3.3.6. to the subscription costs plus VAT. The costs relating to ownership were.

Cost-per-title (science) = £18 32 + annual subscription

Cost-per-title (other) = £9 43 + annual subscription

Cost-per-title (unbound) = £0 54 + annual subscription

As only science titles were in the top twenty-one titles the cost-per-title (science) was added to the subscription costs to obtain total costs. Total costs were then divided by the average request (lifetime use) rate for each title to obtain a cost-per-use.

Substituting the cost-per-title (unbound) for the cost-per-title (science) has little impact as dividing 54 pence by the number of average requests results in a very small extra cost-per-use and is therefore not shown in **Appendix B**.

Three of the titles included in **Appendix B** are marked invalid, this has been done to exclude them from further scrutiny as the library already subscribes to these titles and the level of demand for articles from these titles is underestimated because the library holds recent issues. The Proceedings of the National Academy of Sciences, one of the three titles marked invalid, was examined in more detail to see from which years the articles were being requested and it was found that most of them were for the years just prior to the Library's subscription start date. In this case it would be a question of whether it would be more cost-effective to buy back issues to fill the gaps or continue with ILL. As this issue is outside of the scope of this study it has not been investigated further.

3.6.1. CONCLUSION

As **Appendix B** shows all the top twenty-one titles are scientific journals, although the original lists were cross-disciplinary. Scientific journals on average cost more than titles in the humanities and social sciences, the average price of scientific journal in 1995 was STG£445 05 (IR£432 09) and for the humanities and social sciences it was

STG£94 34 (IR£91.59), so although there may be a relatively high demand for some scientific titles the cost of their subscriptions make them unattractive acquisitions (LA Record, 1995, p 278) The seven titles that had a cost-per-use of below IR£100 all had subscriptions price below the average price for a scientific journal in 1995 and titles with a cost-per-use of over IR£100 all had subscription prices above that rate, obviously price does play an important role in making a title more cost-effective. Given that the price of a BLDSC is currently just over IR£4 62 (before other costs are added), only one title the **Journal of Nematology** with an average requests rate of 6.8 articles and a cost-per-use of IR£11 00 looks like a candidate for possible subscriptions, the others look less likely

CHAPTER FOUR

INTER-LIBRARY LOANS DEPARTMENT OF MAYNOOTH COLLEGE

4.1. INTRODUCTION

This chapter will try to ascertain all the costs involved in obtaining photocopies or faxes of articles from the BLDSCL and other institutions, these include not only the cost of a British Library form but also the costs of running the Inter-Library Loans Department of Maynooth College. An examination will also be taken of the effectiveness of supplying articles through inter-library loans.

The operational costs of the ILL Department have been identified by interview, a diary kept by the Library Assistant in charge of the ILL Department, documents written by the Department and information produced from the statistics option on the Lancaster University inter-library loans system. The processes and tasks involved in both supplying articles and books have been identified and labour, material, and equipment costs associated with their operation.

In order to separate the running costs involved in supplying books from those for periodicals, a diary was kept for two weeks, the period over which all the different operations of running the service could be observed and the time taken to perform tasks relating to article requests noted. As in the case of the Periodicals Department, costs are listed as either direct or indirect costs, variable or fixed; variable costs have been calculated and finally, all relevant costs have been added together to obtain a cost-per-article which in this case is also the cost-per-use.

Prior to October 1995 staff were required to contribute £2.00 towards the cost of each ILL request made for up to 30 articles, after that the rate increased. Students received articles free of charge. The rate changed from October 1995 with both students and

staff contributing to the cost of an ILL, the students paying a minimum of 50 pence and staff £3 00 per article. These rates only apply to the standard mail delivery, if a student or staff member requires quicker delivery of an article by Urgent Action mail delivery they will be charged £10 00 and for Urgent Action fax delivery £18.00. Although charging for ILLs is a method of recouping some of the money which the library pays for ILLs and thereby keeping within a limited ILL expenditure, it will be considered irrelevant for the purposes of this study as it does not effect the actual price that is paid for an ILL.

4.2. PROCESSES AND TASKS

The ILL Department of Maynooth College operates as a support service. As a support service it processes ILL requests made by staff and students, maintains this information on the Lancaster system, orders forms and produces statistics, etc. All tasks associated with the operation of the Department are performed by the sole member of staff except for invoices which are processed by the Acquisitions Department of the Library and then sent to the Accounts Department of the College for payment. The processes and tasks of the ILL Department are listed in **Table 4.1**.

4.3. COSTS

4.3.1. LABOUR COSTS - DIRECT

The labour costs associated with the processes and tasks outlined are all direct costs which can be traced to the performance of the function of the ILL Department. The Department is normally staffed by a Library Assistant on a one year contract, working 35 hours per week with 26 days annual leave. In addition to the salary received by the Library Assistant, employer PRSI has to be added to obtain the actual cost to the

Processes and Tasks

Processes	Tasks
Ordering Articles	Checking requests against Library holdings checking bibliographic details, Reader ID, credit limit and fund name checked on Lancaster system, requests sent by automated methods (ARTTel, e-mail or fax) or mail, library request form stapled to BLDSC form and filed.
Creating Reader's Records	New readers are entered on the User File Maintenance and Funds file on Lancaster system
Post	Opening and sorting post into books, photocopies and letters, Receipt items on Lancaster system, checking photocopies for correct pages, printing photocopy and book notices, posting photocopies directly to the user; placing books for collection at issue desk and notifying user by post, collecting returned books and parcel for return
Following-up	Processing replies received from the BLDSC on requests; generating chasers from the Lancaster system and sending to the BLDSC, cancelling requests, sending to alternative locations or conducting an international search if required, extension or renewal of loans, overdues and reminders generated and sent; lost items paid for, refunds sought from BLDSC for unsatisfied requests.
Providing books and photocopies to other libraries	Books processed and sent to libraries for loan, articles photocopied, checked and sent to libraries, refunds sought from BLDSC
Statistics	Number of items received in the post counted each day, items supplied counted, statistics can be generated from the Lancaster system when required, departmental requests counted for invoicing
Ordering forms and stationery supplies	Ordering BLDSC request forms, usually in batches of 900, checking and ordering stationery

Table 4.1. Support Service Processes and Tasks of the ILL Department

College of employing the staff member There is no pension contribution as the ILL staff member is not involved in the College pension scheme. The labour costs for the purpose of this study will be regarded as variable as a change to an EDD service for document delivery could lead to a substantial reduction in the need for labour input. However, books would still be required so that the ILL Department would not completely disappear but would be required to process this material and would also be needed to locate articles not available through an EDD service.

In order to find out how much time is spent dealing with article request related work, the staff member was requested to keep a diary for two weeks in early 1996 noting the start and finish times of article request work On average approximately 15 minutes was taken to complete the article request cycle, from sending out the original request to sending the article to the requester This figure was then used to allocate a portion of the staff member's salary to article related work by estimating the staff member's hourly rate of pay and dividing by four (15 minutes) to obtain an labour cost-per-article In order to obtain an accurate hourly rate, annual leave, bank and Maynooth College holidays were subtracted from the employee's total work days per annum (Anderson, 1989). Anderson also suggests subtracting the number of sick days from the working year but as this can vary it has been left out. There are 260 possible working days per annum (52 weeks x 5 days) and a total of forty-two days can be subtracted from this for annual leave, bank and College holidays. This means that there are approximately 1,526 working hours per annum (218 days x 7 hours) The labour cost-per-article can be broken down as follows

Labour costs (1995) = £9,479 00 (pay) + Employer PRSI @ 9% = £10,332 11

Hourly Rate = $\frac{£10,332.11}{1,526} = £6 80$

Labour cost-per-article (1995) = $\frac{£6.80}{4} = £1 70$

This means that the labour cost-per-article (1995) is equal to £1 70 The labour cost-per-title will vary from year to year as in normal circumstances the staff member would be expected to absorb any minor increases or decreases in their workload and it is acknowledged that there could be a slightly higher or lower cost-per-article than presented here This has certainly been the case in Maynooth where inter-library loan applications were 2,498 in 1994 and had risen to 3,282 in 1995 but with no additional staff to help with the extra workload

4.3.2. LABOUR COSTS -INDIRECT

The list of indirect labour costs as outlined in section 3.3.2. on ownership would be similar to those of the ILL Department. They will be treated in the same way as fixed costs and therefore as an irrelevant cost

4.3.3. MATERIAL COSTS - DIRECT AND INDIRECT

4.3.3.1 BLDSC REQUEST FORMS

One of the major costs included in this category is that of the BLDSC request form and it will be treated as a variable cost as a form or group of forms is needed for each ILL request, so that the cost of a form is directly related to the level of service provided The Department normally buys request forms in batches of 900. In 1995 the forms were invoiced at STG£3,807.00, which when converted to Irish pounds and VAT added at 12 5 per cent, is equivalent to IR£4,158 13 Therefore, the average cost of a request form was IR£4 62 One request form is used for the BLDSC's Standard Photocopy Service which provides articles (up to 50 pages) or book delivery by mail and is the service used by the ILL Department Other services include Urgent Action which offers same day despatch by mail (3 request forms required for up to 50 pages) or fax (4 requests forms up to 50 pages) if the request is received before 3 30 p m

The normal request form is not copyright cleared and if copyright clearance is required then special forms are purchased through the Copyright Clearance Service. This service includes not only the copying price but a royalty fee which is passed on to the UK Copyright Licensing Agency for distribution to publishers. The copyright cleared forms are purchased in packs of 20 at STG£147.60, which when converted to Irish pounds and VAT added at 12.5 per cent, is equivalent to IR£161.21 and so the average cost of a form is IR£8.06. Urgent Action mail or fax delivery can also be copyright cleared by replacing one normal form with a Copyright Cleared form.

The costs for the different services in 1995 are as follows:

Standard Photocopy Service by Mail	IR£4.62
Urgent Action Mail	IR£13.86
Urgent Action Fax	IR£18.48
Copyright Cleared by Mail	IR£8.06

4.3.3.2. TELEPHONE CALLS

As in the case of the Periodicals Department telephone calls are a direct cost which can be traced back to the ILL Department by the number of calls made from its extension. However, in the case of article requests no telephone calls are made to request or chase undelivered articles, this is done by e-mail, fax or ARTTel. Therefore, the cost of telephone calls can be treated as irrelevant.

4.3.3.3. POSTAGE

The cost of postage in the ILL Department is a direct cost which can be traced back to the Department and is a variable cost directly related to the volume of ILL requests. Postage costs are incurred in the majority of cases when an article is sent to the requester and when books and theses are sent back to the BLDS or the lending library. The only relevant cost to this study is the former cost and a report produced

by the ILL Department at the end of 1993 found this cost to be £0 72. As the cost of postal delivery has not changed since 1993, the postage cost-per-article will be taken as £0 72.

4.3.3.4. STATIONERY

As in the case of the Periodicals Department stationery is an indirect cost which cannot be directly assigned to the ILL Department as no separate account is kept for each department within the library. It is also a variable cost because the amount of stationery used does depend on the volume of ILL request applications. The average cost for Departmental stationery expenditure for 1994/95 is used, as calculated in section 3.3.3. and it is divided by the average number of ILL request applications for 1994 and 1995 (2890).

	Expenditure 1994/95	Average cost Department	Average cost-per-title
Stationery	£2,167 22	£216 72	£0 08

4.3.4. EQUIPMENT - DIRECT

Included under this heading is the equipment and furniture used directly by the ILL Department in its operations. This covers equipment such as the computer, printer, table, shelving and chair. The computer runs the Lancaster inter-library loans package and the hard disk is divided into two to run the Pick ILL system and DOS/Windows. There is an annual maintenance fee of STG£150 00 from Ian Stuart of Lancaster University who designed the ILL system. All this equipment and furniture can be considered fixed as it provides the capacity to carry out the functions of the

Department and does not change as the level of service changes. All equipment will therefore be considered irrelevant for the purposes of this study.

4.3.5. INDIRECT COSTS

The indirect costs for the ILL Department (except labour) would be similar to those outlined in section 3.3.4. on ownership. They will be treated in the same way as fixed costs and therefore, as an irrelevant cost. However, one indirect cost not included in the study of the Periodicals Department but incurred by the ILL Department is telecommunication cost. This is incurred when e-mail and ARTTel are used to transmit and receive information on document requests. E-mail transmissions are carried out using the Internet and costs are therefore covered by the College's service charges paid to HEAnet. However, ARTTel transmission is currently carried across the public data communications network using a X.29 interface and it is difficult to trace this cost back to the ILL Department. However, it is the College's intention to discontinue using X.29 when ARTTel becomes available through the Internet. On the basis of the difficulty in calculating X.29 costs and the intended switch to the Internet in the future, ARTTel costs will be treated in the same way as e-mail costs.

The College is connected to the Internet by HEAnet, the Irish academic and research network. HEAnet not only provides full connectivity within the Irish research community but also provides access to the resources of the Internet. HEAnet is funded by a central grant from the Higher Education Authority (HEA) and by contributions from the HEAnet members. Charging for access is shared equally among the HEA members and charging for the use of international connectivity is allocated according to an agreed formula among the members (Computer Centre, St. Patrick's College, Maynooth, 1994). This means that currently there is a flat rate charge for each institution and that institutions are not charged directly for their volume of use. However, there are discussions about volume charging. If the present flat rate policy is used to estimate the cost, then the cost can be regarded as a fixed cost because the

level of use does not effect the price of the service provided by HEAnet to the College
The cost can therefore be regarded as irrelevant

4.3.6. SUMMARY OF COSTS

The irrelevant costs are

- Labour costs (indirect)
- Telephone
- Equipment (direct)
- Other indirect costs

The relevant costs are.

Costs	Cost-per-article
● Labour (direct)	£1 70
● Stationery	£0 08
● Postage	£0 72
● BLDSC Request forms	
Standard Photocopy Service by mail	£4.62
Urgent Action Mail	£13 86
Urgent Action Fax	£18 48
Copyright Cleared by mail	£8 06

When all the relevant costs are considered the formula for cost-per-article/cost-per-use
is

Cost-per-article/ = BLDSC request form + Labour + postage + stationery
Cost-per-use

Cost-per-article/ = BLDSC request form + £2 50
Cost-per-use

Therefore, the cost-per-article/cost-per-use for the following BLDSC services are:

Standard Photocopy Service by mail	£7 12
Urgent Action Mail	£16 36
Urgent Action Fax	£21.00
Copyright Cleared by mail	£10 56

4.4. EFFECTIVENESS

The ILL Department acts as an intermediary between the user requesting the article and the BLDSC which supply the article, so it is effectiveness of both the ILL Department and the BLDSC that has to be measured. A brief examination will be made of the effectiveness of the Maynooth ILL Department and the BLDSC using the criterion discussed under methodology in section 2.1.2. .

4.4.1. COVERAGE, DELIVERY RELIABILITY AND THEIR SPEED OF DELIVERY

BLDSC is one of the largest suppliers of documents in the world and supplies material not only from its own collection but also from back-up libraries. Its serial titles collection at Boston Spa currently stands at 242,000 titles and it claims to be able to satisfy over 90% of enquiries from its own collection or through its back-up libraries. A print-out obtained from the Lancaster system showed that the BLDSC was able to satisfy 88% of all initial application requests made to the ILL Department in 1994 and it was the supplier of 75% of all requests made in that year.

The second major supplier for which BLDSC request forms are used, was Trinity College Dublin which supplied 15% of all initial application requests and was able to satisfy 76% of all requests made to it. The Trinity catalogue is always checked first to see if this library holds the serial title and if it does the article request is e-mailed to it.

If the serial title is not held in Trinity College the request is then normally sent to the BLDSC but other local libraries may be tried if the request is urgent

In 1994 83% of all initial applications made through the ILL Department were satisfied. However, the figures relate to all requests and not specifically to the percentage of satisfied articles requests. The ILL Departmental librarian expressed the view in interview that most article requests are satisfied and that unsatisfied requests are predominately for books, thesis etc

In order to obtain a figure for satisfied article requests the Inter-Library Loan Applications for 1994 were analysed and were also analysed to ascertain the speed of document delivery as well. The print-out of the Inter-Library Loan Applications for the period January - June 1994 was used, the date of the application and of the receipt of each article was recorded and article requests which had been cancelled or for which there was no receipt date were also noted. Article requests are cancelled either because they are no longer required or have failed to arrive after a certain period has elapsed. Those with no receipt date were presumed to be failed requests which had not as yet been cancelled on the system.

During the period January-June 1994 there were 765 article requests made and it was felt that this was a large enough sample. It corresponds to just over 52% of all article requests for 1994. There were thirty article cancellations, representing 3.9% of all requests and these cancellations were excluded from the calculations of average delivery times. The number of the days taken from the initial application to receipt of the article were calculated to obtain the article delivery time and the average article delivery time calculated. This can be represented as follows

$$\text{Average Article Delivery Time} = \frac{\text{Total number of delivery days}}{\text{Total number of articles}} = \frac{8533}{735} = 11.6 \text{ days}$$

The article requests were then grouped together by the number of days each article had taken to be delivered and a bar chart was obtained from these calculations. The results are shown in **Fig. 4.1**.

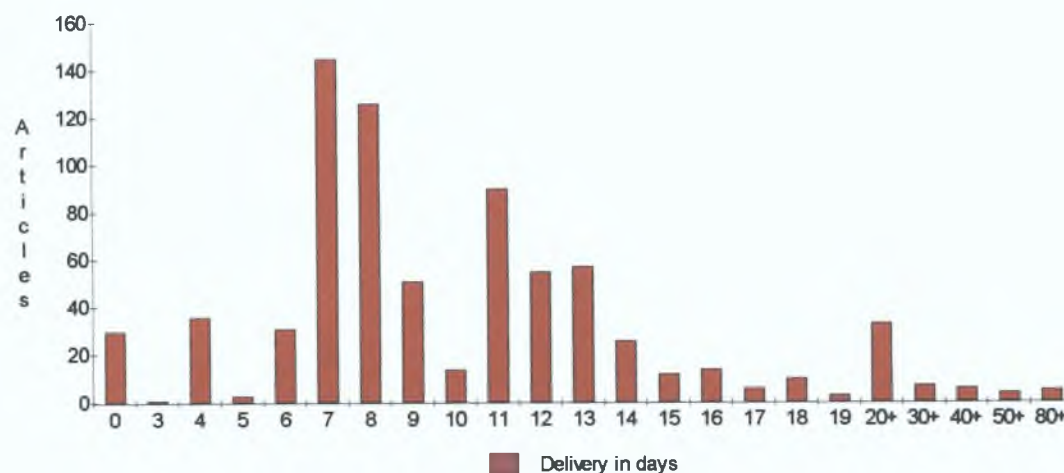


Fig. 4.1 Frequency of articles with a specific article delivery time

Articles with zero days delivery time are cancelled articles, those with delivery times 20+ were delivered between 20 and 29 days etc., and the entries at 80+ correspond to those articles which took 80 or more days to arrive. It was felt that the average article delivery time of 11.6 days had been distorted somewhat by some extreme values of delivery times and that the mode shown in the figure above as 7 (145 articles) days might be more representative of the actual delivery time. Further calculations based on grouping of delivery days showed that 46.5% of all articles were received within 8 days, 86.4% within 14 days and 92.5% with 19 days.

The article delivery times discussed above do not include the time it takes for the ILL Department to obtain the ILL request for processing and the user to obtain her/his copy of the article. This could amount to 1-2 days for a staff member who will receive the article by College internal post and 2-3 days for a student who will receive the

article by mail. Therefore, the average time for this part of the ILL process will be taken as 2 days

In summary, the BLDSC and its back-up libraries cover an impressive number of serial titles and as such they would be expected to satisfy most article requests. This has certainly proved to be true in the case of Maynooth where it was able to satisfy 96% of all requests made in the first half of 1994. The speed of delivery was also reasonably quick with 2 weeks being the average article delivery time when the initial average article delivery time of 11.6 days is rounded up to 12 days and 2 days are added on for ILL administration. This speed of delivery would seem to be satisfactory to most users in Maynooth as the Urgent Action fax service was only used for 15 requests made by staff in 1995 (no exact figures for Urgent Action were available for 1994). However, the prohibitive cost of the Urgent Action services to staff and students may be a factor in the underuse of this service.

4.4.2. RESPONSE TIME (ISSUES) OF THE SYSTEM

The response time (issues) of the BLDSC has not been investigated and therefore no comparison can be made between the publication of an issue of a title and its presence within the BLDSC periodicals collection. However, the average document delivery time of twelve days indicates that there is possibly little delay between the publication of an issue and its availability from the BLDSC.

4.4.3. USER FRIENDLINESS

By using an ILL Department as an intermediary between the user and the supplier for the supply of articles the responsibility for checking bibliographic details, payment and chasing unfulfilled requests is removed completely from the user. This has the advantage of relieving users of these worries but has the disadvantage of incurring extra delay which is not a feature of the other alternatives.

4.4.4. QUALITY OF COPIES PROVIDED

The quality of the photocopies provided by the BLDSC and its back-up libraries was not investigated by this author, however, the ILL librarian is not aware of any major problems with the quality of photocopies received. Although the fax option has not been used very much in Maynooth, it would suffer from the same problem as discussed in relation to UnCover and ArticlesFirst in section 5.4.5., namely that if group 3 facsimile is used for the transmission then one would expect some variation in the quality

CHAPTER FIVE

CONTENTSFIRST/ARTICLESFIRST OF FIRSTSEARCH AND UNCOVER

5.1. INTRODUCTION

This chapter will try to determine cost-per-article of the two EDD services ContentsFirst/ArticlesFirst of FirstSearch and UnCover. The cost components that will be considered are not only the cost of the individual articles but the subscription, telecommunications, labour and equipment costs of each service. The subscription cost to ContentsFirst/ArticlesFirst is included in the general subscription to FirstSearch, and the initial discussion will relate to that subscription but a specific subscription cost-per-use will be obtained for ArticlesFirst/ContentsFirst. These EDD services and their cost components will be discussed in relation to their provision as services within Maynooth College, as FirstSearch is already in use it will form a basis for cost considerations.

As an EDD service is provided directly to users it can be regarded as a direct mission centre but unlike other direct mission centres there should be little need for support service back-up once the service has been established. Staff will be on hand to train and assist users if necessary but EDD services are designed for end-users, therefore, there should be minimum library labour input. There are no significant material costs although there may be need for user instruction documentation near to the computers.

The various subscription and article costs for the two EDD services will be discussed first and the associated cost-per-article(s) will be determined. The other costs will be identified and will be listed as either direct or indirect, variable and fixed, and using the relevant and irrelevant criterion only relevant costs will be used to calculate a cost-per-

article or several values of cost-per-article for each EDD service. All individual values of cost-per-article will be totalled to obtain an average cost-per-article for the EDD services. As in the case of article supply through the ILL Department, the cost-per-article is also the cost-per-use.

An extensive look will also be taken at the other measures of effectiveness in regard to the two EDD services as outlined in section 2.1.2., to provide both in-depth comparison between the two services and to form a basis of comparison with the other two alternatives.

5.2. SUBSCRIPTION COSTS

There are a number of annual subscription options available from both FirstSearch and UnCover, ranging from free access to £6,330.00 in the case of UnCover and from £6,020.00 to £15,600.00 in the case of FirstSearch. An outline of the subscription options within UnCover and FirstSearch are given in the two tables, **Table 5.1** and **Table 5.2**. Prices were originally quoted in dollars for UnCover and in sterling for FirstSearch and are those prevailing at the end of 1995. The exchange rates are those as of the 10th February 1996, IR£1.00 = STG£1.03 and IR£1.00 = \$1.58.

In order to simplify matters two access options only will be considered for UnCover, Open Access and the Customised Gateway. They are being used because they reflect the two extremes as far as pricing is concerned, the cheapest which is free and the most expensive. They also provide different levels of access. With Open Access users contend with other users for access, Customised Gateway provides four channel dedicated access to UnCover. The Paid Password and IRIS options are geared more towards individual access and are therefore of limited use in an academic environment.

<u>Options</u>	<u>Subscription</u>	<u>Comments</u>
Open Access	Free	Can be slow, contend with other users
Paid Password	£570 00 (\$900 00)	Individual access only £1 26 discount per article Can be slow, contend with other users
Standard Gateway	£3,165 00 (\$5,000 00)	Gateway access for multi-users No password required Can be slow, contend with other users £1 26 discount per article £190 00 of free articles
Customised Gateway	£6,330 00 (\$10,000 00)	Standard Gateway <u>plus</u> Customised screens Local journal holdings displayed 4 dedicated access channels to UnCover £380 00 (\$600 00) of free articles
IRIS	None	Initial registration with IRIS, user ID <u>plus</u> 10 hours connect time £250 00 + VAT Additional blocks of connect time 10 hours £200 00 + VAT 25 hours £400 00 + VAT 200 hours £3,000 00 + VAT Includes free access to UnCover
IRIS <u>plus</u> Paid Password	£570 00 (\$900 00)	Connect time fees as above <u>plus</u> £1 26 discount per article

Table 5.1. Annual Subscriptions options to UnCover with comments

where multi-user access is desirable. The Standard Gateway provides multi-user access but there are no dedicated access channels and users will have to contend with other users for access. One subscription option will be considered for FirstSearch, that is Option B, which is the current option used by St. Patrick's College, it is also the cheapest option and includes the databases ArticlesFirst and ContentsFirst

<u>Options</u>	<u>Subscription</u>	<u>Comments</u>
Option A	£8,205 00	Includes ArticlesFirst, ContentsFirst, FastDoc & WorldCat plus 18 Wilson databases
Option B	£6,020 00	Includes ArticlesFirst, ContentsFirst, FastDoc & WorldCat plus 5 other databases
Option C	£13,400 00	Includes Option B plus UMI 's ABI/Inform Global ed
Option D	£15,400 00	Includes Option C plus Periodicals Abstracts Research 2nd ed & Newspaper Abstracts
Option E	£9,515 00	ABI/Inform Global edition

Table 5.2. Annual Subscription options to FirstSearch with comments

Having selected the options to be studied, the next step is to consider how the subscriptions to each option can be related to a cost-per-use for article supply. In the case of Open Access to UnCover there is no need for further consideration because there is no subscription cost. However, the annual subscription to Uncover's Customised Gateway is £5,950 00 (subscription minus free articles) and £6,020.00 to FirstSearch. This study is going to ignore the subscription cost element of cost-per-use by relating the subscription cost directly to the provision of the CAS and considering all document delivery costs as additional costs incurred when an article is requested. This reflects the pricing structure that currently exists within EDD services. What this essentially means is that it does not matter who delivers the documents as articles have to be identified from some source and costs incurred, and articles have to

be supplied and paid for separately This is the situation which pertains in Maynooth in relation to FirstSearch, documents are still supplied through the ILL Department by BLDSC but if an individual wishes to order an article from an EDD service he/she can but the service is not supported

Therefore, the subscription cost-per-use will be used to compare the CAS costs to find the cheapest EDD service but will not be one of the costs included in the overall cost-per-use as irrespective of which document delivery service is use, articles have to be identified from some source or sources A cost-per-use will be calculated based on the EDD service supplying all articles which it can rather than using the ILL Department Its potential to provide articles will be related to the total number of articles requested by inter-library loan in 1994 as shown in **Appendix A** (681) with the single title requests included (778), and the proportion that the EDD service is able to identify and to supply will be calculated in order to give a measurement of its potential use

An analysis of the 1994 inter-library loan request indicates that just under 1,460 articles were supplied In theory UnCover would be able to supply approximately 90 4% of all articles based on the title coverage findings shown in **Appendix C** but only from 1989, the start date of UnCover **Appendix C** shows the cost-per-article and coverage of Uncover, which was compiled from fifty-two titles extracted from the 1994 list of Inter-Library Loans, **Appendix A**. The fifty-two titles selected had received, in the most part, three or more requests per title They were selected not only to reduce the titles to a number that could easily be checked but because it was felt that a service could be truly tested by the presence or absence of the highly requested titles The UnCover supply rate of 90 4% was ascertained when articles from the fifty-two titles were ordered and it was noted which articles from those journal titles could not be supplied Where N/A appears as a price against the title entry this indicates that the suppliers were unable to supply any articles from those journal titles This was found when a number of articles from the same title were requested In **Appendix A** only

41% of all article request are for 1989 onwards and this means that UnCover could potentially identify and supply 540 articles This figure was derived by taking

$$90.4\% \text{ of } 1,460 \text{ articles} = 1,320$$

$$41\% \text{ of } 1,320 = 540$$

When the annual subscription to UnCover's Customised Gateway option is divided by the number of potential articles it can supply, the subscription cost-per-article/cost-per-use is

$$\frac{\text{Annual Subscription Cost}}{\text{Article Coverage}} = \frac{\pounds 5,950.00}{540} = \pounds 11 \text{ } 00$$

Therefore, the subscription cost-per-article/cost-per-use for Open Access to UnCover under is zero and for the Customised Gateway access is £11 00

It should be noted that the subscription cost-per-article/cost-per-use of UnCover and also ContentsFirst/ArticlesFirst will decrease with time as their ability to supply articles increases as the number of years covered by the services grows

Applying the same technique to FirstSearch, it would be able to supply approximately 96% of the articles as shown in **Appendix D** but only from 1990, the start date of the ArticlesFirst service **Appendix D** shows the cost-per-article and coverage of ContentsFirst/ArticlesFirst, which was also compiled from fifty-two titles extracted from the 1994 list of Inter-Library Loans, **Appendix A** In **Appendix A** only 36% of all article request are for 1990 onwards This means that FirstSearch could potentially identify and supply 504 articles This figure was derived by taking

96% of 1,460 articles = 1,400

36% of 1,400 = 504

The full application of this technique becomes more difficult in relation to FirstSearch's Option B as this option contains a number of databases. These databases include: ArticlesFirst, ContentsFirst and FastDoc; Medline and Eric (both of which index journal articles); and the other databases which contain material other than journal articles, e.g. WorldCat, GPO, PapersFirst and ProceedingsFirst. In order to apportion the annual subscription between these databases the Monthly Summary Reports issued by FirstSearch showing the number of searches for eight months of 1995 were used to determine the percentage use made of each database by users and then these figures were used to apportion the subscription cost. The result of this analysis is shown in the pie chart **Fig. 5.1**. This approach seemed more equitable as it is based on actual use as some databases like PapersFirst, ProceedingsFirst and GPO are rarely used and this is borne out by the figures for these databases combined as 'Other' in the pie chart.

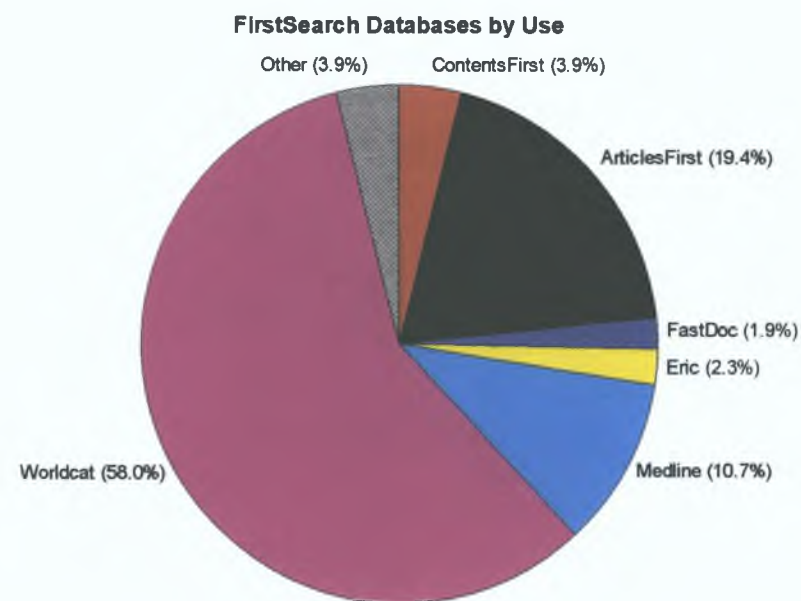


Fig. 5.1

The combined use of ContentsFirst and ArticlesFirst is 23.3%, this as a percentage of the annual subscription £6,020.00 is equal to £1,403.00. Therefore, the subscription cost-per-article/cost-per-use is

$$\frac{\text{Annual Subscription Cost}}{\text{Article Coverage}} = \frac{\text{£1,403.00}}{504} = \text{£2.80}$$

5.3. DELIVERY COSTS

The subscription options outlined exclude the cost of ordering documents, although there is discount attached to some subscription options within UnCover. The delivery options and their associated costs will be discussed first for UnCover and then ArticlesFirst of FirstSearch.

5.3.1 UNCOVER

The document delivery arrangements for UnCover are simple, document delivery is by fax only and there is only one supplier. Articles from the UnCover database are currently delivered by Group 3 fax, they do however, plan to offer Group 4 fax to those customers who can receive that format. They also intend to provide File Transfer Facilities via FTP and delivery by E-mail, subject to the publisher's agreement. UnCover aims to deliver 95% of all requested articles within twenty-four hours and if publishers have granted UnCover permission to store articles electronically, then delivery is under one hour anywhere in the world. Payment can either be made by credit card when the document is ordered or by establishing password-controlled deposit accounts against which documents are automatically deducted.

The cost of an UnCover document is composed of three elements: the service charge (i.e. the cost of retrieving and sending the document), copyright fee and a fax surcharge for customers outside the US and Canada. The service charge is a fixed fee,

the fax surcharge to Ireland currently stands at \$3 00 but the copyright royalties vary according to the rates set by the publishers The breakdown in charges per article is

Service charge \$8.50

Fax Surcharge \$3 00

Copyright fee Variable

In order to establish the *average delivery cost-per-article* fifty-two titles were extracted from the 1994 list of Inter-Library Loans, articles from these titles were then ordered so that the charges would appear on the screen and then immediately cancelled. The results of this procedure have already been noted and are presented as **Appendix C** A number of articles from the same title were ordered and it was found that articles from the same title are charged at a standard rate This shows that if the service charge is deducted from the cost-per-article then copyright fees vary from \$1 50 for the American Journal of Sociology to \$13 00 for Leukaemia When the fax surcharge is added onto the cost of an article the average cost-per-article is \$16 73 (IR£10.60) It is also important to note from **Appendix C** that although all the titles were located on the database, UnCover could only supply articles for 90.4% of the listed titles

5.3.2. ARTICLESFIRST OF FIRSTSEARCH

ArticlesFirst document delivery options are more complex because there are a number of suppliers offering different types of document delivery There is one British document supplier, the BLDSO, and four American document suppliers UMI InfoStore, EBSCOdoc, ISI's The Genuine Article and INDIVIDUAL. All suppliers claim that they will deliver a fax within 24 hours, UMI also provides a rush fax for some articles within one hour and INDIVIDUAL, which offers fax only, claim business day delivery within 30 minutes. EBSCOdoc and UMI can also deliver articles to ARIEL workstations They all deliver by mail except INDIVIDUAL, delivery within North America is three to five days and extra days will have to be

added on for delivery outside North America. For example, the only article ordered from the UMI InfoStore by this author arrived by post 10 days after it was ordered but this may not be typical. Three suppliers, excluding BLDSC and INDIVIDUAL provide rush mail by overnight courier and prices for rush mail reflect delivery to the US and Canada, and rush mail, if it is available outside of North America, costs more. The different suppliers and their delivery options are shown in the **Table 5.3**

Supplier	Fax	Rush Fax	Mail	Rush Mail
BLDSC	Yes	No	Yes	No
UMI	Yes (plus ARIEL)	Yes	Yes	Yes
EBSCOdoc	Yes (plus ARIEL)	No	Yes	Yes
ISI	Yes	No	Yes	Yes
INDIVIDUAL	Yes	No	No	No

Table 5.3. Suppliers with different document delivery options within ArticlesFirst

When the document delivery option is selected on the ArticlesFirst database a menu of suppliers with their delivery methods and prices are displayed. The supplier is then selected from the menu and mailing and billing information is requested. The supplier charges include order processing, delivery and copyright and royalty fees. Payment is by credit card or from a pre-established account with the supplier. A warning appears on the screen that prices *may not include sales tax, if applicable, or international delivery charges* and although it is not made explicit there are extra charges for faxing to Ireland. It has been difficult for this author to ascertain the exact fax surcharges which each supplier applies to Ireland. Writing to the BLDSC confirmed the fact that

all surcharges are already included in the price given on the Document Ordering screen. The only other supplier from which this author received concrete information on fax surcharges was from the UMI who charge \$5.00 above the price quoted on ArticlesFirst. Although EBSCOdoc and ISI were e-mailed and faxed more than once no information was received on fax surcharges.

In order to obtain a fax surcharge from the ISI an article was ordered and the difference between the on screen price and actual price noted. Although the article was ordered on screen at \$16.75 and credit card details supplied, this author received an invoice for \$24.00. This suggests a fax surcharge of \$7.25. It can only be assumed (as no reply has yet been received from this author's faxes querying the invoice) that as the amount was greater than that authorised when credit card details were given that an invoice was sent instead of debiting the amount against the credit card. This has left the author with an invoice that has to be paid by dollar bankdraft! Finally, a fax surcharge of \$5.00 was allocated to EBSCOdoc based on information available on their World Wide Web homepage (<http://www.ebscodoc.com/>)

5.3.2.1. AVERAGE COST-PER-ARTICLE

In order to establish the *average cost-per-article* the fifty-two titles extracted from the 1994 list of Inter-Library Loans, **Appendix A** were again used, this time articles from these titles were ordered by the different delivery method from each supplier, prices noted and orders immediately cancelled. This procedure was more difficult within FirstSearch because of the two related but separate databases of ContentsFirst and ArticlesFirst. In order to check price by journal title, ContentsFirst was searched by journal title first, the author(s) and title noted and the article then had to be located in ArticlesFirst so that the article could be ordered. This approach was necessary for two reasons, firstly articles can only be ordered through ArticlesFirst and not ContentsFirst and secondly, ArticlesFirst does provide access by journal title but not by

its contents. The results of this procedure are presented as already noted as **Appendix D**.

INDIVIDUAL does not appear as a supplier in the table because it was unable to supply any articles from the titles listed. The BLDSC does not appear under the Rush Mail heading because it does not supply by this method. As with UnCover entries for which N/A appears as a price indicates that the suppliers were unable to supply any articles from those journal titles and that the price for articles from the same title are charged at a standard rate. The BLDSC charges a standard price for both fax and mail delivery, all other suppliers vary their cost-per-article. **Fig. 5.2** is compiled from **Appendix D** and shows the average cost-per-article by supplier and method.

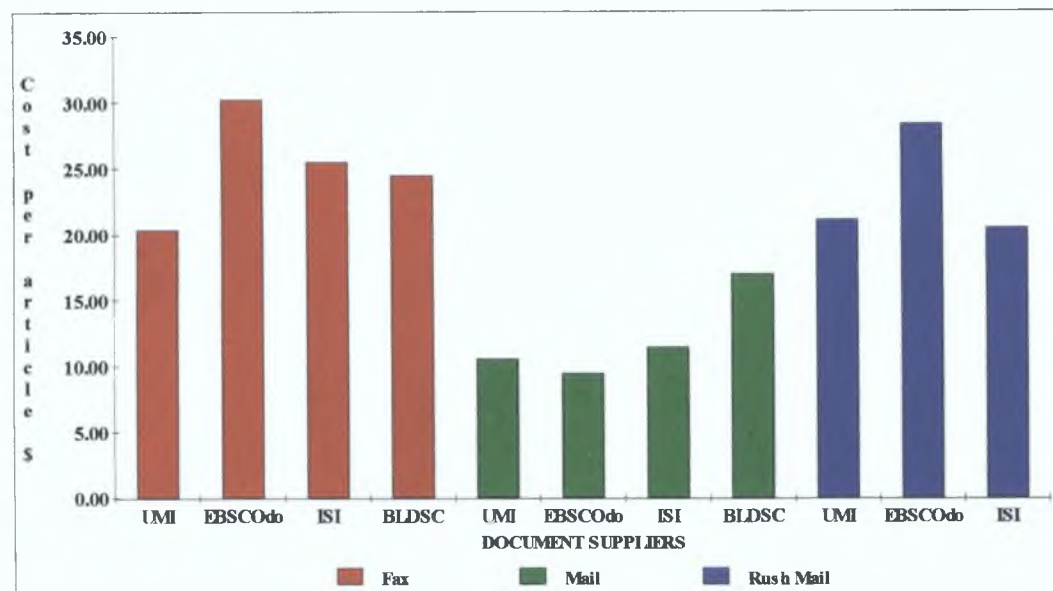


Fig. 5.2 The average cost-per-article by supplier and method

The average cost-per-article for a fax varies from \$20.35 (IR£12.88) for UMI to \$30.28 (IR£19.16) for EBSCOdoc, the overall average for all fax suppliers being \$25.41 (IR£16.07). However, it might be more realistic if one wanted to use just two suppliers regularly, to take the average cost-per-article of the combined cheapest fax supplier UMI, which can supply the least amount of articles at 65% and the BLDSC,

which is more expensive than UMI at \$24.50 (IR£15.50) but can supply 96% of articles from the listed titles. The UMI/BLDSC average fax price is then \$22.43 (IR£14.20). The average cost-per-article for mail varies from \$9.50 (IR£6.00) to \$17.00 (IR£10.75) for the BLDSC, the overall average for all mail suppliers being \$12.15 (IR£7.70). Again it may be more realistic to take the average cost of the combined cheapest mail supplier EBSCOdoc who can supply only 69% and the BLDSC the most expensive who can supply 96% of articles from the listed titles. The EBSCOdoc/BLDSC average mail price is the \$13.25 (IR£8.39). The rush mail method of delivery will be discounted from further analysis, although the overall cost-per-article is \$23.32 (IR£14.75) it is not known whether the three suppliers are able to deliver to Ireland by overnight courier or the extra cost of such delivery. Although there are different criteria which could be used to obtain an average cost-per-article, for the purposes of this study the overall average cost-per-article for fax and mail will be used and is summarised as follows:

Overall Cost- Per-Article by Fax	\$25.41 (IR£16.07)
Overall Cost-Per-Article by Mail	\$12.15 (IR£7.70)

There are also discounts available for volume purchases for those individuals or libraries with pre-established accounts. For instance, UMI gives a discount of 25 cents per article when between 201-500 articles are purchased per year, and 25 cents discounts for between 501-1,000 articles and further discounts for larger numbers. The ISI also states that there are volume discounts. Volume discounts will not be taken into consideration within this study because of the difficulties in calculating such discounts that do depend on the volume purchased but it is noted that the cost-per-article will be lower if discounts are considered.

There are three other delivery options which have recently become available from FirstSearch, they are Rush Fax, on-line viewing and e-mail delivery. When the fifty-

two titles were examined at the end of 1995 only two titles were available by Rush Fax, the American Economic Review and the Journal of Consumer Research, and none by on-line viewing or e-mail delivery. When Rush Fax is available it substitutes ordinary fax, is delivered within one hour and costs \$10.50 within North America and \$15.50 outside. All these types of delivery are available from within ArticlesFirst and as a separate subset database of ArticlesFirst called FastDoc. They are all supplied from the UMI InfoStore and are stored there as full-text scanned images on UMI's ProQuest PowerPages database. While those facilities do not impact on the current study, they may be significant in the future.

5.3.3. OTHER COSTS

5.3.3.1. TELECOMMUNICATIONS

The method used by this author to access both UnCover and FirstSearch was via the Internet. In the case of UnCover, the Open Access option was used by telnetting to **database.carl.org**. Comments concerning UnCover will be related to this author's use of Open Access to UnCover unless otherwise stated. FirstSearch is available campus-wide throughout Maynooth College from the menu option **Library Catalogues** on PCs and via the College VAX for those who have accounts. When users select the FirstSearch option on the Library Catalogues menu they are automatically logged on to FirstSearch without being made aware that they are being connected by telnet.

The Internet cost can be estimated in the same way as it was for the ILL Department as an indirect cost and that if the present flat rate policy is used to estimate the cost, then the cost can be regarded as a fixed cost because the level of use does not effect the price of the service provided by HEAnet to the College. The cost can therefore be regarded as irrelevant because the introduction of either UnCover or FirstSearch will

not lead to any further telecommunication charges being incurred by the Library or College

5.3.3.2 EQUIPMENT

A PC connected to the Internet is the basic piece of equipment needed to access the EDD services, ideally a printer is needed to print and a floppy disc to download records, and a fax for receiving transmitted articles. All PC's available in the Library and throughout the Maynooth campus provide access to various databases, computer packages and the Internet. CD-ROM databases such as Religion Indexes, Celex, Eurocat, Philosopher's Index and Times and Sunday Times are available to individual PCs over the PathWorks network. These databases, the College OPAC, Irish University library OPACs and FirstSearch are available as a menu options called Library Catalogues from all networked PCs. In these circumstances it is very difficult to trace the cost of providing PCs to access FirstSearch or UnCover and for this reason it will be considered an indirect cost. It will be also considered to be a fixed cost because whether access exists to these services or not PCs will be needed to make available other services, so that there is no extra or any reduction in the cost of providing PC access to FirstSearch or UnCover. The same argument can be applied to printers and faxes which can be used for various reasons. Equipment will be regarded as a fixed cost and therefore an irrelevant cost to this study.

5.3.3.3. LABOUR COSTS

Staff with different types of expertise may be involved in bringing EDD services to users, ranging from computer staff with the technical know-how, library staff involved with administrative detail, training and enquiries from users. Unlike the labour costs involved in the operations of the Periodicals Department or the ILL Department, the

labour costs involved in the provision of an EDD service cannot be easily traced to it and so will be regarded as indirect

In the case of Maynooth College the Computer Centre of the College provides the technical expertise to make FirstSearch easily accessible to students and staff over the PathWorks network as a menu option on public PCs, easily available from other PCs and provide technical support on a continual basis. However, the telecommunications infrastructure needed to telnet to FirstSearch and to UnCover has existed for some time. FirstSearch is an EDD service instigated by the library, its staff have investigated it, set-up its subscription, set its parameters, organised training sessions for its own staff and liaise with OCLC over the provision of the service on a continual basis. The library supports users by organising training session and answering enquiries as they arise.

How is this staff time to be costed? This study treats staff time as a fixed cost because both library and computer staff are there to provide a service, the nature of the service may change, e.g. from providing user education on the use of hardcopy bibliographies to on-line database, but if no extra staff are employed or reallocated then the cost is fixed. Therefore, labour costs will be regarded as an irrelevant cost for the purposes of this study.

5.3.4. SUMMARY OF COSTS

The irrelevant costs are

- Telecommunications (indirect)
- Labour costs (indirect)
- Equipment (indirect)

Subscription cost-per-article will be used to compare the EDD services but will not be included in the overall cost-per-article given below. The subscription cost-per-article are

Subscription Options	Subscription cost-per-article
UnCover Open Access	IR£00 00
UnCover Customised Gateway	IR£11 00
ContentsFirst/ArticlesFirst	IR£2 80

The relevant costs are:

Costs	Cost-per-article
UnCover fax	\$16 73 (IR£10 60)
ArticlesFirst fax	\$25 41 (IR£16 07)
ArticlesFirst mail	\$12 15 (IR£7 70)

5.4. EFFECTIVENESS

5.4.1. COVERAGE

5.4.1.1. SUBJECT COVERAGE

The subject coverage of UnCover and of FirstSearch's ContentsFirst/ArticlesFirst is cross-disciplinary, they both contain journal titles taken from Science, Technology and Medicine, the Humanities and Social Sciences. Both these services have large databases, UnCover has currently around 16,000 titles and ContentsFirst/ArticlesFirst 13,000 titles. However, one must question their coverage in relation to the needs of the users in this study to provide articles that are likely to be requested? The issue of coverage was discussed early in relation to article costs and coverage figures can be seen in **Appendix C** and **Appendix D**. It was found that UnCover could supply 90.4% of the selected fifty-two titles investigated and ArticlesFirst, taking all suppliers into consideration, could supply 96%. These figures suggest that both databases are able to satisfy most requests for articles from Maynooth College users. However,

these results need to be qualified because as stated earlier, the fifty-two titles were extracted from the Inter-Library Loan listing for 1994, which had received, in the most part, three or more requests per title. Further research needs to be carried out into those titles which received two requests and those which received only one request and are not included on the Inter-Library Loan list, to see if the databases can maintain the coverage level for these less requested titles.

Dorothy Milne, Co-ordinator of Collections at Memorial University, found when reviewing a list of three hundred cancellations against the titles available through UnCover, that only about twenty-five percent of the titles receiving ten uses or fewer were available from UnCover, while about ninety per cent of the titles which had received twenty or more uses per year were available (Wooliscroft, 1994, p 173). The implication of this is that any library deciding to use an EDD service, for whatever reason, must undertake a detailed study of EDD services to ensure that relevant titles are covered and that although one EDD service might suit one library, it might not suit another.

5.4.1.2. TIME SPAN

The starting date for EDD services is another important factor, most services only go back as far as 1990. The UnCover database began in 1988, so most titles are indexed from 1989 to present. FirstSearch began in 1990, some titles go back as far as 1990 but others commenced in 1992 and in 1994. This means that requests for earlier material, especially in the Arts and Humanities where older material is often requested, will not be met by these services. Examining again the Inter-Library Loan statistics for 1994 excluding those with only one request, in **Appendix A**, it can be seen that of the 681 article requests made in that year, 400 or 59 per cent of those requests were for articles published before 1989. Therefore, earlier material will have to be identified and supplied from elsewhere. This problem does not arise with UnCover which operates a service called UnCover Complete which provides document delivery for

items from any periodical listed in the database, even if it is not indexed. To use UnCover Complete, the journal title has to be first located, the Complete service selected and then bibliographical details entered. There is no additional charge for the Complete service.

It is also possible to request articles not listed on the UnCover database by exiting from it and selecting the BLDSC database from which articles can be ordered. The BLDSC is one of the open access databases available from CARL which can be accessed when telnetting to **database.carl.org**. The BLDSC provides a fax only delivery at \$20.00, however, this service has not been investigated so that it is not known whether there may also be a fax surcharge for international delivery to Ireland.

5.4.1.3. TYPES OF MATERIAL

Finally, the actual contents of a hardcopy edition of a title may contain non-article material which will not be available as part of an EDD service or as a standard inter-library loan and if this is the case, then owning a copy may be the only option. This type of material could include bibliographies, book reviews, letters or job advertisements. ArticlesFirst does index this type of material and it is possible to select this material by specifying one of nine article types. UnCover does not index this material but it can be requested through the UnCover Complete service.

5.4.2. USER FRIENDLINESS

Both databases are menu driven, end user systems, designed so that they are searchable with little or no training being given. FirstSearch is more complicated to use than UnCover because the user is confronted with a number of databases to choose from when the Database Selection screen appears, ranging from specific subject databases like Medline and ERIC to the general ones of ContentsFirst and ArticlesFirst. Although a brief description is given about each database it may be unclear to the untrained user which one is the most appropriate to their immediate needs. The user

has also got to understand the different approaches to article retrieval represented by ContentsFirst and ArticlesFirst and realise that if articles are required that they can only be ordered through ArticlesFirst. When the user is connected to UnCover, although other databases available from the Carl Corporation Network and UnCover are listed, UnCover is clearly distinct from the other options presented on the first screen.

5.4.2.1. SEARCHING, SELECTION AND ORDERING ARTICLES

A lengthy detailed description is given in **Appendix E** of UnCover's and ContentsFirst/ArticlesFirst's search, selection and ordering procedures, and the other services available on each database. The salient features of these procedures have been summarised in the conclusion at the end of this section.

5.4.2.2. TELECOMMUNICATIONS PROBLEMS

This author has experienced two telecommunications problems, firstly, gaining access to the databases and secondly, the slow response time when databases becoming very slow in the afternoons and evenings to the point of being virtually unusable. The Open Access option to UnCover is competitive, users have to contend with other users for access and so a problem with access is to be expected. The Maynooth College access to FirstSearch is shared as part of a consortium with 25 other Universities and Colleges in the UK and Ireland and it therefore has to compete with these other institutions for access. The problem of access to both services is usually overcome by persistence, several attempts will eventually get you in. The Customised Gateway to UnCover includes four dedicated access channels to UnCover, so in theory access should be easier.

More disturbing than the access problems is the slowness experienced in using the database in the afternoons and evenings. This problem seems to be more or less eliminated if the databases are used in the mornings and at weekends. In practice this

means that a user could be waiting a long time for a response to any data that he/she has input and this can be very irritating. To avoid this problem it is better to confine usage of the database to mornings and weekends. Dade has found a similar problem with UnCover but not quite as dramatic, she has found that "*The speed of retrieving article citations is very fast, although at certain times of the day, it tends to slow down (mainly in the afternoon, when the US east coasts wakes up)*" (Dade, 1995, p 41). In France some university sites accessing FirstSearch by Internet have "*experience degradation of response time during the afternoon*" (Mitchell and Halberg, 1995, p 247). This problem has also been experienced by University of Sydney in Australia, it has also found it better to access UnCover and RLG's Citadel (which it also uses) in the mornings because "*the databases are either very slow or in fact impossible to access in the afternoons*" (Wooliscroft, 1994, p 177).

The problem of the slow response time appears to be related to the Internet access. An article in OCLC's own publication **OCLC newsletter** states the '*many geographical areas have significant response time and reliability problems that neither the library nor OCLC can ameliorate*' (Carney, 1995). However, this represents the current picture which may change as improvements are made to the Internet, e.g. an increase in bandwidth. Other access options are available such as dial-up access and X.29 which may improve the response time but unlike Internet access they are volume related so that costs become unpredictable.

5.4.2.3. USER FRIENDLINESS - CONCLUSION

Both databases provide menu level search facilities which enable users to search the databases without assistance. However, in order to use the databases to the full, it is necessary for first time users to take time to acquaint themselves with searching techniques by reading the help screens available. This applies in particular to FirstSearch where strange terminology like labels, limits and Boolean operators are used. FirstSearch is a multiple database service which can present problems to users

who may be unsure which database to use. This choice, combined with the high level searching capability, make it more desirable for users to receive training so that they can maximise the benefits the service can offer, in particular a well trained user is more likely to retrieve more relevant and specific article citations than UnCover

However, both databases suffer from a lack of subject descriptors and abstracts, although both include abstracts if they come as part of the contents pages of the journal. Stebelman (1994) noted in a comparison between UnCover, ArticlesFirst, Faxon Finder and a locally mounted database with subject descriptors and abstracts, that although the locally mounted database covered fewer titles, it retrieved more citations. However, although a database might have a higher retrieval performance this must be weighed against its user friendliness. Studies carried out in France, Spain and Scandinavia found the FirstSearch interface to be in most cases either "quite easy", "easy" or "very easy" to use but the screen layout too cluttered (Mitchell and Halberg, 1995). A study carried out by the University of Hertfordshire Library and Media Services, found that "although the UnCover interface is easy to use, its layout and American terminology can make it less user friendly" (Dade, 1995, p 41). This author has found the FirstSearch interface "quite easy" to use and the UnCover interface "very easy" to use.

An unfriendly feature which both databases share is that their citations only give the starting page for each article, so that the user has no idea how long the article is and therefore, cannot evaluate its likely usefulness. A more friendly feature of the databases is the possibility of mounting a library's own journal holdings so that users can check whether their own library holds a journal before ordering it. In the case of UnCover this service is only provided under the Customised Gateway option but this is compensated in the Open Access option by a reminder to users to check their own library holdings before ordering.

Ordering is simple with UnCover as there is only fax document delivery and only one supplier. If an individual or a Library wishes to set up an account or a number of accounts for different Departments or Faculties in its institution then this is a relatively easy affair. This is a different matter when using ArticlesFirst where there are five potential suppliers. If a Library wishes to guarantee getting the cheapest article then it will need to establish accounts with all suppliers and if it wishes to establish accounts for each Department then the number of accounts become unwieldy. Given the current arrangement a Library wishing to use the document delivery options would have to select a supplier or possibly two suppliers on the basis of average article price combined with optimal journal coverage. There is a second problem using FirstSearch, the fax and rush mail surcharges to Ireland are not made transparent when a document is ordered. This is not the case with UnCover who display the fax surcharge after the country code has been inserted on the ordering screen. The BLDSC is the only supplier for which the total price is known to users as surcharges are already included in the price given on the Document Ordering screen. An individual user may be completely unaware of any extras despite the warning on the screen or may be too worried about the extras to order an article. A Library with established accounts with suppliers will have to make their users aware of what the surcharges are likely to be so that they are able to calculate the total cost of an article.

There is a problem accessing both databases but this can usually be overcome by persistence but a more serious problem is the slowness of response experienced when 'America wakes up'. What this currently means is that users should avoid using UnCover and FirstSearch in the evenings and afternoons during the working week.

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There is a problem accessing both databases but this can usually be overcome by persistence but a more serious problem is the slowness of response experienced when 'America wakes up'. What this currently means is that users should avoid using UnCover and FirstSearch in the evenings and afternoons during the working week.

5.4.3. THE RESPONSE TIMES (ISSUES) OF THE DIFFERENT SERVICES

The currency of nine different titles were examined to see if there is any significant difference in arrival time for an issue between receipt by subscription in the Periodicals Department of Maynooth College, by ArticlesFirst and by UnCover. The last issue received for each title by the three different services was recorded and appear in the **Table 5.4.**, with place and frequency of publication

<u>Title & Place of Pub.</u>	<u>Periodicals Department</u>	<u>ArticlesFirst</u>	<u>UnCover</u>	<u>Freq. p.a.</u>
American Econ. Review(US)	V 85 N 4	V 85 N 5	V 85 N 5	13 p a
The Pope Speaks(US)	V 41 N 1	V 40 N 4	V 39 N 2	6
Amer J of Sociology(US)	V 101 N 3	V 101 N 3	V 101 N 3	6
Ann of the Amer. Acad of Pol and Social Science (US)	N 541	N 541	N 542	6
Past and Present(UK)	N 150	N 149	N 149	4
Educational Gerontology(US)	V 22 N 1	V.21 N 8	V 22 N 1	8
J of Philosophy(US)	V.93 N 1	V 93 N 1	V 93 N 2	12
Physics Today(US)	Feb '96	Feb '96	Feb '96	12
English Hist Review(UK)	N 440	N 440	N.440	5

Table 5.4. Comparison of currency of titles for the Periodicals Department, ArticlesFirst and UnCover

On balance there seems to be no significant difference between them, with all three services having accessioned the same current issue for three titles, the Periodicals Department and UnCover each having a later issue for two titles, UnCover and ArticlesFirst having one later issue than the Periodicals Department and finally, the Periodicals Department and UnCover having one later issue than ArticlesFirst. Only

one title stands out as being significantly different in terms of currency between the different services and that is "The Pope Speaks" This is a theological journal published in the United States six times a year The Periodicals Department had the most recent issue with ArticlesFirst being three issues behind and UnCover eleven issues behind the Periodicals Department In the case of "The Pope Speaks" the disparity in the rates of currency of the different services make it more desirable to receive on subscription than to rely on the EDD services

5.4.4. DELIVERY RELIABILITY AND SPEED

This study has not examined the degree to which articles ordered are delivered and their speed of supply in any depth and will rely on evidence produced by users The Hertfordshire Library and Media Services is currently conducting a pilot trial of UnCover and has so far been impressed by the speed of which ordered articles are received It does not comment on any failure to receive ordered articles (Dade, 1995). The University of Cincinnati, also using UnCover, have found that nearly all articles are delivered within the promised 24 hours and a significant number within two hours. It again does not relate any failure to receive ordered articles (Kohl, 1995). A review of the suppliers to ArticlesFirst is more difficult because of the number of suppliers involved However, the Research Express Pilot Project at the University of Sydney, whose suppliers include UnCover, The Genuine Article and the BLDSC (the latter two suppliers to ArticlesFirst), has found that the "*response time has been excellent with almost all requests being received within twenty-four hours, some within two hours and one within four minutes*" (Wooliscroft, 1994, p.175)

5.4.5. QUALITY OF COPIES PROVIDED

Unless group 4 facsimile or ARIEL transmission is used, the quality of articles, especially STM (Science, Technology and Medical) articles can be poor With the exception of UMI and EBSCOdoc which use both ARIEL and group 3 facsimile,

group 3 facsimile only is used for the transmission of articles by UnCover and the other suppliers to ArticlesFirst, so one would expect some variation in the quality. Dade has found that the faxes delivered by UnCover to the users at the University of Hertfordshire "*are very variable, mainly good but sometimes bad*" (Dade, 1995, p.42). The Research Express Pilot Project in its Interim Report found "*the quality of faxed copies is in many instances "unacceptable" and the Team recommends that the Library seriously consider becoming a full ARIEL user and acquire higher quality fax machines in order to ensure a higher rate of acceptable copies*" (Wooliscroft, 1994, p 175). In another trial being carried out in Australia by the Library of the University of Western Australia a preliminary finding has been "*some problems with the quality of faxed copies, most particularly with the quality of photographs from medical/biological journals. This will continue to be a problem for requests where photographic and other half-tone images are important adjuncts to the text until such time as higher resolution of transmitted documents is able to be achieved*" (Wooliscroft, 1994, p 176). As long as group 3 facsimile transmission continues to be the most common form of article transmission then the quality of articles will be variable.

5.5. CONCLUSION

The subscription cost-per-article and the overall cost-per-article have already been summarised in section 5.3.4. and will not be discussed further here but will be used in the final chapter for comparison with the other services. A brief summary is given below of the effectiveness of the two services and this will be expanded on when all the services are compared in the final chapter.

- Both databases can be searched by users with little assistance but FirstSearch is more difficult to use because of its multiple databases and command language searching capability
- Ordering is straightforward on UnCover but problematic on ArticlesFirst due to the number of suppliers involved
- The price of an article to the user is clear on UnCover but on ArticlesFirst the price is not always made transparent
- Both services can suffer from a slowness of response times which can make them virtually impossible to use in the afternoons and evenings
- The subject coverage of both databases is good but both have a limited time span
- There is no significant difference between the arrival time for an issue in the Periodicals Department of Maynooth College, by ArticlesFirst or by UnCover
- The quality of group 3 facsimile is variable and in particular this may effect the quality of STM articles, unless group 4 facsimile or Ariel is used Although this applies to both services, UnCover delivers articles by fax only, so that users of this service can expect a variation in the quality of articles received
- The reliability and the speed of document delivery of the services has not been examined by this study but limited evidence suggests that they are satisfactory

CHAPTER SIX

CONCLUSIONS

6.1. INTRODUCTION

This study is based on the premise that ownership is still the preferred option for a periodical title of interest to a user or group of users because users do perceive certain advantages of ownership such as 'browsing' but it is recognised that it is impossible to facilitate this option in most cases because of serial price rises, declining library budgets and the growth in periodical literature. Although alternatives are being compared in this study, comparisons are not easy as the alternatives are not identical and there are disadvantages and advantages accruing to each of the alternatives. The BLDSC for example, provides only IAS and articles have to be identified from some other source. Whereas, the two EDD services ContentsFirst/ArticlesFirst and UnCover provide both IAS and CAS and as such provide a 'one stop' shopping system. However, a decision on whether a title should be 'owned' or 'accessed' has to be decided on rational grounds and a cost-effective approach has been taken by this study to evaluate the alternatives.

The costs of library and information services are a major concern of the library community at this moment not only because of the continuing financial constraints under which they operate but the increasing need for libraries to justify the use of resources to their institutions and to assess sources available in different formats as libraries move from being primarily print-centred to more electronic-centred. This concern is illustrated by the prominence given to the subject in a recent issue of the **Journal of the American Society for Information Science** which included a number of articles presented under the heading of '*Perspectives on Costs and Pricing of Library and Information Services in Transition*' (Lunn and Abels, 1996).

In this final chapter the limitations of the study will be discussed first and then conclusions will be drawn on the basis of each alternatives cost-per-use, the subscription cost-per-use and measures of effectiveness discussed throughout this study

6.2. LIMITATIONS OF THIS STUDY

This study is based on managerial accounting where costs are considered to be either relevant or irrelevant. It also uses a short-term analysis of five years. This approach does not take into account, for example, the long-term costs of the introduction of new equipment, in particular the costs involved in acquiring extra shelving and more importantly the extra space needed to accommodate a growing collection. However, this may not be a problem if collection management policy dictates that complete back runs are not kept and in the future when more journals are digitised the need for extra shelving space may no longer be such a problem.

The method of comparing costing between alternatives is somewhat unsophisticated as no mathematically based management tools such as operational research have been used. Operational research is the '*science of planning and executing an operation to make the most economical use of the resources available*' (Cohen, 1985, p 1). One widely used technique of operational research is linear programming which involves maximising or minimising a stated objective by the manipulation of two variables within some constraints on the combinations of those variables. Linear programming has not been used here as although one of the objectives is to minimise the article cost-per-use, no constraints such as budgetary, document delivery time or labour costs have been set. If these constraints were known then the application of linear programming could be used to optimise the use of available resources.

A spreadsheet based decision making tool recently published by SCONUL called 'MA/HEM Methodology for Access/Holdings Economic Modelling', could also have been applicable to this study but was published too late to be considered (SCONUL, 1996) It is a decision support tool which allows you to '*compare the total costs of accessing the same information from different commercial sources It presents these costs in terms of graphs, which relate total access cost against the number of times a service is used*' (p 2) It is supported by a set of Microsoft Excel version 5.0 spreadsheets into which financial information has to be input and it allows a range of cost allocation parameters to be modified, so that the consequences of charges can be viewed However, it does not adequately explain how some of the costs are to be calculated and on what basis it has selected the costs included in the model This model includes costs excluded from this study as it appears to take a different accounting approach and in order to apply it directly to this study the spreadsheets would have to be modified It is a model which establishes which service is likely to be the least expensive for a given predicted use and as such is purely a costing tool, it does not seek to evaluate the effectiveness of each service to library users

The number of EDD services that have been selected for examination in this study is very small and therefore any conclusions drawn are themselves limited by this small survey However, it does relate in particular to the situation currently found in St Patrick's College, Maynooth and it is hoped that any conclusions drawn by this study may be useful in the future development of this type of service in Maynooth. It is also hoped that this study will provide a base from which further comparisons with other EDD services can be made

6.3. COST-PER-USE

A summary of the cost-per-use of all the alternatives is given in the **Table 6.1** and all prices are given in Irish pounds. Two titles with the lowest cost-per-use of ownership taken from **Appendix B** are given and it can be seen that both are above the cost-per-use of the cheapest mail delivery provided by BLDSC but in terms of fax delivery the **Journal of Nematology** is just above UnCover and well below ArticlesFirst and the BLDSC. Given that a ILL analysis of cost-per-use probably underestimates use and that the cost-per-use of the **Journal of Nematology** is significantly lower than the cost of fax delivery provided by two of the document delivery services, this title is than certainly a candidate for subscription (ownership) over access. However, the other titles listed in **Appendix B**, including the **Journal of Bacteriology**, which has the second lowest cost-per-use at £33.00, have a cost-per-use well above the other alternatives and as such are candidates for access only.

Therefore, if most titles listed in **Appendix B** can be discounted as possible future subscriptions, access will continue to be the method of article supply and by comparing the other access alternatives the cheapest cost-per-use can be found. If the cheapest cost-per-use is taken, then the BLDSC mail delivery is the cheapest but with the cost-per-use of ArticlesFirst being only slightly dearer. However, if fax delivery is preferred UnCover is significantly cheaper than ArticlesFirst and much cheaper than the BLDSC.

Articles provided by ArticlesFirst and UnCover are copyright cleared, however, BLDSC standard mail delivery are not and copyright cleared articles have to be requested separately. If the price of a BLDSC copyright cleared article is compared with the others, then ArticlesFirst is considerably cheaper and a faxed article provided by UnCover is the same price as a copyright cleared mail delivered BLDSC article.

<u>Method of Delivery</u>	<u>Cost-per-use</u>
Ownership	
Journal of Nematology	£11 00
Journal of Bacteriology	£33 00
ArticlesFirst of FirstSearch	
Fax	£16 07
Mail	£7 70
UnCover	
Fax	£10 60
BLDSC	
Standard Photocopy (Mail)	£7 12
Urgent Action Mail	£16 36
Urgent Action Fax	£21 00
Copyright Cleared (Mail)	£10 56

Table 6.1 A summary of cost-per-use of all the alternatives

The BLDSC Urgent Action Mail option has no equivalent to which it can be compared as the Rush Mail delivery on ArticlesFirst was discounted earlier but it is similarly priced to ArticlesFirst fax delivery and would presumably arrive only a day or so later from the UK than a fax from ArticlesFirst. However, both are more expensive than fax delivery from UnCover.

6.3.1. COST-PER-USE - CONCLUSIONS

It is very difficult to decide between the alternatives purely on the basis on cost-per-use alone and depending on the requirements of an organisation when considering the alternatives different conclusion will be drawn. It is almost impossible to compare the alternatives without considering at least one of the measures of effectiveness, that is the different speed of document delivery offered by fax over mail delivery. In some organisations where speed of delivery may be a prime consideration, UnCover would appear to be very attractive option as it has the cheapest cost-per-use for fax delivery. However, in the case of Maynooth College, where there is a limited budget for the provision of ILLs and an ever growing demand for them, cost is a major deciding factor. Copyright cleared articles are rarely required by Maynooth users and are irrelevant to Maynooth but may be a consideration for other organisations. On the basis of cost-per-use alone, the use of the BLDSC for mail delivery and UnCover for urgent requests could be a possible arrangement for Maynooth College or any other organisation. However, when the other elements of effectiveness and an organisation's needs considered this outlook may change.

6.4. SUBSCRIPTION COST-PER-USE

Although the subscription cost-per-use has not been added onto the cost-per-use, it will be used to compare the cost-effectiveness of the two EDD services ContentsFirst/ArticlesFirst and UnCover. The cost-per-use of the subscription options are given below.

Subscription Options	Subscription cost-per-use
UnCover Open Access	£00
UnCover Customised Gateway	£11 00
ContentsFirst/ArticlesFirst	£2 78

The UnCover Open Access subscription is the cheapest and may be the subscription option for some organisations but it does not offer the benefits of the other two options such as dedicated access channels, multi-user access and customised screens. If the UnCover Customised Gateway is compared with ContentsFirst/ArticlesFirst, the latter appears to give greater value for money as it is not only much cheaper but has the added benefit of giving access to a number of other databases. As with the cost-per-use a final decision on the alternatives cannot be given without reference to the other measures of effectiveness and an organisation's requirements.

6.5. EFFECTIVENESS

The cost-per-use approach has ruled out all but one title currently taken as an ILL as a candidate for ownership, so that the access services will now be compared using their cost-per-use and the measures of effectiveness discussed throughout this study to rank and select an alternative or alternatives for document delivery. However, there are two measures of effectiveness which might effect this outlook, namely the coverage and the response time (issues) of the system. If the title is not covered by the service or if the service receives issues much later than the Periodicals Department in the library, ownership might be preferred to access. However, this study has found that the response time (issues) is similar for all the services in most cases and on this basis the response time (issues) will not be discussed further when comparing alternatives.

In recognition of the fact that different decisions could be made on the selection of an services depending on the requirements and constraints of the organisation requiring document delivery, two scenarios will be considered. The first will consider a small organisation with Internet access which requires information quickly, doesn't require information more than five years old, is not involved in research but requires general

information over a range of topics and does not wish to use an intermediary but is prepared to order directly from the EDD service. In order to simplify matters even further the costs incurred will be assumed to be similar to those of Maynooth College. The second scenario will consider the case of Maynooth College where information is not always needed so quickly but it does require information that is well over five years old and that is both general and more specialised in nature.

6.5.1. THE SMALL ORGANISATION

Given the scenario described above UnCover would appear to fit the requirements of the organisation. The cost-per-use of fax delivery is lower and ordering is simpler on UnCover than ArticlesFirst. This study has found that users of UnCover have not reported any failure to receive articles and that nearly all articles are delivered within the promised 24 hours and a significant number within two hours. Ordering is straightforward on UnCover so that the organisation should have no problem setting up an account or if preferred paying by credit card. Users are made aware of the international fax at the time of ordering, so that the organisation will know exactly what the article costs.

The organisation has chosen the 'Open Access' option to UnCover because it is free and multi-user access is not required. It did not consider access to ContentsFirst/ArticlesFirst because it did not require access to the other databases on FirstSearch and the subscription cost was prohibitive. In this instance the FirstSearch subscription cost-per-use would be much higher than that for Maynooth College.

The start date of UnCover is 1989, so that its coverage meets the organisation's requirements. It has a small 'library' staffed by unqualified personnel and UnCover is sufficiently user friendly to make it easy to use without any professional assistance, although a thorough reading of the help screens is necessary. The CAS and IAS

facilities provided by UnCover means that the organisation can now identify and receive articles without recourse to an intermediary

There are two measures of effectiveness in relation to UnCover that are problematic, the quality of the articles received and under the heading of user friendliness, the degradation of response time of the database experienced during the afternoons and evenings. The problem of the quality of some of the faxed articles is a factor but the quick delivery of articles offsets the disadvantage of the possible variation in article quality. However, the response time of the databases is a significant factor and the organisation confines its use of the database to morning consultations. It is considering looking into the possibility of alternative access through IRIS or possibly a X29 connection which might improve the response time but it realises that these connections involve unpredictable access costs that will need to be examined and costed.

6.5.2. MAYNOOTH COLLEGE

Maynooth College currently uses FirstSearch primarily as a CAS tool and document delivery continues to be provided by the BLDSC. In the light of this study should it change its current policy? Should it now be promoting both the CAS and IAS capabilities of FirstSearch, using the UnCover database instead of FirstSearch, a mixture of all the alternatives or be looking at other alternatives not considered by this study? These questions will be examined by recourse to the cost-per-use and measures of effectiveness discussed throughout this study in relation to the alternatives and they will be ranked according to the needs of Maynooth College.

6.5.2.1. COVERAGE

Maynooth Library would rank the coverage of a database as one of the most important measures of its effectiveness and therefore, the multiple database coverage provided by FirstSearch one of its most attractive features. The EDD capabilities of any of

FirstSearch's databases or UnCover would not be a prime consideration. Although ContentsFirst/ArticlesFirst, and indeed UnCover, are able to provide good title coverage as demonstrated by the ILL article request analysis, they do not cover articles prior to 1989 and Maynooth users require material that pre-dates their coverage. However, it is realised that their cover will improve over time. In the meantime, other bibliographic sources are needed to identify material not covered by ContentsFirst/ArticlesFirst and UnCover and even if the document delivery service provided by these EDD services were satisfactory, the BLDSC will still be needed to provide articles that neither service could supply. The other databases available on FirstSearch provide this extra coverage not just in terms of information published prior to 1989 but more in-depth subject specialisms and information which is not just confined to articles but a variety of other material such as books, conference proceedings and reports. In the light of this, FirstSearch would continue to be the favoured database in terms of coverage.

6.5.2.2. SUBSCRIPTION COST-PER-USE

Although the subscription cost-per-use of FirstSearch is more expensive than the UnCover Open Access it does provide access to all the FirstSearch databases which is a Maynooth Library requirement and at a lower subscription cost-per-use than the UnCover Customised Gateway but with similar benefits such as multi-user access which are not provided by the Open Access option.

6.5.2.3. COST-PER-USE, DELIVERY RELIABILITY AND THEIR SPEED OF SUPPLY

The cost of document delivery is a major consideration for Maynooth as stated in section 6.3.1. and as the BLDSC currently provides the cheapest cost-per-use by mail delivery there would seem little advantage to Maynooth in changing from the BLDSC to document delivery through ArticlesFirst. Also, given the extra time that transatlantic mail delivery will take, it is unlikely that ArticlesFirst will be able to

provide faster mail article delivery than the BLDSC, although the speed of delivery of the different suppliers on ArticlesFirst was not tested in this study. Moreover, the BLDSC is a tried and tested service which has proved itself to be a very reliable service. The reliability of the document suppliers on ArticlesFirst to deliver requested articles remains unknown and there appears to be no documentary evidence available concerning this matter. The current ILL intermediary situation in Maynooth also has the advantage of taking the pressure off the users in terms of dealing with suppliers and the necessity of dealing with document delivery problems should they arise.

The speed of delivery by mail would appear to be satisfactory for most Maynooth users as delivery by fax is requested rarely. However, the cost to the user of fax delivery is very expensive and this must have some impact on the actual demand for this service. It would be useful to be able to offer fax delivery directly to the user via ArticlesFirst as the cost-per-use is cheaper than the BLDSC but the present set-up with multiple suppliers and the lack of information on screen of the actual amount of international fax surcharges makes the service unusable for non-North American users.

However, Maynooth should look into the possibility of the ILL Department using UnCover for fax delivery as it appears to be reliable, is much cheaper than BLDSC and it is also cheaper and easier to order documents from than ArticlesFirst. It should also make it known to users that the UnCover service is freely available on the Internet and that it provides a cheaper fax service than either BLDSC or ArticlesFirst. However, users should be made aware that the quality of the faxed articles received from UnCover may vary in quality. It may be difficult to promote a 'free service' while at the same time providing a service like FirstSearch which is paid for but it will give users an opportunity to try the two services, to experience the benefits of both services and will no doubt provide a platform for informed debate.

6.5.2.4. USER FRIENDLINESS

Both databases are user friendly but more training is needed to use FirstSearch to its full potential than UnCover because of its multiple database structure and command level searching facility. However, this disadvantage is offset by the fact that a well trained user is likely to retrieve more relevant articles using FirstSearch than when using UnCover. The need for training to use FirstSearch does not present a particular problem in Maynooth Library where user education is a regularly service provided by library staff.

The major problem with the Open Access option to UnCover and access to FirstSearch is the degradation of response time experienced when using these databases at certain times. While this may be dismissed as a mild irritant when using the free Open Access to UnCover it becomes more serious when one is paying for access as in the case of FirstSearch. Is it acceptable to the users to be confined to using FirstSearch when the response time of the database is likely to be at its best? Are users willing to put-up with this problem so that they can enjoy the end-user facility that FirstSearch offers? FirstSearch has now been in operation for just over two years in Maynooth and user reaction to this service has as yet not been ascertained. At this stage it would be very useful to conduct a survey of user opinion to gain some insight into the users' perspective, especially in relation to their opinion on the issue of the slow response time.

6.6. CONCLUSIONS

Clearly, FirstSearch offers many advantages to Maynooth such as the good title coverage provided by ContentsFirst/ArticlesFirst and its other databases, multi-user and end-user access and predictable costs. However, FirstSearch does have some

disadvantages such as a user unfriendly document delivery system provided through ArticlesFirst and the slow response time of the database at times ContentsFirst/ArticlesFirst does not provide the perfect EDD solution as yet nor does the Internet access to FirstSearch at present provide the ideal connection. In Maynooth, document delivery by mail should continue to be provided by the BLDS but other end-user services need to be continually accessed by Maynooth to see if they can provide a more cost-effective service and overcome some of the deficiencies of FirstSearch and also UnCover e.g. services such as BIDS and SwetsScan which are based in the UK, may provide a more reliable Internet access. Also databases in other formats, such as CD-ROM, with or without document delivery, should be assessed or reassessed by Maynooth using a cost-effective approach.

It is hoped that the results and the methodology of this study will be used by other libraries, especially academic and specialised libraries with similar financial constraints and technological capabilities to utilise electronic resources. The results can be used by other libraries but may need to be adapted to suit local circumstances, where priorities and costs may be different to those of St Patrick's College, Maynooth. The cost results should be applied with particular caution as they do not directly relate to conditions at Maynooth and all costs will change over time. However, the results and methodology could be used to

- Alert libraries to some of the disadvantages/advantages of the two EDD services examined with possible application to other EDD services not examined
- To acquaint libraries with the cost differentials of the services, in particular document delivery charges
- Carry out similar analyses of inter-library loans in other institutions to ascertain titles that should be owned rather than accessed
- As an aid to comparing and selecting different EDD services or other reference material in any format.

- As an aid to evaluating existing material
- As an aid to conducting a cancellation exercise but with a modified cost-per-use based on Milne and Tiffany's original approach

There are many possible areas of further research to which the methodology used in this study can be applied and they are as follows:

- To evaluate other EDD services not covered by this study and to evaluate new products as they appear on the market e.g. **STeaMline** from BIDS and **Inside** from the British Library, new products previewed at the 19th Annual Conference of the United Kingdom Serials Group in April, 1996
- To evaluate non-EDD services which provide a bibliographic/current awareness service only and are used in conjunction with a separate document delivery service. To compare the results from these services with EDD services
- To carry out a comparative in-depth study of individual elements of effectiveness for a number of EDD services, e.g. speed of document delivery, user friendliness of suppliers, Internet connectivity, etc
- To carry out a comparative evaluation study of EDD services used in academic libraries in Ireland

Title	DEPT	ISSN	Country	No. of Articles requested by year of publication:																TOTAL
				1900	1974	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994				
ADULT EDUCATION (WASHINGTON)	DIPED	0741-7136	US		2													2		
AMERICAN ECONOMIC REVIEW	U ECON D MATH P ECON	0002-8282	US		2											1		3		
AMERICAN J OF HUMAN GENETICS	BIOLOGY	0002-9297	US		1							1						2		
AMERICAN JOURNAL OF MEDICINE	U SCIE	0002-9343	US			2												2		
AMERICAN JOURNAL OF PATHOLOGY	P BIOL	0002-9440	US			1									1		2			
AMERICAN JOURNAL OF PHYSIOLOGY	P BIOL	?	US			1				1				1			3			
AMERICAN JOURNAL OF PSYCHIATRY	STAFF RES GEOG	0002 953X	US											1		2	3			
AMERICAN JOURNAL OF SOCIOLOGY	P SOCI LIBR P HIST	0002-9602	US		4				1								5			
AMERICAN PSYCHOLOGIST	P SOCI P ADED	0003-066X	US		1				1					1			3			
ANALYTICAL BIOCHEMISTRY	P BIOL	0003-2697	US		1				1							1	3			
ANGEWANDTE CHEMIE (INTERNATIONAL ED.)	P CHEM U SCIE	0570-0833	UK		3	1											4			
ANNALS OF APPLIED BIOLOGY	P BIOL BIOL	0003-4746	UK		1	1								1			3			
APPLIED MICROBIOLOGY	BIOL	?	?		2												2			
APPLIED OPTICS	P COMP U SCIE PHYS	0003-6935	US			2		1		1							4			
ARGOSY	U ARTS			2													2			
ARTIFICIAL INTELLIGENCE	P COMP COMP	0004-3702	NE								2	2			1		5			
AUSTRALIA & NEW ZEALAND J OF DEV DISABIL	PSOCI	0726-3864	AT				1					1	3				5			
BASIC RESEARCH IN CARDIOLOGY	P BIOL	0300-8428	GE												2		2			
BIOCHEMISTRY	P BIOL	0006-2960	US			2		1							1	1	5			
BIOESSAYS	BIOL P BIOL U SCIE	0265-9247	US			1				1			1				3			
BIOMETRICS	P BIOL GEOG	0006-341X	US		2				1								3			
BRITISH CORROSION JOURNAL	CHEM	0007-0599	UK						1						1		2			
BRITISH JOURNAL OF CANCER	P BIOL BIOL	0007-0920	UK						1						2		3			
BRITISH J OF PREVENTIVE & SOCIAL MEDICINE	GEOG	0007-1242	UK		3												3			
BRITISH J OF PSYCHIATRY	GEOG	0007-1250	UK						2			1					3			
BRITISH MEDICAL JOURNAL	U ARTS GHOSH GEO		UK												2		2			
BULLETIN OF THE AMERICAN MATH SOC	P MATH	0273-0979	US		3												3			
BULLETN OF THE CHEMICAL SOCIETY OF JAPAN	P CHEM	0009-2673	JN			1				1							2			
CANADIAN JOURNAL OF CHEMISTRY	CHEM	0008-4042	CN							1	1						2			
CANADIAN JOURNAL OF ECONOMICS	P ECON	0008-4085	CN			1		1									2			
CANADIAN JOURNAL OF TECHNOLOGY	BIOL	?	CN		2												2			
CANCER RESEARCH	BIOL P BIOL GEOG	0008-5472	US		1	1					1	1		1	2	3	10			
CARIBBEAN QUARTERLY	P ENG	0008-6495	JM		1	1											2			
CATHOLIC LIBRARY WORLD	LIBR	0008-820X	US		2												2			
CELL	U SCIE P BIOL	0092 8674	US			4	1	1	1		1						8			
CELLULAR IMMUNOLOGY	P BIOL	0008-8749	US											1		1	2			
CHEMISCHE BERICHTE	CHEM	0009-2940	GE		2	1											3			
CHEMISTRY LETTERS	CHEM P CHEM		JA		2	1						2					5			
CHEMICAL PHYSICS	P CHEM	0301-0104	NE								1			1			2			
CHEMICAL REVIEWS	CHEM P BIOL	0009-2665	US			1		1									2			
CHEST	U ARTS P BIOL	0012-3692	US											1	1		2			
CHIRALITY	CHEM	0899-0042	US									1			1	1	3			
CLINICAL BIOCHEMISTRY	PRESS OFFICE	0009-9120	CN										1		1		2			
COGNITIVE SCIENCE	COMP PCOMP	0364-0213	US			2					1			1			4			
COLLEGE AND RESEARCH LIBRARIES	LIBR	0010-0870	US			1					1						2			
COMMUNICATION RESEARCH	P SOCI	0093-6502	US			2							1				3			
COMMUNITY DEVELOPMENT JOURNAL	ADED	0010-3802	UK							1			1	2	1		5			
COMPUTER	P COMP	0018-9162	US						1					1			2			
CORROSION	CHEM	0010-9312	US								1				1		2			
CORROSION SCIENCE	P CHEM CHEM	0010-938X	UK			1					1				6	1	9			
CRITICAL SOCIAL POLICY	P MESPA	0261-0183	UK													2	2			
CRYOBIOLOGY	BIOLOGY	0011-2240	US		1		1										2			
CULTURAL CRITIQUE	U ARTS	0882-4371	US								1		1				2			
CURRENT ANTHROPOLOGY	P ANTH	0011-3204	US			1	1										2			

JOURNAL TITLES	ILL REQUESTS PER YEAR					Average Requests (Lifetime Use)	Subscription plus VAT IR£	Total Costs IR£	Cost-per-use IR£	Start Date
	1994	1993	1992	1991	1990					
*CELL	8	3	4	1	2	3.6	£330 00	£348 32	Invalid	1974
*JOURNAL OF BIOLOGICAL CHEMISTRY	13	4	25	17	16	15	£746 00	£764 32	Invalid	1905
*PROC OF THE NAT ACAD OF SCIENCES	17	9	12	11	8	11.4	£425 00	£443 32	Invalid	1915
JOURNAL OF NEMATOLOGY	2	5	11	11	5	6.8	£57 00	£75 32	£11 00	1969
JOURNAL OF BACTERIOLOGY	7	2	9	16	16	10	£311 00	£329 32	£33 00	1916
INFECTION AND IMMUNITY	4	8	4	9	7	6.4	£296 00	£314 32	£49 00	1970
CANCER RESEARCH	10	13	6	1	6	7.7	£412 00	£430 32	£56 00	1941
JOURNAL OF BIOCHEMISTRY	5	0	6	1	2	2.8	£146 00	£164 32	£59 00	1922
CHEMISTRY LETTERS	5	0	9	0	2	3.2	£172 00	£190 32	£60 00	1972
PHOTOCHEMISTRY AND PHOTOBIOLOGY	5	2	2	4	8	4.2	£376 00	£394 32	£94 00	1962
JOURNAL OF GENERAL MICROBIOLOGY	3	5	8	4	16	7.2	£935 00	£953 32	£132 00	1947
NUCLEIC ACIDS RESEARCH	2	9	11	5	0	5.4	£852 00	£870 32	£161 00	1974
ANALYTICAL BIOCHEMISTRY	3	4	3	8	5	4.6	£1,153 00	£1,171 32	£255 00	1960
BIOCHEMICAL AND BIOPHYSICAL RES COMM	0	4	6	3	11	4.8	£1,244 00	£1,262 32	£263 00	1959
JOURNAL OF MOLECULAR BIOLOGY	4	3	14	2	3	5.2	£1,379 00	£1,397 32	£269 00	1959
BIOCHEMISTRY LETTERS	5	2	8	3	4	4.4	£1,184 00	£1,202 32	£273 00	1964
CORROSION SCIENCE	9	0	3	3	2	3.4	£1,016 00	£1,034 32	£304 00	1961
ELECTRIMICA ACTA	12	5	2	2	0	4.2	£1,380 00	£1,398 32	£333 00	1959
JOURNAL OF MOLECULAR CATALYSIS	9	3	2	2	1	3.4	£2,040 00	£2,058 32	£605 00	1975
TETRAHEDRON LETTERS	2	2	10	6	2	4.4	£4,035 00	£4,053 32	£921 00	1959
TETRAHEDRON	2	2	5	7	1	3.4	£4,710 00	£4,728 32	£1,391 00	1957

TITLE	COST OF A FAX PER ARTICLE IN DOLLARS (WITHOUT A FAX SURCHARGE)
AMERICAN ECONOMIC REVIEW	11 50
AMERICAN JOURNAL OF SOCIOLOGY	10 00
ANGEWANDTE CHEMIE (INTERNATIONAL ED)	12 25
APPLIED OPTICS	14 50
ARTIFICIAL INTELLIGENCE	18 00
AUSTRALIA & NEW ZEALAND J OF DEV DISABIL	11 50
BIOESSAYS	13 75
BIOCHEMISTRY	17 75
BRITISH CORROSION JOURNAL	11 50
BRITISH JOURNAL OF CANCER	17 75
CANADIAN JOURNAL OF CHEMISTRY	11 75
CANCER RESEARCH	10 75
CELL	N/A
CHEMISTRY LETTERS	10 75
COGNITIVE SCIENCE	11 50
COMMUNITY DEVELOPMENT JOURNAL	13 50
CORROSION SCIENCE	18 00
ELECTROCHIMICA ACTA	18 00
ENVIRONMENTAL ENTOMOLOGY	10 75
FREE RADICAL RESEARCH COMMUNICATIONS	N/A
GEOPHYSICAL RESEARCH LETTERS	11 75
IEEE SOFTWARE	12 75
IEEE TRANS ON NEURAL NETWORKS	12 75
INFECTION AND IMMUNITY	12 75
INORGANIC CHIMICA ACTA	18 00
J OF BACTERIOLOGY	12 75
J OF BIOCHEMISTRY	11 50
J OF BIOLOGICAL CHEMISTRY	11 25
J OF CELL BIOLOGY	10 75
J OF CLINICAL MICROBIOLOGY	12 75
J OF CONSUMER RESEARCH	10 50
J OF DIVORCE AND REMARRIAGE	N/A
J OF FAMILY ISSUES	14 50
J OF MARRIAGE AND THE FAMILY	11 50
J OF MOLECULAR BIOLOGY	16 75
J OF MOLECULAR CATALYSIS	18 00
J OF SOLID STATE CHEMISTRY	14 75
J OF THE GEOLOGICAL SOCIETY (LONDON)	11 75
J OF THEORETICAL BIOLOGY	16 75
LEUKEMIA	21 50
MEDICAL HISTORY	11 50
METEROLOGICAL MAGAZINE (HMSO)	15 95
MOLECULAR AND CELLULAR BIOLOGY	12 75
NEW INTERNATIONALIST	11 50
ONCOGENE	17 75
ORGANOMETALLICS	17 75
PHOTOCHEMISTRY AND PHOTOBIOLOGY	N/A
PHYSICAL REVIEW LETTERS	14 75
PROC OF THE NATIONAL ACADEMY OF SCIENCE	N/A
REVIEWS OF MODERN PHYSICS	14 75
STATISTICS IN MEDICINE	17 50
URBAN STUDIES	14 00
TOTAL=	654 70
AVERAGE COST PER ARTICLE(WITHOUT A FAX SURCHARGE)=	13 73
AVERAGE COST PER ARTICLE PLUS FAX SURCHARGE OF \$3 00=	16 73
SUPPLIER OF % OF TITLE=	90 40%

TITLE	ISSN	FAX	FAX	FAX	FAX	MAIL	MAIL	MAIL	MAIL	RUSH MAIL	RUSH MAIL	RUSH MAIL
	COST-PER-ARTICLE IN DOLLARS					COST-PER-ARTICLE IN DOLLARS				COST-PER-ARTICLE IN DOLLARS		
	UMI	EBSCO	ISI	BLDSC	UMI	EBSCO	ISI	BLDSC	UMI	EBSCO	ISI	
AMERICAN ECONOMIC REVIEW		10 50	N/A	16 75	24 50	9 75	N/A	10 00	17 00	20 25	N/A	19 00
AMERICAN JOURNAL OF SOCIOLOGY	0002 9602	14 75	15 50	16 75	24 50	9 75	8 00	10 00	17 00	20 25	27 00	19 00
ANGEWANDTE CHEMIE (INTERNATIONAL ED)	0570-0833	N/A	29 00	16 75	24 50	N/A	10 00	10 00	17 00	N/A	29 00	19 00
APPLIED OPTICS	0003-6935	N/A	17 50	19 75	24 50	N/A	10 00	13 00	17 00	N/A	29 00	22 00
ARTIFICIAL INTELLIGENCE	0004-3702	N/A	30 00	22 30	24 50	N/A	11 00	15 55	17 00	N/A	30 00	24 55
AUSTRALIA & NEW ZEALAND J OF DEVEL DISABILITIES????		14 75	0 00	0 00	24 50	9 75	N/A	N/A	17 00	20 25	N/A	N/A
BIOESSAYS		14 75	17 50	0 00	24 50	9 75	10 00	N/A	17 00	20 25	29 00	N/A
BIOCHEMISTRY	0006-2960	17 25	27 50	18 25	24 50	12 25	8 50	11 50	17 00	22 75	27 50	20 25
BRITISH CORROSION JOURNAL		14 75	0 00	16 75	24 50	9 75	N/A	10 00	17 00	20 25	N/A	19 00
BRITISH JOURNAL OF CANCER		16 25	27 00	16 75	N/A	11 25	8 00	10 00	N/A	21 75	27 00	19 00
CANADIAN JOURNAL OF CHEMISTRY		14 75	34 70	16 75	24 50	9 75	15 70	10 00	17 00	20 25	34 70	19 00
CANCER RESEARCH	0008-5472	14 75	27 00	16 75	24 50	9 75	8 00	10 00	17 00	20 25	27 00	19 00
CELL	0092 8674	N/A	0 00	16 75	24 50	N/A	N/A	10 00	17 00	N/A	N/A	19 00
CHEMISTRY LETTERS		14 75	27 00	16 75	24 50	9 75	8 00	10 00	17 00	20 25	27 00	19 00
COGNITIVE SCIENCE	0364-0213	N/A	15 50	16 75	24 50	N/A	8 00	10 00	17 00	N/A	27 00	19 00
COMMUNITY DEVELOPMENT JOURNAL	0010-3802	14 75	27 00	18 75	24 50	9 75	8 00	12 00	17 00	20 25	27 00	21 00
CORROSION SCIENCE	0010-938X	17 75	30 00	22 30	24 50	12 75	11 00	15 55	17 00	23 25	30 00	24 55
ELECTROCHIMICA ACTA	0013-4686	17 75	30 00	22 30	24 50	12 75	11 00	15 55	17 00	23 25	30 00	24 55
ENVIRONMENTAL ENTOMOLOGY	0046-225X	14 75	27 00	16 75	24 50	9 75	8 00	10 00	17 00	20 25	27 00	19 00
FREE RADICAL RESEARCH COMMUNICATIONS	8755-0199	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GEOPHYSICAL RESEARCH LETTERS	0094-8276	N/A	27 00	16 75	24 50	N/A	8 00	10 00	17 00	N/A	27 00	19 00
IEEE SOFTWARE ?	0740-7459	14 75	19 50	16 75	24 50	9 75	12 00	10 00	17 00	20 25	27 00	19 00
IEEE TRANS ON NEURAL NETWORKS		14 75	N/A	16 75	24 50	9 75	N/A	10 00	17 00	20 25	N/A	19 00
INFECTION AND IMMUNITY	0019-9567	14 75	27 00	16 75	24 50	9 75	8 00	10 00	17 00	20 25	27 00	19 00
INORGANIC CHIMICA ACTA	0020-1693	N/A	30 00	22 30	24 50	N/A	11 00	15 55	17 00	N/A	30 00	24 55
J OF BACTERIOLOGY	0021-9193	14 75	15 50	16 75	24 50	9 75	8 00	10 00	17 00	20 25	27 00	19 00
J OF BIOCHEMISTRY	0021 9193	N/A	N/A	16 75	24 50	N/A	N/A	10 00	17 00	N/A	N/A	19 00
J OF BIOLOGICAL CHEMISTRY	0021 9258	14 75	27 00	16 75	24 50	9 75	8 00	10 00	17 00	20 25	27 00	19 00
J OF CELL BIOGY		14 75	15 00	16 75	24 50	9 75	8 00	10 00	17 00	20 25	27 00	19 00
J OF CLINICAL MICROBIOLOGY		14 75	27 00	16 75	24 50	9 75	8 00	10 00	17 00	20 25	27 00	19 00
J OF CONSUMER RESEARCH		10 50	15 50	16 75	24 50	9 75	8 00	10 00	17 00	20 25	27 00	19 00
J OF DIVORCE AND REMARRIAGE	0147-4022	N/A	N/A	16 75	24 50	N/A	N/A	10 00	17 00	N/A	N/A	19 00
J OF FAMILY ISSUES	0182-513X	14 75	15 50	19 75	24 50	9 75	8 00	13 00	17 00	20 25	27 00	22 00
J OF MARRIAGE AND THE FAMILY	0022-2445	14 75	N/A	16 75	24 50	9 75	N/A	10 00	17 00	20 25	N/A	19 00
J OF MOLECULAR BIOLOGY	0022-2836	N/A	32 00	21 75	24 50	N/A	13 00	15 00	17 00	N/A	32 00	24 00
J OF MOLECULAR CATALYSIS	0304-5102	N/A	30 00	22 30	24 50	N/A	11 00	15 55	17 00	N/A	30 00	24 55
J OF SOLID STATE CHEMISTRY	0022-4596	N/A	29 00	19 75	24 50	N/A	10 00	13 00	17 00	N/A	29 00	22 00
J OF THE GEOLOGICAL SOCIETY (LONDON)	0016-7649	14 75	15 50	16 75	24 50	9 75	8 00	10 00	17 00	20 25	27 00	19 00
J OF THEORETICAL BIOLOGY	0022 5193	N/A	32 00	21 75	24 50	N/A	13 00	15 00	17 00	N/A	32 00	24 00
LEUKEMIA	0887-6924	16 25	N/A	16 75	24 50	11 25	N/A	10 00	17 00	21 75	N/A	19 00
MEDICAL HISTORY	0025-7273	14 75	N/A	N/A	24 50	9 75	N/A	N/A	17 00	20 25	N/A	N/A
METEROLOGICAL MAGAZINE (HMSO)		14 75	N/A	16 75	24 50	9 75	N/A	10 00	17 00	20 25	N/A	19 00
MOLECULAR AND CELLULAR BIOLOGY	0270-7306	22 75	29 00	20 75	24 50	17 75	10 00	14 00	17 00	28 25	29 00	23 00
NEW INTERNATIONALIST	0305-9529	N/A	N/A	N/A	24 50	N/A	N/A	N/A	17 00	N/A	N/A	N/A
ONCOGENE	0950-9232	16 25	27 00	16 75	24 50	11 25	8 00	10 00	17 00	21 75	27 00	19 00
ORGANOMETALLICS	0276-7333	17 25	27 50	18 25	24 50	12 25	8 50	11 50	17 00	22 75	27 50	20 50
PHOTOCHEMISTRY AND PHOTOBIOLOGY	0031 8655	N/A	N/A	22 30	24 50	N/A	N/A	15 57	17 00	N/A	N/A	24 55
PHYSICAL REVIEW LETTERS	0031 9007	N/A	27 00	19 75	24 50	N/A	8 00	13 00	17 00	N/A	27 00	22 00
PROC OF THE NATIONAL ACADEMY OF SCIENCE	0027 8424	14 75	N/A	16 75	24 50	9 75	N/A	10 00	17 00	20 25	N/A	19 00
REVIEWS OF MODERN PHYSICS	0034-8861	N/A	27 00	19 75	24 50	N/A	8 00	13 00	17 00	N/A	27 00	22 00
STATISTICS IN MEDICINE	0277 8715	14 75	33 00	16 75	24 50	9 75	14 00	10 00	17 00	20 25	33 00	19 00
URBAN STUDIES	0042 0980	20 25	N/A	19 25	24 50	15 25	N/A	12 50	17 00	25 75	N/A	21 50
TOTAL=		522 00	910 20	857 05	1225 00	360 50	341 70	539 82	850 00	717 50	1021 70	962 55
AVERAGE COST PER ARTICLE=		15 35	25 28	18 24	24 50	10 60	9 50	11 48	17 00	21 10	28 38	20 48
AVER COST PER ARTICLE PLUS FAX SURCHARGE=		20 35	30 28	25 49	24 50	10 60	9 50	11 48	17 00	21 10	28 38	20 48
SUPPLIER OF % OF TITLES=		65%	69%	90%	96%	65%	69%	90%	96%	65%	69%	90%

APPENDIX E (PART ONE)

E.1. UNCOVER

E.1.1. SEARCHING

UnCover can be searched in three ways.

Enter N for NAME search

W for WORD search

B for BROWSE by journal

When any of the options are selected step-by-step instructions are given on how to do a search and examples are given. If a user wishes to find out more about the UnCover service before commencing a search or on particular services such as UnCover Complete or UnCover Reveal the user can select any of these options. The NAME option allows searching by the author or authors as listed on the Table of Contents page e.g. if the author is listed as Francis Mulligan on the contents page he will not be found by using F Mulligan but only by using Francis Mulligan. The WORD search can be words from the title or from subtitles, summaries or abstracts that appear on the Table Of Contents page for each journal. The name of the journal can also be used in conjunction with a WORD to limit the results to a particular publication, e.g. AIDS SCIENTIFIC AMERICAN. The Boolean operator 'and' is implicitly used when a number of keywords are used together. If too many items are retrieved, results sets larger than 300 items are not sorted, or it is necessary to narrow the search, after the initially search has been performed the user is prompted to use ADD to enter a new word. There is also a QUICK SEARCH facility that can be used at any time to perform a search immediately and a typical search looks like this

//WPEACE PROCESS NORTHERN IRELAND

APPENDIX E (PART TWO)

The two slash characters '/' is used to begin the command, the second part indicates the type of search, in the above example, it is a WORD but could be a NAME or a T for TITLE browse and the final part indicates what the search is for, in this case it is PEACE PROCESS NORTHERN IRELAND. Whichever way the user decides to search, there is one problem inputting data on UnCover, a mistake cannot be corrected by using the backspace, the search has to be run with the mistake and the correct search inputted again

E.1.2. SELECTING ARTICLES

After a search has been performed the number of hits are displayed, at this stage the user can either ADD a new word, <D>ISPLAY the current list or <Q>UIT for a new search. On selecting <D> the items are displayed, a WORD or NAME search produces a list by author, title, journal title and date and a BROWSE search produces a list of journal titles alphabetically by journal title with the exact match title first. At this stage in a WORD or NAME search articles can be marked for subsequent ordering by entering line number and M (e.g. 2M) or the line number can be selected to view the full record and then marked for ordering. In the case of a BROWSE search a journal title is selected from the list of titles displayed, the journal details are then displayed and to examine current issue information <E> is selected. The issues are then displayed in reverse chronological order with the most recent issue first and its status, whether it is published or expected. When an issue is selected the author, title and first page number for each article in the issue are displayed and if required can be marked for subsequent ordering.

APPENDIX E (PART THREE)

E.1.3. ORDERING ARTICLES

After articles have been marked they can be ordered by selecting <O> and all marked orders are then displayed. The user can then delete any articles if not required, type <A> to order all displayed articles or quit without ordering. The price is displayed at the beginning of the ordering process, credit card details or special deposit account number is requested and details are verified. The user's telephone number, name, fax country code, fax area code and fax number is then requested. UnCover is able to tell the user exactly what the fax surcharge will be based on the fax country code which the user has inputted. At the end of this process the user has the option of aborting the order process.

E.2. CONTENTSFIRST/ARTICLESFIRST

E.2.1. SEARCHING

The user having already decided to use the general databases of ContentsFirst and ArticlesFirst, he/she then has to decide which of these databases to use. If the user is specifically interested in consulting the table of contents of journal titles or obtaining a listing of journal titles by subject then the ContentsFirst database is the most appropriate. If on the other hand the user is not interested in either of those areas, then ArticlesFirst should be used. It should be remembered also that articles can only be ordered from ArticlesFirst. The search screen of both databases displays three access methods with their labels (searchable fields) and gives examples on how to conduct a search. The search screens of the databases are displayed as **Fig. E.1.** and **Fig. E.2.** The different searchable fields or labels which appear as menu options on the search screen of each database indicate their different emphasis. Whereas the label SU on ContentsFirst matches keywords found in journal names and journal subject headings, the label SU: on ArticlesFirst matches keywords found in the title and abstracts of journal articles.

APPENDIX E (PART FOUR)

ContentsFirst		
SEARCH SCREEN		
SEARCH	DESCRIPTION	EXAMPLES
Subject	Type the label SU and a word (s) (Journal names and subjects)	su immunodeficiency su applied radiation
Journal title	Type the label JO and the journal name of part of the name	jo science jo nuclear medicine
Subj Hdg	Type the label SH and a word(s) from a journal subject heading	sh.chemicals sh radiology medical

Fig. E.1. ContentsFirst search screen

ArticlesFirst		
SEARCH SCREEN		
SEARCH	DESCRIPTION	EXAMPLES
Subject	Type the label SU and a word(s) (Titles and abstracts)	su voter+ su middle east
Author	Type the label AU name or any part of the name	au kaplan au peter drucker
Title	Type the label TI and the title or any word(s) in the title	ti airline safety ti underground

Fig. E.2. ArticlesFirst search screen

APPENDIX E (PART FIVE)

To conduct a search on either database the label and search terms are typed after
SEARCH WORD (S) (or Action):. e g

SEARCH WORD (S) (or Action) :jo nuclear medicine

The above example illustrates a keyword search on ContentsFirst for any journals with nuclear and medicine in the title. Here as in UnCover the Boolean operator 'and' is implicit. When a search has been performed the number of records retrieved are displayed at the top of the screen and the records are listed in reverse chronological order i.e. the latest issue of the each journal title first (unless an earlier issue was received late, in this case it will appear out of sequence)

The example given illustrates a typical low level search but HINTS are displayed on the search screens of both databases to help facilitate more advanced searching techniques. The hints include typing + at the end of a word to include the plural (s and es) or the possessive variation of a word in a search, or by typing H other LABELS can be viewed which enable searches to be conducted using other searchable fields. The other searchable fields include ISSN (label sn), abstract (label ab) and publication date (label pd). In the case of ContentsFirst other searchable fields are volume (label vo) and number (label no) Also included under the heading of labels is bound phrase searching, bound phrases are complete titles, journal titles, authors' names, etc and include all words and spaces in a field bound together as a single term. The journal title field (label jo) is a searchable but hidden field on ArticlesFirst as well as a menu label on ContentsFirst, however, searching by journal title produces a list of records with author, article title and year not the list of contents. The fields searchable as bound phrases have labels ending with = e g jo= Bound phrase searching is very useful when searching for journal titles because only the exact match title is listed,

APPENDIX E (PART SIX)

whereas keyword searching using **jo** lists all journal titles in with the keywords are present.

A list of **ACTIONS** also appear on the search and on other screens which indicate which actions can now be taken. The list of **ACTIONS** which appear on the search screen are as follows

ACTIONS: Help Limit Database Wordlist BYE Reset

A search can be limited by entering **L** after a search has been completed, when **L** is selected a list of categories appear and can be selected by entering the category number. Searches can be limited by language, year of publication and by article type. Spellings can be verified and variant forms of words can be checked by using **Wordlist** action to look them up. The **Wordlist** action can be used in conjunction with any searchable field. e.g. abstract (label ab.)

SEARCH WORD (S) (or Action): w ab censorship

It is also possible by using the **ACTION** facility to get **Help** by typing **H**, to return to Database Selection by typing **D**, to disconnect by typing entire word **BYE** or to return to the FirstSearch Welcome screen by typing **R** for **Reset**. Other facilities include the use of the Boolean operators **AND**, **OR** and **NOT** to make searches more specific by finding fewer records. **AND** is the only operator at menu level, it appears as a **Action** options after an initial search has been done so that the search can be narrowed, the other operators are hidden. There is also command level searching which offers proximity searching by typing **N** (near) or **W** (with), the use of parenthesis and short cuts to take users straight to a new database (**D 2** takes you to the second database

APPENDIX E (PART SEVEN)

selected on the Database Selection screen), to start a search by typing **S** at any stage or by typing **W** to view the wordlist anywhere in the database

E.2.2. SELECTING ARTICLES

Once a search has been completed articles have to be selected from a List of Records presented on the screens. In the case of a journal title search on ContentsFirst a short record display appears for each title and includes the journal title, volume and issue but with no year. In the case of a subject search on ArticlesFirst the short record display includes the details of the author(s), the title or part of the title (as much as can be accommodated on two lines) and the year of publication. Typing **F** (Forward) moves the screen on to more records and **B** (Back) moves the screen back so that previous records can be viewed. The use of **B** to move back through record display screens can cause confusion to the user as **enter** is also used to move back through earlier screens.

To view a particular record the record number has to be typed and then the full record is displayed on the Full Record Display screen. The ArticlesFirst Full Record Display gives details of the author(s), title, journal name, volume and issue, the first page number of the article, year, article type and ISSN. There are a number of **Actions** that can be taken at this stage, these actions include to **Email**, or **Print** record details, using the **LIBraries** option to check which libraries hold the journal title before ordering, **Search** to begin a new search, **F** or **B** to view more records and **Order** to the article. The ContentsFirst Full Record Displays contain bibliographic details relating to the journal title and the contents of the issue, listing each article by author(s), title and the first page number of the article. If a user wishes to order any of the articles displayed the record details have first to be recorded, the user must then exit from ContentsFirst by either pressing return until he/she is back to the Search screen and then typing **D** to get back to the Database selection screen (if however, the

APPENDIX E (PART EIGHT)

user knows the command language **D 2** will get he/she straight into ArticlesFirst) The user then has to locate the article on ArticlesFirst before it can be ordered

E.2.3. ORDERING

Once the article has been located it can be ordered by selecting **O** for **Order** from the of **Actions** displayed. The document delivery options are then displayed with their associated range of prices and the user then has to choose the document delivery option he/she requires. When this option is chosen the suppliers are then listed with their cost-per-article charge. If the user does not have an account with the supplier it will be assumed, *ceteris paribus*, that the user will select the cheapest supplier but if the user or the user's institution has an established account or accounts with a supplier selection will be based on this fact. The supplier will then request the user's name, country code, area code and fax number, address details, credit card details and finally the user is asked to confirm the order.

E.3. OTHER SERVICES

UnCover's Reveal Service delivers journal tables of contents (up to 100) selected by a user to the user's e-mail address. Author or topic searches are run weekly against new articles added to the UnCover database and any matches are e-mailed to the user. This started as a free service but is now only available at a cost of \$20 per profile for up to fifty titles. OCLC also provides a similar service called OCLC ContentsAlert, with up to 100 titles, e-mail updates and an annual subscription fee.

BIBLIOGRAPHY

ABELS, E G , KANTOR, P B AND SARACEVIC, T (1996) Studying the cost and value of library and information services Applying functional cost analysis to the library in transition Journal of the American Society for Information Science Vol 47 No 3 pp 217-227

ANDERSON, S (1989) No more free ride cost analysis in the Serials Department In Pitkin, G M (ed) Cost-effectiveness technical services. Neal-Schuman pp 119-123

BEKHRADNIA, B (1995) Pilot national site licence initiative for academic journals. Serials Vol 8 No 3 pp 247-250

BODEN, M A (1991) Appraisal of research In Brookfield, K (ed) Scholarly communication and serials prices Bowker-Saur pp 15-25

BRAID, J A (1993) Electronic document delivery . a reality at last? Aslib Proceedings Vol 45 No 6 June pp 161-166

BROOKS, B (1975) Principles of management accounting Gee & Co

BROWN, D J. (1993) Current awareness and document delivery the changing market Serials Vol 6 No 3 November. pp 29-39

BURCH, B (1991) Opening remarks In Brookfield, K (ed) Scholarly communication and serials prices Bowker-Saur pp 1-3

CARNEY, B (1995) OCLC access options increase. OCLC Newsletter March/April pp 23-29

CLEMENTS, D W G (1984) Costing of library systems In Roberts, S A (ed) Costing and the economics of library and information services Aslib Reader Series, vol 5 Aslib. pp 94-106

COHEN, S S (1985) Operational research Edward Arnold

COMPIER, H and CAMPBELL, R (1992) ADONIS latest developments and its role in the changing publisher/library relationship Health Libraries Review Vol 9 No 1 pp 3-13

COMPIER, H and CAMPBELL, R (1995) ADONIS gathers momentum and faces some problems Interlending & Document Supply Vol 23 No 3 pp 22-25

COMPUTER CENTRE, ST PATRICK'S COLLEGE, MAYNOOTH (1994) Computer centre guide to network services Computer Centre, St Patrick's College, Maynooth

CONSORTIUM OF NATIONAL AND UNIVERSITY LIBRARIES (1993)
University Library Statistics 1980/81-1990/91 Consortium of National and University
Libraries

COSTERS, L and KOOPMAN, S (1993) The Dutch Rapdoc project from interlibrary
loan to electronic document delivery Interlending and Document Supply. Vol 21
No 1 pp 4-6

DADE, P (1995) Pilot trial of Blackwell's UnCover database Vine. No.98 March
pp 40-42

DICTIONARY OF FINANCE (1993) Oxford University Press

DONOVAN, B T (1995) Electronic information - who pays? Serials Vol 8 No 1
pp 27-32

DRURY, C (1992) Management and cost accounting 3rd ed Chapman & Hall

FORD, G (1973) Library automation guidelines to costing. Office for Scientific and
Technical Information

GAVIN, U (1995) Electronic document delivery: a question of availability A thesis
submitted in partial fulfilment of the requirements for the degree of Master in Library
and Information Studies The Department of Library and Information Studies,
University College, Dublin

HAYES, R. M. (1996) Cost of electronic reference resources and LCM the library
costing model Journal of the American Society for Information Science Vol 47 No 3
pp 228-234

HAYES, R M and BECKER, J (1984) Cost accounting in libraries In Roberts, S A
(ed) Costing and the economics of library and information services Aslib Reader
Series, vol 5 Aslib pp 8-25

HAYES, S (1980) What does it really cost to run your library? Journal of Library
Administration Vol 1 No 2 pp 1-10

HEWGILL, J C R. (1984) Management accounting and library activities In
Roberts, S A (ed) Costing and the economics of library and information services
Aslib Reader Series, vol 5 Aslib pp 87-92

HING, T (1995) Document delivery services - the future today? Advanced
Materials Vol 7 No 4 pp 343-347

IRELAND. CENTRAL STATISTICS OFFICE Statistical abstract Central Statistics
Office

- IRISH LIBRARY NEWS (1994) IRIS launched Irish Library News. No 149 April pp 1-2
- KANTOR, P B (1989) Library cost analysis Library Trends Vol 38 No 2 Fall pp 171-188
- KOHL, D F (1995) Revealing UnCover simple, easy article delivery Online Vol 19 No 3 May/June pp 52-60
- LA RECORD (1995) Annual periodical prices for 1995 LA Record Vol 97 No 5 May pp 278
- LANCASTER, F W (1971) The cost-effectiveness analysis of information retrieval and dissemination systems Journal of the American Society for Information Science Jan-Feb pp 12-27
- LEACH, R G and TRIBBLE, J E (1993) Electronic document delivery new options for libraries Journal of Academic Librarianship Vol 18. No 6 pp 359-364
- LUNIN, L F and ABELS, E G (eds) (1996) Perspectives on . costs and pricing of library and information services in transition Journal of the American Society for Information Science. Vol. 47 No 3 March. pp 207-246
- LUPOVICI, C (1993) The use of new information technologies at INIST-CNRS Inspel Vol 27 No 1 pp 55-60
- MAGSON, M S (1973) Techniques for the measurement of cost-benefit in information centres Aslib Proceedings Vol 25 No 5 May pp 164-185
- MASON, D (1972) PPBS applications to an industrial information and library service Journal of Librarianship Vol 4 No 2 pp.91-105
- MCKNIGHT, C (1993) The electronic journal a user's perspective Serials Vol 6 No 1 pp 13-19
- MILLSON-MARTULA, C (1998) Use studies and serials rationalization a review Serials Librarian Vol 15 Nos 1/2 pp 121-136
- MILNE, D and TIFFANY, B (1991a) A cost-per-use for evaluating the cost-effectiveness of serials a detailed discussion of methodology Serials Review Vol 17 No 2 pp 7-19
- MILNE, D and TIFFANY, B (1991b) A survey of the cost-effectiveness of serials a cost-per-use method and its results Serials Librarian Vol 19 Nos 3/4 pp 137-149
- MENIL, C. (1993) FOUFRE A French project for electronic document delivery Serials Vol 6. No 2 pp.32-34

- MITCHELL, J (1994) OCLC interlending and document delivery services Vine No 96 September pp 14-18
- MITCHELL, J and HALBERG, P (1995) End-user searching and document ordering the experience with the OCLC FirstSearch service Veröffentlichungen der Universitäts-Bibliothek = Publications of Essen University Library Vol 8 pp 243-254
- NELIGAN, A (1994) Turn it on, take a look FirstSearch Lir bulletin of the HEAnet user group for libraries Vol 1 No 4 pp 1-2
- ONLINE LIBRARIES AND MICROCOMPUTERS (1991) Ariel RLG's PC-PC document transmission service Online libraries and microcomputers Vol 9 No 4 pp 6
- PILLING, S (1994) The ADONIS experience some views. Serials Vol.7 No 3 Nov pp 249-252
- QUADE, E S (1967) Introduction and overview. In Goldman, T A (ed) Cost-effectiveness analysis new approaches in decision-making Praeger pp 1-16
- SCONUL (1996) MA/HEM Methodology for access/holdings economic modelling Acquisitions decision support tool user manual SCONUL, Standing Conference on National and University Libraries
- SHILLINGLAW, G (1989) Costing methods and applications In Pitkin, G M (ed) Cost-effectiveness technical services. Neal-Schuman pp 5-21
- SMITH, G S (1991) Managerial accounting for libraries and other not-for-profit organisations American Library Association
- SMITH, G C K and SCHOFIELD, J L (1971) Administrative effectiveness time and costs of library operations Journal of Librarianship Vol 3 No 4. pp 245-66
- SRIDHAR, M S (1988) Is cost benefit analysis applicable to journal use in special libraries? Serials Librarian Vol 15 Nos 1/2 pp 137-153
- STEBELMAN, S (1994) Analysis of retrieval performance in four cross-disciplinary databases Articles1st, Faxon Finder, UnCover, and a locally mounted database College and Research Libraries Vol 55 No 6 pp.562-567
- VAN MARLE, G (1994) Electronic serial publishing and its effect on the traditional information chain Serials Vol 7 No.1. pp 17-15
- VIRGO, J A (1987) Costing and pricing information services Drexel Library Quarterly Vol 21 No.3 pp 75-98
- WENGER, C B and CHILDRESS, J (1977) Journal evaluation in a large research library Journal of the American Society for Information Science Vol. 28 pp.293-99

WILLIAMS, A (1973) Cost-benefit analysis bastard science? And/or insidious poison in the body politik? In Wolfe, J N (ed) Cost benefit and cost effectiveness studies and analysis Allen & Unwin pp 30-60

WILLIAMS, G et al (1968) Library cost models owning versus borrowing serials publications Office of Science Information Service, National Science Foundation

WOOLISCROFT, M (1994) Access and ownership academic libraries' collecting and service responsibilities and service responsibilities and the emerging benefits of electronic publishing and document supply New Zealand Libraries Vol 47 No 9 March pp 170-180

YOUNG, H. (1983) The ALA glossary of Library and Information Science American Library Association

ZIJLSTRA, J (ed) (1994) The University Licensing Program (TULIP) a large scale experiment in bringing electronic journals to the desktop Serials Vol 7 No 2. pp 169-172