

Electronic journals collection management literature review

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Abstract: The rapid growth of computer networks and of Electronic Information (EI) sources are currently producing a great explosion in the usage of EI all over the world. Effective, fast and easy access to the networks has caused Academic Libraries to change the way they develop and manage their collections especially in periodicals (serials or journals). They play a central role in the whole process of scholarly communication, which includes the periodical information chain, publishers, subscription agents and librarians (Woodward, 1994, p36). Accordingly, selection policies are changing to reflect the complex array of criteria and issues driving selection decisions. Weintraub presents a new form of collection policy - the genre statement - designed to aid the library organization as a whole in coping with the shift to digital publishing and Electronic Journals (EJ) (Weintraub, 1998, p1). Academic libraries have traditionally been perceived as information providers. They struggle to supply materials and services that support the educational and research objectives of their parent organizations. This widely accepted role of information provider usually overshadows the library's important role as information consumer. The information explosion has produced more materials than any library can afford to purchase. Although, computer technology has assisted libraries in controlling information, online and CD-ROM products have placed new funding burdens on libraries as a current publication output. The increased cost of these new products came at a time when library budgets were decreasing, thus making library managers predict the funds and require a specified level of user satisfaction in each subject.

In this article literature reviews will be undertaken in electronic journals (EJs) collection management. Firstly, some studies, that will serve as a general background will be discussed and secondly a review of literature focusing on the following:

- Concepts in EJ.
- EJ provisions and formats.
- Collection management and development policies in decision-making.
- EJ selection policy and collection evaluation.

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1.1 Background studies

Studies conducted before the year 2000 and after 2000 will be described and discussed here. The first two studies conducted in 1999 focused on who is responsible for and the criteria used in EJ decision-making process. The third study, focused on collection assessment, which is also considered an important factor influencing EJ decision-making.

Ashcroft and Langdon investigated the benefits of and barriers to the purchase of electronic journals in university library collections in the UK and North America. It found that electronic journals decision-making in the UK is the responsibility of librarians (38%) while in the North American respondents showed that the faculty made these decisions, usually with librarian assistance or the assistance of collection development professionals. As regards purchasing, there is much more evidence of consortia purchasing occurring in North America than in the UK (Ashcroft and Langdon, 1999, pp105-113).

Brennan and Burkhardt describe the experience a multi-sites higher education library consortium had in purchasing electronic journals and databases. The criteria and guidelines developed to assist in the decision-making process for the purchase of multi-disciplinary electronic products and services can be of value to other libraries whether singular or in consortium. Factors such as database features, coverage, search features, and delivery options were considered (Brennan and Burkhardt, 1999, pp113-126).

Diedrichs states that vendors and agents have a plethora of reports, databases, and tools that can be used by libraries in support of collection assessment as well as the day-to-day process of acquiring library material in the Ohio State University Libraries in USA. The paper reviews the current status of these tools particularly as they relate to monographic acquisitions including selection, in-print titles, out-of-print titles, and exchange of duplicates and serials acquisitions including management reports, document delivery, and electronic journals (Diedrichs, 1999, pp 321-338).

Studies conducted after 2000 and mainly focusing on EJ collection management, development and decision-making policies will be discussed here.

Gessesse at University of Alabama in USA examines the concepts and problems that an academic library must consider in order to align its collection development activities with the changing environment of digital librarianship in the twenty-first century. Both print and digital information must be selected, organized, preserved and delivered. The availability of electronic journals made libraries re-examine and redesign other collection development practices. The growth of full-text databases made libraries consider acquiring materials on a needed basis (Gessesse, 2000, pp 362-372).

Montgomery's study in the Drexel Library in USA describes the impact of electronic journals on staffing, shifting workloads, and new job responsibilities. Administration, management, and the computer network infrastructure all saw increases in responsibility (Montgomery, 2000).

Cox (2003) examines the proposition that electronic journals provide enhanced value for their costs when compared to print subscriptions. At the journal, article, and use levels, the author reviews the pricing policies of two different journal publishers, one commercial and one nonprofit. He confirms and extends these findings using recently published research. Whereas much research remains to be undertaken on the basis of standards, and definitions must be agreed on, the existing, albeit imperfect, evidence indicates that both libraries and their readers benefit significantly from electronic journals in the areas of cost per use and convenience of delivery of

scholarly and research literature. This proposition serves as a clarion call for more detailed research based on agreed-upon standards (Cox, 2003, p 83).

The e-libraries program ([eLib](#)) which was funded by the Joint Information systems committee (JISC) in the United Kingdom explored the pricing models to electronic journals subscriptions, licensing agreements, and infrastructure requirements (Evaluation of the electronic libraries programme, 2000). JSTOR (Journal Storage: the scholarly journals archive) is building journal backfiles related to costs. They are also reducing long-term capital and library operating costs. It guarantees online availability of backfiles and it discards old journal runs without decreasing services to users (JSTOR, 2000).

Gyeszly in Texas A& M University in USA compared the annual subscription prices and the percentage increases of 203 core-printed journals with their electronic counterparts in the disciplines of political science and economics during 1998-2000. The complete list of electronically available titles was identified and priced. Pricing information and user statistics were for both electronic and printed resources (Gyeszly, 2001, pp 5-10).

Johns at university of California in USA describes a grant-funded research project to relocate selected print journal runs, for which an electronic version is available, to remote storage on shelves of campus libraries at California University. data of costs, usage of print and electronic journals are used to develop long-range strategies and policies (Johns, 2001).

The studies mentioned above, which focus on the collection management and development of EJ and PJ by undertaking a comparative evaluation, emphasize the importance of the impact of EJs on the process of collection management as a whole and costs in particular.

Gardner in USA focused primarily on the evaluation of electronic resources after purchase in the Charleston Advisor pre-conference Series on evaluating, selecting, and acquiring electronic resources. The premise being that tracking use of the many electronic resources offered by libraries is one of the most difficult challenges facing collection development librarians and the creators of electronic products. A lack of context may be present regarding the timing of statistics collection. Librarians need to be careful not to compare statistics drawn from one time frame with those drawn from another. There are no standards for measuring use across all of the formats in which information can be accessed, for example print, CD-ROMs, and Web-based materials. Many agreed that they had to develop statistical sets for internal use before attempting to provide data to customers (Gardner, 2001, pp 17-32).

Chao's study on assessing the quality of academic libraries on the Web tests an instrument useful for evaluating the quality of academic libraries on the World Wide Web (Libweb). By consulting authoritative criteria used for traditional print resources and Internet/Web resources, a set of 68 essential indicators was generated and later reorganized and reduced to 16 criteria through factor analysis. Furthermore, a regression model considering both the respondents' demographics and the quality criteria were applied to identify 11 significant factors, which were later reduced to eight factors. Two instrument forms are suggested for prospective users to evaluate academic Libweb quality and to construct and maintain a good site (Chao, 2002, p 169).

Gardner and Chao both emphasized on the standards and criteria for the evaluation of electronic resources.

Bluh and Boissy in USA state that a successful selection is carried out systematically, and ultimately results in improved management and control of the serials collection. Systems people need to know not only what does not work, but also more importantly how it does not work. Does the system or the functionality never work, or does it work sporadically? No serials system can sell today if it does not have a coherent strategy for managing e-journals and locally stored digitized collections. Where should the various tools and databases necessary for e-journal management reside? If a more clearly articulated strategy for managing electronic serials were developed, some of the redundancy in the storage of licensing information in databases belonging to the publisher, the agent, and the library could be eliminated. Serials librarians must cope with a constant flow of changes to titles, publication frequencies, fund codes, and even vendors. Managing these changes consists of two distinct processes:

- Finding out that a change is needed, and
- Having a system that makes the changes easy to accomplish (Bluh and Boissy, 2002, pp299-305).

Emery at University of Houston in USA states that, although a national library has extra dimensions to consider, all types of libraries have to consider the effect of electronic acquisitions on their organizational structure. In order to avoid the selectors forum having to review every title, the database records were circulated to core selectors so that everyone could express an interest in a product selected by someone else. The manager responsible for the budget authorized all orders and invoices. The Library's finance system codes for literature and staff times were rationalized, so that an accurate picture of the resources devoted to electronic acquisition could be gained. Information on expenditure was derived from the local MS Access database and from the Library's finance system, not from the acquisition systems. Savings from print and CD-ROM cancellations were taken into account when assessing the total amount spent; this often proved to be a complex calculation, with various permutations of overlapping categories being considered. It can take a variety of forms, reflecting the size, nature and structure of the library. Each organization should review the different models, ranging from extending the span of existing jobs to creating a new section, and select the one best suited to its own circumstances (Emery, 2001, pp 78-81).

Webba (2001) explores the convergence of collection development and systems in a research library. It sets forth the philosophical underpinnings of that convergence, and it discusses issues encountered in the integration of the two services in the Washington State University Libraries. Finally, it explores strategic issues for future collection development and management from the perspective of this new organizational paradigm (Webba, 2001, p 461).

Schulz outlines the challenges inherent in electronic journals that have led some libraries in Australia to develop databases to assist in their management. These challenges include: new subscription options, new ways of providing access and new staff involved in acquisition; an increase in complexity in the supply chain; license restrictions; the volume and volatility of electronic journals; and, changes for collection development. The first part of the paper contains a discussion of these challenges and the resulting e-journal management database solutions, with examples provided from the Griffith University Library Electronic Resources Database (ERD). The second part of the paper focuses on the long-term viability of e-journal databases by examining the future evolution of the e-journal, alternatives such as integrated library systems and subscription vendors, and collaborative endeavors (Schulz, 2001, pp 449-459).

Studies discussed above generally focus on the development of a system, for managing the ever-changing environment of electronic resources, both on the organisational level and the serials system.

The last three studies discussed below are directed towards the importance of accessing E-resources information in suggesting an appropriate policy framework for purchasing decisions.

Research findings from PURCEL in some UK academic libraries (purchasing decisions of electronic resources in higher education institutions HEI), show a weakness in existing models and an inadequacy to meet the challenges of the electronic environment. A short-term option of adopting separate funds for print and e-resources was suggested. The study also concludes that an appropriate policy framework for purchasing decisions for e-resources is needed for effective assessment of potential purchases and establishing standards against which usage and user satisfaction can be measured (Joint Information Services Committee, 2000).

Mercer describes the problems encountered in trying to collect and analyze vendor information for use in service evaluation and decision-making. Results show users accessing the electronic journals in numbers far exceeding the print collection (Mercer, 2000).

Bevis and Graham (2003) studied the evolution of an integrated EJs collection. He focuses on decisions regarding collection management and information access which have become much more complex, incorporating an array of delivery options. Every aspect of providing information, from technical services to reference services, has seen major changes not only in the extraordinary amount of information, but also in the way that information is delivered and presented to the user. Administrative choices regarding bibliographic control of these new options, made early in the progression of this transformation, have had a significant impact on successive management decisions as to how libraries present their collection to the user. Bevis and Graham, 2003, p 115).

All the studies reviewed above were conducted in developed countries like USA and UK. However, it is considered important to discuss and understand the trend of research in other parts of the world.

In Thailand Ratchatavorn stresses the importance of using electronic journals. A number of search techniques appropriate for use within the electronic environment are described. The article concludes with specific suggestions for enhancing the effectiveness of Thai use of electronic journals (Ratchatavorn, 2002, pp 279-287).

Ke and others analyze usage of the Taiwan-based Science Direct Onsite E-journal system, one of the largest and most heavily used full-text Science, Technology, and Medicine (STM) databases worldwide (Ke, 2000, pp 265-291).

Lee states that the KRIC (Korea Research Information Center) was unable to buy full-text articles of every desired foreign journal and provide them to Korean researchers without additional charge due to the astronomical price demanded by the copyright owners. The overseas information service companies that negotiated with KRIC demanded that they be paid by the "number of sites" concept rather than the "number of users" concept. In other words, if KRIC intended to provide the overseas information to everybody in Korea, then it would have had to pay for all the sites that could provide KRIC service. Considering that all universities and research institutions could be potential sites, there could be more than a thousand sites. The KRICs proposal was that paying by "number of users" should be applied, since there were relatively few users on the system at a given time because this system was available only for registered researchers (Lee, 2002, pp 255-260).

Jain study's focuses in the Indian Council of Social Science Research (ICSSR), which was established for development of social science research in India. It provides grants to 27 research institutes and six regional centers in India. The present study includes 22 institute libraries and three regional libraries in different Indian states. The study analyses their annual acquisition of books; periodicals; CD-ROMs; annual budgets; computerization; hardware and software; Internet; library network; and interlibrary loan and photocopy facilities available in these libraries. Digitization provides a solution to traditional library problems such as conservation, preservation, multimedia documents, and remote access to information, collection, and storage space. ICSSR institute libraries are replacing conventional storage and network systems with digital systems. The progress is a bit slow. Only a few ICSSR institute libraries are subscribing to electronic journals and having electronic documents. ICSSR institute libraries have started computerized operations and are making vigorous attempts to have digitized collections (Jain, 2003, pp217-232).

The above studies conducted elsewhere in the world show a different trend from the developed countries in that they are in the process of transition from traditional to electronic system. Thus, their research concentrates on use and user studies.

1.2 Concepts in Electronic Journals (EJs):

During the 1990s a phenomenon variously called *electronic journals*, *electronic serials*, or *electronic publishing* rapidly evolved. Breaks and Ashcroft define EJ within their definition of electronic resources. Electronic information is a broad term that encompasses abstracting and indexing services, full-text materials such as newspapers and reference books, electronic journals and other offerings of electronic aggregators, article delivery services and free resources on the Internet. These e-resources can be accessed via electronic networks information providers or mounted locally within the institution or within the library (Breaks, 1999, p1 & Ashcroft, 1999, p105).

Nisonger suggests that electronic journals may fundamentally transform serials management in libraries. EJ covers a wide variety of diverse phenomena: It includes networked publications available on the Internet through e-mail, listservs, anonymous File Transfer Protocol (FTP), gophers, and the world wide web (www), as well as offline technologies such as floppy disks, disk cartridges, magnetic tape, or CD-ROM. An EJ can be fee-based through subscription, licensing, or pay-for-use. Some can be purchased as part of a multi-journal package (Nisonger, 1998, p267).

Nisonger also states that EJ can be electronic only, electronic only version of a former print journal, or simultaneously electronic and print. They can be stored on a local library or campus computer, or accessed from a remote site (Nisonger, 1996, p223). Finally, Nisonger believes that electronic publishing not only covers serials, indexing information, abstracts, tables of contents, full-text and graphics, but also non-serial items such as e-books or other types of text (Nisonger, 1998, p268).

Woodward introduced electronic information provision mostly in response to user demands: knowledge of the marketplace and evaluation of new and alternative products and services. The most important thing in Woodward's definition is the consideration of E-provision. These are essential components, which make a distinction between library provisions of products, such as full-text EJ on the one hand, and the provision of services, which allow for example, access to information about individual journal articles on the other. Both are highly pertinent to the future of

serial collection management but they do need to be treated as separate entities (Woodward, 1994, p37, 38).

Shemberg and Grossman, who mostly agree with Nisonger and Woodward in their definitions of EJ, added the importance of access to reasonably fast networks in academic libraries, wide distribution of easy-to-use software and hardware, and a user base that is familiar with, if not totally accepting of, electronic resources (Shemberg and Grossman, 1999, p27). Guthrie further extends the concept of electronic forms, in the study of a cost-driven, value-based pricing model, in images or text files. If text, it can be SGML (Standard Generalized Markup Language), PDF (Portable Document Format), HTML (Hyper Text Markup Language), SGML-to-HTML, or some combination of these which affect the Internet. The format that is chosen has far-reaching implications for present and future software capabilities, charging mechanisms and user acceptance (Guthrie, 1997, p2).

Van Marle defines EJ as a viable alternative to the printed journal: a primary scientific EJ is an on-line information system, owned by a legally and technically responsible body (the publisher), controlled by an identified quality control committee (editorial board/peers), containing articles by identified authors, reporting original results of research which have not yet been published before (regardless of the medium), available to subscribers via an open network, providing its subscribers with an irregular but continuous flow of new articles, which are individually date and time stamped, reflecting the moment when the article became available to its subscribers on the network (Van Marle, 1993, p20). Van Marle also recommends that all articles be numbered chronologically and that the date be included in the numbers. These numbers, combined with the (International Standard Serial Number) ISSN, make it possible to create a worldwide system of unique electronic article numbers (Van Marle, 1993, p20).

During the review of literature the researcher experienced that studies conducted at the advent of electronic publishing have defined the concepts related to it in sufficient detail. The current studies are based on the same definitions concentrating more on the methods of EJ management in terms of strategies, policies, guidelines and decision-making processes.

1.3 EJ provisions and formats

Bibliographic Databases: The BIDS-ISI (Bath Information and Data Services) provides staff and students in the subscribing institution with free site license self-service access to the main ISI databases: *Science Citation index*, *Social Citation Index*, *Art & Humanities Index* and *The Index to Scientific and Technical Proceedings (ISTP)*. These datasets have long existed in electronic form, even though their output had been in print, which enabled users to be provided with long back-runs of information that helped the rapid take-up of services. The number and range of networked datasets has increased substantially since 1991 and there were over forty major national dataset agreements in UK higher education by the year 1998. Most of these datasets are electronic versions of printed abstracting and indexing services and are held by many libraries (Breaks, 1999, p 2).

Vickery states that there was a equal balance between CD-ROMs and Internet publications, and between bibliographic and research material resulting in over one thousand full-text journals being made available electronically for both on-site and document supply use. The preferred mode of accessing licensed online material was through designated IP addresses rather than passwords (Vickery, 2001, pp 302-303).

Electronic Journals: The Association of Research Libraries pioneered reporting the growth of electronic journals. As of October 2000 Ulrich's International Periodicals Directory, lists 20,430 active online serials available "exclusively online" or in addition to a print counterpart. Electronic journals are quickly becoming a mainstream form of scholarly communication as demonstrated in recent initiatives by professional associations and even scholars themselves (e.g., SPARC, Public Library of Science [PLoS]) (Sitko, Tafuri, Szczyrbak and Park, 2002, p177-178).

Journal Aggregation Services: Individual publishers were making full-text EJ available by 1998 (Breaks, 1999), but only for recent issues, which led to an increasingly confused environment for libraries with the different access methods and licences being offered by publishers. Before committing on a major scale to providing users with access to the full-text of electronic libraries, there is a need to balance the benefits against the costs of managing these individual services. In anticipation of a market demand, a number of organizations, often subscription agents, are establishing journal aggregation services for publishers. These services provide integrated access to a range of electronic journals, in the same way as subscription agents now manage the supply of printed journals (Breaks, 1999, p3).

The usage statistics available for document delivery also became available for electronic journal usage. In aggregator systems, * the serials vendor licenses the full text of journals published by a variety of publishers and makes them available through a standard interface. Such systems have opened entire new horizons about the actual usage of journals and particularly the individual articles within a journal. As with document delivery services, these systems are able to track what journals are used, which articles within those journals are used, and by whom. When supplied by a subscription agent, it should be relatively easy to include cost information for print subscriptions (and electronic ones) into a standard report (Diedrichs, 1999, p333). Subscription agents also play the role of aggregators of information. The vendor then becomes the first point of contact for any queries and can provide usage statistics. In the Journal Access Core Collection (JACC) project at the California State Library system, EBSCO provided access to a defined list of titles via both EBSCO host and EBSCO online (Schulz, 2001, p501).

Sitko et al. (2002) state that e-journals are available via aggregator gateways. The same journal may be available in more than one provider's or aggregator's products (e.g., via EBSCOhost and also via Elsevier's ScienceDirect). They proposed a database-driven model for the best access, searching functionality, and flexibility to users by allowing them multiple access points to electronic journals on a single list. This database-driven model underscores a key problem in electronic journal management—lack of bibliographic control. Not all electronic journals are fully cataloged (or even partially cataloged as are their print journal counterparts) in most library OPACs. Only cataloged e-journals have been made immediately available in a library's Web catalog. Large collections of full-text journals available via an aggregator's gateway (e.g., EBSCOhost, InfoTrac, WilsonWeb, Proquest, LexisNexis) will probably not be cataloged or displayed on a library's Web e-journal list.

*** Aggregator systems**

Blackwells <<http://www.blackwell.co.uk/journals/subserv/docdel.html>>

EBSCO <<http://www.ebsco.com/>>

Faxon <<http://www.faxon.com>>

UnCover <<http://uncweb.carl.org/>>

The weakest feature for an aggregator's list is the lower visibility of their available titles on a library's electronic journal collection list and local OPAC. The challenges and efforts of providing access to aggregations of full-text electronic journals has been reported by national groups such as the Program for Cooperative Cataloging, Standing Committee on Automation (PCCSCA) Task Group on Journals in Aggregator Databases. The group's final report included their work with EBSCO, Bell & Howell, and LexisNexis regarding recommendations and strategies in bibliographic control of full-text titles in aggregator services (Sitko, Tafuri, Szczyrbak and Park, 2002, p177-179).

Internet Resources: Breaks states that Libraries are increasingly considering whether and how to provide access to relevant Internet resources for their users, but any move into the area should be addressed as a part of the library's overall collections policy for electronic resources. Most libraries post pages on their institution's CWIS (Campus Wide Information System), which not only describes the library's services, but also includes pointers to relevant Internet sites. This helps libraries apply, develop and manage collections of printed and paid EJ, and also apply free Internet resources to their collections.

There is a need to define the scope of collection, to allocate collecting responsibilities and to insure that mechanisms are in place to maintain the collection and review its effectiveness. The Internet environment needs to restrict access to unsuitable sites, which can be dealt with by software 'nannies' that prevent access to designated sites. As libraries now house clusters of networked workstations, they can be the front line of enforcing any institutional access restrictions. Therefore, they need to establish guidelines for how their staff should deal with problems that arise (Breaks, 1999, p3, 4).

Sitko and others state that the Internet and Web provide new paths for access to journals and create new approaches to scholarly communication. The multiple and diverse contexts in which electronic journal titles appear and alternative methods of presenting titles pose complex and formidable barriers that often hinder ease of access. The choices of formats, sources, contents, bibliographic control, and library holdings are the most challenging and unresolved problems in managing e-journals today. As the proliferation of e-journals continues and libraries shift periodical collections from paper to online access, patrons urgently need to know what is available in a library's electronic journal collection. Most libraries do not have adequate personnel to concentrate on e-journal information and changes; therefore, e-journal management services represent a niche in the marketplace to assist libraries with these responsibilities and add value to user services. An increasing number of libraries are building their e-journal collections by cataloging and incorporating them into their local OPACs (Sitko, Tafuri, Szczyrbak and Park, 2002, p179).

1.4 EJ collection management and development

Cancellation is a major collection management issue that concerns the time when the print subscription should be discontinued. A library would not cancel the print subscription until it had confidence in an archiving strategy for the electronic version. Nisonger suggests that another crucial criteria would be the cost differential between an electronic only and a dual electronic and print subscription, the degree of patron comfort with the electronic format, and the extent to which the print version for the period covered by the dual subscription is still being used. A reasonable policy might specify that all dual subscriptions be maintained for a set minimum time period, such

as two years, with the final decision to cancel the print subscription made on a title-by-title basis (Nisonger, 1998, p285). However, according to Sculz a long-term solution of e-journal databases is essential until integrated library systems are enhanced to cope with all of the new requirements of libraries that manage electronic journals. This is not to imply that all libraries should develop their own databases. To avoid duplication of effort, collaborative endeavors provide a way forward (Sculz, 2001, p 449, p502).

Networks and resource sharing is another issue in collection management. Gessesse suggests that electronic information services depend on the availability of networks together with cost and telecommunications infrastructure. The Internet seems to be an important issue for academic libraries in order to continue making collection development decisions. The problem that faces many libraries in terms of the provision of CD-ROM services is whether or not to network their CD-ROM products. Besides, there is a big difference between providing access to bibliographic databases appearing in CD-ROM forms and access to the traditional formats. In some cases, libraries do not own items; the CD-ROMs are leased rather than purchased. Gessesse states that *library only acquire the rights that are detailed in the licensing agreement signed by the library and database vendor. A license usually covers a specific period of time. Most licenses require the return or destruction of older copies; if a library cancels a title it usually loses all access to the information from that database, regardless of money paid.... Thus networks or consortia must be established to permit cooperative sharing of library resources...and the assembling of local collections becomes less important.* However, the basic problem with cooperative collection development programs in academic libraries is that there is a core of material and information sources that all important research libraries want to own or have access to (Gessesse, 2000, p369, 370).

Storage, Preservation, and Archiving: Nisonger suggests that the content of EJ will be lost from the scholarly record if appropriate archiving strategies are not developed. Libraries routinely archive print periodicals by binding them, but not all print subscriptions are considered important enough to bind. Likewise, some EJ may lack the enduring scholarly value to warrant permanent archiving. There have been numerous efforts to cooperatively archive EJ on a regional or national basis. Nisonger has proposed the following criteria for deciding whether a library should locally archive an EJ: 1) Is the EJ fee-based or free? 2) Does the publisher provide an authorized archive? 3) What is the remote site's menu quality like; in terms of structure and content? 4) What is the currency of remote site's files? 5) Is restricted access required by the publisher? 6) How available are equipment and staff resources at the local library?

Theoretically, formats available for archiving purposes include paper, CD-ROM, disk, micro format, optical media, plus electronically on computers. Currently, the guaranteed archiving strategy, which is quite expensive, is for a library to store the electronic back runs on its own server which gives it direct control (Nisonger, 1998, p281, 282). One disadvantage of local development is that changes in supported software at the institution (e.g., change in Microsoft Office versions) can lead to additional in-house programming work (Schulz, 2001, p501). One of the central issues relating to the licensing of networked datasets is whether the institution will have continuing access to the back files of the data after the license has expired. In the

print journal, library users can access back files even though a current subscription may not be held (Breaks, 1999, p11).

Nisonger raises some important questions concerning EJ archiving and preservation: 1) Who does the archiving? 2) Which EJ should be archived? 3) What format should be used for archiving? There are three possibilities to answer the first question. Firstly, electronic journals can be archived through EJ publishers, secondly through local libraries, and on a cooperative regional or national basis such as CICNET, which seeks to archive all the electronic journals that are available free on the Internet, thirdly through ARL (Association of Research Libraries) which depends on consortia for archiving. The first option only has a problem in that many observers feel that publishers cannot be depended upon for permanent archiving. The second question was to be answered through the process of collection management responsibility. The last question addresses a variety of formats including: paper, disk, micro format, CD-ROM, optical media, or on a computer (Nisonger, 1996, p235, 236). In the British library Storage and preservation electronic data are dependent, in the longer term, on the Library's Digital Store. A preservation checklist was drafted, for consideration by selectors at the time of ordering, to ensure that this key aspect was not forgotten (Vickery, 2001, p305).

Bibliographic Control: Unlike print serials, an EJ does not exist in a tangible, physical format and is not shelved in the library. From the perspective of library management of electronic journals, a key issue concerns whether records for remote access EJ should be entered into the (Online Public Access Catalogue) OPAC. Although, this would ease access to remote journals selected specifically to meet local user needs, but at the same time, placing the records in the OPAC may confuse the functions of a catalogue (what a library holds) and a bibliography (what is available) (Nisonger, 1998, p279, 280).

Acquisition: The word acquisition logically implies that the library physically acquires the item. However, one might question if the traditional serial acquisitions model can be applicable to remote-access EJ. Nisonger has stated that the library, in the last case, is simply licensing access right, but not purchasing for permanent ownership as in the case of print journal. The Massachusetts Institute of Technology identified five specific procedures for fee-based EJ: 1) Determining the price, 2) Negotiating with the vendor, 3) Completing the license agreement. 4) Releasing funds, and 5) Recording the order. In addition to those five steps, Nisonger adds three more: 6) Verifying that the title can be accessed, 7) Communicating with the vendor if it cannot be accessed (the electronic equivalent of claiming) and 8) Preparing an invoice for payment (Nisonger 1998, p276). Four implications were identified for these changes in the acquisitions department: First, inextricably tied to vendor services, and especially to selection support such as approval plans. Second, acquisition is inextricably linked to automation (its own automated system and vendors' automation, plus online catalogs, online utilities, and new bigger databases and directories of publishers, wholesalers, and publications). Third, since collection managers will be doing more with less, they will call upon acquisitions to be even more accurate and to do even more comprehensive pre-order and follow up work. And fourth, everyone will continue to look everywhere for ways to cut staff even further (Diedrichs, 1999, p322).

The British Library, which does not belong to electronic purchasing consortia, is using the existing monograph and serial systems to acquire electronic material,

rather than set up a new, third system. Cataloguing standards based on AACR2, and records are used for the OPAC, including the British Library Public Catalogue on the BL website, and separate specialist listings (Vickery, 2001, p305).

Check-in, Claiming, and Holding: Nisonger states that the concept of check-in is applicable to EJ if sent to libraries through e-mail or listservs. In 1995 the Massachusetts Institute of Technology subgroup stated that for journals pointed to on the web, check-in is meaningless since there is no holding for EJ. Link maintenance is the EJ quality-control substitute for check-in.

Regarding the claiming issue, Nisonger states that several problems could be associated with claiming EJ, including an unpredictable issuing schedule (for some journals), the release of articles separately rather than grouping them into issues, and the fact that Web-based journals are not actually sent to the library. When a larger proportion of EJ become fee-based rather than free, a systematic mechanism will be necessary for ensuring that a library actually has access to what it has paid for (Nisonger, 1998, p278).

Traditional measures of holding for print collections need to be expanded to accurately and consistently count collections of electronic journals. Librarians need a flexible means to count electronic journals for statistical information. These statistical measures need to be clarified and standardized, specifying what gets counted and how to permit meaningful measures of collection, strengths and comparisons among peer institutions, and an accurate picture of the complicated e-journal environment (Degener, 2000, pp3-11).

Weeding: Nisonger states that weeding an EJ could mean deciding to no longer provide access through a library's gopher or WWW site; to archive a journal on a local computer, or to pay a fee to access an external archive. It could also be related to archiving because the decision to stop archiving an electronic title is the functional equivalent of weeding it. Most libraries have not yet confronted the issue of weeding EJ because they are still struggling with more fundamental questions regarding selection and access (Nisonger, 1998, p284).

IT infrastructure: As the range and format of electronic information resources increases, libraries are dependent for the delivery of their services on a robust IT infrastructure within the institution, and both nationally and internationally. Breaks states that, libraries could operate in a relatively technically self-supporting way within their institution, only requiring the support of institution's computing service to provide and manage the campus technological infrastructure and the connection to the Internet. The nature of the IT infrastructure will depend on the methods through which the information resource is to be delivered. If the resource is to be installed on a stand-alone CD-ROM workstation, then the requirements are relatively simple and within the capability of most libraries to set up and manage. Many libraries now have moved to networked datasets, either within the library building or across the campus. Making CD-ROM networks requires considerable technical input, and a continuous source of funding to develop and expand the network (Breaks, 1999, p 6, 7).

Lee states that an example of a national digital library in utilizing web technology is called Timely Information for All, Relevant and Affordable (TiARA) in Singapore. This system was a multi-agency collaborative effort by the National Computer Board, the National Library Board, The National Science and Technology Board, and participating libraries. It provided users with on-line access to a network

of library catalogs, local and international databases, and links to a vast range of interesting and informative Internet web sites. In other words, this national digital library successfully utilized web technology by having library information available in a convenient and stimulating format (Lee, 2002, p258).

Support Services, and Equipment: The growth of electronic information resources is leading to an increased demand for printing facilities, and failure to provide these adequately will be seen by users as a reduction in service. Breaks has stated that printing requirements will range from needing prints from a CD-ROM dataset, to wanting the full-text of an article in an electronic journal, including color graphics. The library might meet the first need by providing free dot-matrix printers for each stand-alone workstation, but the staff costs in managing and supporting this facility need to be considered. Alternatively, the library may require the users to download the information from the databases to a floppy disk and take the disk elsewhere for printing. More sophisticated printing requirements, which may require a networked postscript printer, cannot usually be met by the library alone, but will require an institutional infrastructure that supports the provision of network printing facilities. The cost of obtaining, supporting and upgrading local equipment has therefore to be considered within the collections policy, but often the cost can be met from other institutional budgets, as it can be made available for other uses. Moreover, the impact, from the growth of the provision of e-resources, appears in the planning and use of library buildings. A library's collection strategy may therefore be significantly influenced by the extent to which the library building can provide the necessary IT infrastructure and can accommodate new uses (Breaks, 1999, p 7, 8).

Access and user interfaces: Breaks states that the question of how best to provide access to each electronic resource has to be fully considered and there is a need to build easy-to-use and integrated interfaces into electronic resources, which can be supported and updated. Most libraries manage access to networked information resources through their Web pages, but if a library wants to provide its users with a fully integrated collection of resources, regardless of the media in which they are available, then ideally there should be one point of discovery and access to the resources. This could be via OPAC, with the added benefit of providing a single-click access to the text of the electronic resources. Also, integrated access to Internet resources could be provided via the OPAC, though many doubt the scalability of such an approach. There are two important questions here:

- 1- Does the library have a Web-based OPAC?
- 2- How should access to the OPAC be managed?

The result is that unrestricted access to both Internet and networked datasets will mean the users spend a lot of time at the OPAC, and an unrestricted network PC also raises network security issues, as it has no audit trail and allows walk-in users to freely use those datasets to which access is regulated only by the (Internet Protocol) IP source address (Breaks, 1999, p7,8).

Whether a library provides its users with access to electronic journals via a web OPAC or an online listing, a choice is made at some stage as to what level the user will be connected, either directly to the journal or at a higher level, such as an index database entry screen (Schulz, 2001, p447). Sitko, et al. believed that a database-driven model would offer the best access, searching functionality, and flexibility to users by allowing them multiple access points to electronic journals on a single list. This database-driven model underscores a key problem in electronic

journal management—lack of bibliographic control. Not all electronic journals are fully cataloged (or even partially cataloged as are their print journal counterparts) in most library OPACs. Only cataloged e-journals have been made immediately available in a library's Web catalog. Large collections of full-text journals available via an aggregator's gateway (e.g., EBSCOhost, InfoTrac, WilsonWeb, Proquest, LexisNexis), will probably not be cataloged or displayed on a library's Web e-journal list. The weakest feature for an aggregator's list is the lower visibility of their available titles on a library's electronic journal collection list and local OPAC. The challenges and efforts of providing access to aggregations of full-text electronic journals has been reported by national groups such as the Program for Cooperative Cataloging, Standing Committee on Automation (PCCSCA) Task Group on Journals in Aggregator Databases. The group's final report included their work with EBSCO, Bell & Howell, and LexisNexis regarding recommendations and strategies in bibliographic control of full-text titles in aggregator services (Sitko, Tafuri, Szczyrbak and Park, 2002, p179).

Withersa et al. state that usability studies undertaken during a re-design of the web site provided some possible clues about low rate of use. A study commissioned by the libraries indicated that the existing electronic journals page was confusing to potential users because they were unfamiliar with the acronyms of many journal providers (EJC, JSTOR, etc.). In addition, usability testing revealed that even when these names did not consist of acronyms, many prospective users simply did not know which aggregators provided access to the electronic journals they wanted to find. During usability testing to assess the effectiveness of the existing web page, students and faculty were asked to locate an electronic journal while observers recorded the results of their efforts. Although faculty and students easily found the electronic journals web page, few were successful in locating an electronic journal title. A few faculty and students successfully used the Libraries' catalog to locate an electronic journal title. However, most test subjects abandoned attempts to locate an electronic journal title or left the Libraries' web site and attempted to locate the journal with a search service such as Google or Alta Vista. Locating electronic journal titles with search engines often led to additional frustrations—on some occasions, subjects located a listing of electronic journals provided by other libraries. As a result, only some of the links to electronic journals functioned properly (Withersa, Cassona and Shrimplin, 2002, pp107-112).

Copyright: The electronic format presents new challenges to the copyright holder. Material converted into digital form can be copied perfectly without any damage or diminution in the quality of the original. Electronic copyright is still an uncertain area, though there should be a legal framework understood by publishers, users, and libraries. Publishers are concerned that unregulated access to their machine-readable data over the Internet might affect the level of return on their investment in publications. They fear that permission may be given to users to copy and then widely distribute materials that they have invested in to create. In UK, (Joint Information Systems Committee) JISC and the Publishers` Association have been working towards developing a set of agreed guidelines on digital copyright clearance and on digital inter-library lending, and on developing model licenses for the use of digital data. Librarians can act as honest brokers in the electronic environment, if they can convince publishers that they can create a controlled environment within their institutions that provides protection for copyright holders (Breaks, 1999, p9).

Authentications and Authorization: Libraries should take responsibility for ensuring that authorized users access the datasets. This may involve authenticating the user for a network resource, prior to authorizing them to have access. Authentication can be defined, as the process whereby a network user establishes a right to an identity or possible multiple identities, and authorization is the process of determining whether a particular identity is permitted to access a resource. The number of user IDs and passwords has to be remembered by libraries due to the variety of authorization and authentication mechanisms in use. In order to address this issue, JISC has recently funded NISS (National Information Services and Systems) to develop and manage a national centralized authorization service, based on institutional authentication. ATHENS* is a service, which provides a single sign-on to all JISC-funded datasets and provide a transferable model, with the same username and password. It has been designed to meet the needs of:

1. The user by providing easy access to databases.
2. The resource supplier by providing strong safeguards for the security of the data.

With ATHENS and all existing JISC dataset users have been provided with re-authentication and helped libraries remove the barriers of major access to networked e-resources (Breaks, 1999, p10).

Collection Management Policy: The daily management of electronic information resources presents valuable opportunities and challenges for all library staff, but also involves significant management overheads, including licensing negotiations and monitoring, equipment provision and support, training and awareness costs. Breaks in the IATUL-Proceedings states that the effective provision of electronic information is often hindered by an outmoded institutional structure. There is a need for the active and willing support of other academic services, in particular an institution's computing services, which should be within the accepted organizational structure. If the library and the computing service are operationally converged under the same management structure, it will be definitely more straightforward to provide effective and managed access to the whole range of electronic information resources (Breaks, 1999, p5, 6).

Nisonger adds that EJ collection management policies should address issues such as the selection criteria, the selection procedure, and archiving. All of those issues should be reflected in a written policy (Nisonger, 1996, p236).

Greenstein discusses the strategic issues involved in managing digital collections in answering these questions: How are digital resources evaluated with a view to including them into a particular collection (either by creating or physically accessing them, or by providing access to them by other means for members of a particular user community)? How should they be catalogued and distributed to end-users? What are the most effective means of managing digital resources and preserving them against deterioration, decay, and information loss? What guidelines, such as preferred data formats, documentation, and delivery mechanisms, can be given to data creators and suppliers to ensure that resources acquired from them can be integrated effectively into an existing collection? Decisions about whether to create or otherwise include a digital resource into a collection, about its content and format, will directly effect how it may be managed and stored on a day-to-day basis (Greenstein, 1997, p24).

*ATHENS is an access management system available at: <http://www.athens.ac.uk>

In the serials arena*, the subscription agent's database is one of the most powerful tools available to collection development librarians charged with serials assessment. Standard bibliographic data have long been available including title, publisher, price, frequency etc. Today's databases include price history, subject categories, language, and indexing and abstracting information. Some databases include whether the title is peer reviewed, if the title is registered with the Copyright Clearance Center, and back issue information. For example, Faxon and EBSCO provide an extensive array of collection management reports (Diedrichs, 1999, p329).

The choices of formats, sources, contents, bibliographic control, and library holdings are the most challenging and unresolved problems in managing e-journals today. As the proliferation of e-journals continues and libraries shift periodical collections from paper to online access, patrons urgently need to know what is available in a library's electronic journal collection. Most libraries do not have adequate personnel to concentrate on e-journal information and changes; therefore, e-journal management services represent a niche in the marketplace to assist libraries with these responsibilities and add value to user services (Sitko, Tafuri, Szczyrbak and Park, 2002, p178).

Serials Solutions* is primarily a metadata provider that will supply libraries every two months with an updated listing of full-text journals available through the aggregators to which they subscribe. As of November 19, 2001, serials solutions had developed relationships with ninety-three publishers, aggregators, and associations to ensure the accuracy of its electronic full-text title lists. These lists provide electronic full-text journals in HTML and PDF file formats on a bimonthly basis as part of its basic service, which are arranged first alphabetically by database aggregator/publisher. Then an alphabetically arranged list of all of the full-text journals contained in those databases by individual journal title follows. A library can include its print journals as part of the journal listing by providing title, ISSN, and holdings data information to serials solutions in an excel spreadsheet. This information can then be incorporated into the bimonthly HTML and PDF file reports (ibid, pp178, 179).

JournalWebCite* offers fifteen reports, the most in any system. The Database Overlap Report compares journal holdings in one aggregator's database to those in another producing a report of titles that overlap, and also those that are unique to a particular database. The Collection Development Overlap Report compares database journal lists against a library's own collection and provides totals and percentages. The ability to search by title, subject, date, volume/issue, or electronic provider is a feature that appeals to all users. TDNet* offers a more sophisticated, customized solution to e-journal management.

***Serial management reports**

Blackwells <<http://www.blackwell.co.uk/journals/subserv/>>

Faxon <<http://www.faxon.com>>

EBSCO <<http://www.ebsco.com/>>

***Serials Solutions**

(http://www.sciencedirect.com/science?_ob=RedirectURL&_method=externObjLink&_locator=url&_cdi=6587&_targetURL=http%3A%2F%2Fwww.serialssolutions.com)

***JournalWebCite**

(http://www.sciencedirect.com/science?_ob=RedirectURL&_method=externObjLink&_locator=url&_cdi=6587&_targetURL=http%3A%2F%2Fwww.journalwebcite.com)

***TDNet:**(http://www.sciencedirect.com/science?_ob=RedirectURL&_method=externObjLink&_locator=url&_cdi=6587&_targetURL=http%3A%2F%2Fwww.tdnet.com)

The ability to track usage by IP address should be especially important in a consortial arrangement. As the most expensive e-journal management solution, TDNet's cost could be shared among consortial members. The specialized usage reports offered by TDNet, which can be run by vendor, publisher, and journal title, are quite beneficial. The most interesting feature is the personal portal "MyTDNet," which allows students and faculty to customize their research. Serials Cybrarian* falls somewhere between Serials Solutions and JournalWebCite for price and functionality.

The subscription cost* for a medium-sized institution is probably slightly less than that for JournalWebCite. The advantage of Serials Cybrarian is the automatic updating via the Update Wizard, journal title search feature, and some basic statistical information (Sitko, Tafuri, Szczyrbak and Park, 2002, pp180-192).

Staffing Implications and Training: The staffing implications of each move into electronic resources are that there is a need for new staff skills, which are formulated from a combination of a relatively high level of technological and information skills in at least one person. Breaks states that many libraries have addressed this challenge by creating a new post of Networked Information Services Librarian, which is becoming increasingly common in libraries as "hybrid information professional" (Breaks, 1999, p5). Mostly, there will be a need for library managers to re-engineer themselves and re-define their roles, in electronic library environments. There is no doubt that librarians with skills in collection management will need to expand their roles and become 'knowledge managers', rather than simply 'collection managers' (Breaks, 1999, p14). Nisonger has the same point of view about whether the acquisition functions for EJ are performed by the regular acquisition staff or different staff with expertise in electronic formats (Nisonger, 1998, p277).

Webba states that Collection development and management of electronic resources in academic research libraries and the use of technology throughout their operations have changed the organizational dynamics of these institutions. They have developed increased levels of internal cooperation among departments. Activities that were once the sole responsibility of a single department are now often shared in ways that have led to the convergence of departments. New organizational models have been both challenging and empowering for librarians, library staff, and administrators. Webba determines that the problem is discontinuing printed journals in favor of the electronic versions is on the rise. One of the biggest challenges has been to find 'opportunity funds' to pay the one-time start-up costs such as backfile fees. Consortia have grown rapidly and are probably the most important examples of new cooperative strategies. Public services and technical services librarians have worked cooperatively to develop the best strategies to maximize user access to these strangely intangible yet essential resources. Library systems departments have become involved in practically every aspect of a research library's operations. Library systems departments, which once were responsible almost exclusively for operating the OPAC, became involved with all of the electronic formats since 1980. They set up and maintained the CD-ROM workstations and then developed CD-ROM networks. Many research library

***Serials Cybrarian:**

(http://www.sciencedirect.com/science?_ob=RedirectURL&_method=externObjLink&_locator=url&_cdi=6587&_targetURL=http%3A%2F%2Fwww.creativelib.com)

***Cost of Serials Solutions basic service**

http://www.sciencedirect.com/science?_ob=RedirectURL&_method=externObjLink&_locator=url&_cdi=6587&_targetURL=http%3A%2F%2Fwww.serialsolutions.com, 19 April 2002.

systems departments provided service for locally-loaded databases, some including full text. They also managed library FTP servers. They worked with university information technology departments and systems staffs in the colleges of their universities to develop and offer campus-wide information systems (Webba, 2001, pp 462, 463).

Webba, furthermore clarifies that systems librarians were sometimes those who helped negotiate and then managed the licenses that accompanied networked CD-ROM products and tape-loaded databases. They also worked with public services and technical services librarians to develop closer ties from their OPACs to the growing electronic resources. Librarians with information technology-related job titles and responsibilities foreshadowed new organizational structures. CD-ROM network coordinators, e-resource librarians, electronic information coordinators, and electronic collection development coordinators are examples of some of these new titles and responsibilities. However, the research libraries are finding it difficult to determine what part of the organizational structure these positions appeared (Webba, 2001, p 463). As the Web provides librarians an environment and tools for providing more integrated access to resources, the library OPAC and most of its electronic resources are on the Web. Librarians are becoming **knowledge engineers**. They not only identify quality information resources, they are also becoming partners in the development of new forms of scholarly communication (Webba, 2001, pp 465-466). The Libraries also made an internal reorganization where a new position, **collection services librarian**, was created (Webba, 2001, p 467).

Kwasik (2002) states that a master's degree in Library and Information Science from an accredited institution was the one constant requirement in the qualifications for a serials librarian in an electronic environment. The most frequently mentioned items included traditional skills such as knowledge of MARC formats, AACR2, the Library of Congress (LC) classification system, the Library of Congress Subject Headings (LCSH), the Library of Congress Rules Interpretations (LCRI), and familiarity with the OCLC or other bibliographic utility. Because of the automated environment in libraries, knowledge of integrated library systems was also frequently listed. Relatively new skills such as familiarity with Dublin Core standards, knowledge of markup language, Web design, or experience in cataloging electronic publications were usually listed as desired qualifications. The demand for these skills is growing rapidly. Familiarity with Dublin Core rose from 7 percent in 1999 to 32 percent in 2000; experience in cataloging electronic publications increased from 12 percent to 22 percent. The most frequently used titles for **serials management** were **serials librarian** and **serials cataloger**. The presence of a new job title often called the **serials/electronic resources cataloger**. The new types of librarian were digital resources librarian or **electronic serials librarian**. In general, the electronic resources librarian performs many different duties, from acquisitions and cataloging to reference services. Integration of print and electronic format into one record, frequent revision of records due to URL changes, reference linking, common practice of maintaining Web pages that provide access to electronic resources and journals in addition to MARC bibliographic records, the need to follow cataloging standards more strictly, and conflicting needs between local and shared catalogs bring additional volume and complexity to the work of serials librarians. Serials positions that were less traditional and placed greater emphasis on computer skills and management of electronic resources listed the highest salaries. To stay current with all the cataloging standards and new developments, librarians need to improve their skills constantly (Kwasik, 2002, pp33-37).

With regard to the training methods of EJ selectors Nisonger distinguishes between two approaches; the format-based and subject-based approaches. The former implies a low demand for technical training but possibly a high requirement for training in selection skills. This is because staff members who already possess technical expertise, but might lack selection experience select EJ. In contrast, the latter approach implies a higher need for technical training, but a low requirement for selection skills training. This is because some subject specialists might lack electronic skills, although they possess knowledge of the selection process (Nisonger, 1996, p234).

Users also often need a new set of skills to make full use of e-resources. Many institutions are now providing formal information skills training, which can be departmental, or on an institution-wide basis, and the latter could be accompanied by certificating a set of basic IT skills. This should be addressed as an input into the process of a library, to insure that such a program would have users' information skills, which would be developed and used with the available electronic resources.

Library staff needs to be aware of the range of e-resources to which the library subscribes, and to be aware of the level of support that they may be expected to provide. New skills will be required from library staff if they are to provide the integrated support these users of electronic resources expect, and more libraries are setting aside a weekly training hour when the library is closed for staff training. However, that awareness should not involve only users and library staff, but also the institution's senior management, who all need to share in the library's vision (Breaks, 1999, p8). Schulz (2001, p447) adds that personnel from collection development and reference areas may be involved in detailed negotiation with publishers and vendors prior to the involvement of technical services, and accordingly require access to order information.

Purchasing Decisions: Nisonger defines a license as usually taking the form of a written contract or agreement between the library and the owner of the rights to distribute digital information. Licensing is generally written for the vendor's advantage rather than the libraries', but it is often possible for a library to negotiate more advantageous terms. A major issue for fee-based EJ concerns the terms of the licensing agreement (Nisonger, 1998, p277). Vickery states that responsibility for choosing, contracting and negotiating with publishers and suppliers rested primarily with the selectors, but the licensing representative and acquisitions staff was also involved (Vickery, 2001, p 303).

Finance/ Budgeting: E-information resources raise a new set of financial issues for the library's collections policy. Libraries face a very important demand that requires finding the money to pay for new e-resources in face of a shrinking budget. Libraries can only find money by one of the following options, which are referred to by Breaks as reallocation, or redirecting of existing funds (when the demand for traditional services is continuing to grow). E-resources are more expensive than print resources, and networked resources are more expensive than stand-alone ones. A library's existing budgeting traditions will have a significant effect on the extent of the provision of new electronic information resources. If the decision to purchase is made by academic staff, then it is likely that there will be few e-resources available throughout the library. If a library is keen to provide leadership in electronic library developments it may need to employ budgetary strategies to increase the range of e-

resources, in which the library staff would be able to meet the users' needs (Breaks, 1999, p12).

Webba states that the increasing percentage of collections budgets being devoted to electronic resources, research libraries make continuing heavy investments in user technology. They invest in complex server farms, state-of-the-art database and access software, and both hardware and software systems to provide secure networks and to manage their licensed electronic resources (Webba, 2001, p 466).

Nisonger emphasises the importance of EJ budgeting issues by distinguishing between a subject-based and a format-based approach. The former implies EJ would be funded from the same budget line as other serials; the latter implies separate budget lines for e-resources. Both approaches might be used with some EJ funded from a separate e-resources budget line and others from subject allocations. Budgeting is considered to be a complicated issue as it belongs to different categories of EJ. For example, journals on CD-ROM might be paid from a CD-ROM budget, but full-text journals available through DIALOG might be paid from an on-line searching fund (Nisonger, 1998, p278, 279).

Vogel says that libraries have tended to avoid using funds earmarked for print resources to pay for e-resources. As demand for e-resources increases, new funding is needed, and libraries have been forced to use current financial resources to pay for e-resources as well as for print resources. Incorporating e-resources into the collection development policy allows the library to look at funding for purchase of materials as an integrated unit out of which both print and electronic resources are purchased. In that case, selectors should determine what amount of the funds is used to purchase print materials or e-resources based on the goals for a particular segment of the library's collection (Vogel, 1996, p67).

Cox draws attention to the fact that journal pricing has not been transformed by online distribution because costs, inherent in the process of publishing the traditional peer-reviewed where the supply chain—from author to editor to publisher to subscription agent to library to reader—have not changed. Nevertheless, the flexibility of the online delivery mechanism has opened up the possibility to improve access to the journal literature and to introduce a variety of new business models that extend readership and improve the economic base upon which journal publishing rests. They are not limited to individual title subscription pricing, but they range from pay-per-view to package pricing for what are effectively databases of the publisher's complete journal program. One U.K.-based company, Webgenerics, has specifically targeted scholarly publishers with a Web-based digital publishing system called dotEncrypt. The benefits include: the ability to apply different prices or rules to viewing, downloading, or printing for different categories of user; processing and collection of payments; provision of a fully integrated reporting function; the ability to offer added value to subscribers and other closed-user groups; great flexibility in packaging and pricing information by applying multiple access rules for each piece of content; the ability to adapt pricing after the content has been released; and the facility for customers to preview—to "try before they buy." Used well, these new systems make it possible to implement different usage rights for different prices and to distinguish readily between different types of users—members, individuals, libraries, and library consortia (Cox, 2002, p172, p174).

Consortia Purchasing: The consortium has become an important issue in higher education libraries, e.g. CALIM in Manchester, the M25 Group in London, and SCURL in Scotland, and some of these groups are investigating the consortium

purchasing of library materials. The major journal publishers have approached consortia to discuss a framework for providing access to all the electronic versions of their titles to all members of the particular consortium, whether they subscribe to the print version or not. Therefore, the significant issues of authentication and access management, that will make this vision of cross-organizational access to networked information resources a reality, can be obtained by consortium purchasing (Breaks, 1999, p12).

Pricing: The financial model that has been used for access to JISC datasets has been based on a flat-rate subscription to each dataset for each institution, regardless of the size of the institution. This flat-rate model can be equated with the model of subscriptions to the printed version of the dataset, which has a fixed price regardless of the amount of usage. This system has the advantage of simplicity. However, as library managers like to operate in an environment of predictable costs, the subscription model of dataset charging adopted from the beginning for JISC-funded datasets is often preferred by librarians. The charging model includes a reduced fee for early sign-up and requires a commitment for a period of five years. An alternative model would be to use a tiered subscription rate or pay-as-you-use model of access, and the latter could be equated with the model of access to online databases. Besides these there are a wide variety of pricing models used by commercial information provider. Publishers permit access to e-version of a journal as long as the print version is subscribed to by the library, either for the same price or plus a supplement. Many journal publishers are therefore charging the current print price plus an electronic surcharge plus a significant project inflation surcharge, for simultaneous access to e-versions of their publications. Libraries acting alone cannot influence publishers and therefore these pricing issues need to be tackled internationally through such initiatives as the International Coalition of Library Consortia (ICOLC) 'statement of current perspective and preferred practices for the selection and purchase of e-information' (Breaks, 1999, p12, 13).

Nisonger outlines nine electronic materials pricing options used by publishers: 1) a yearly flat fee, which allows unlimited use, 2) the augmented price model, in which the library subscribes to a title's print version and pays an additional fee for the electronic format, 3) the pay-extra-for-print approach, a reversal of number two, in which the library subscribes to the e-version and pays extra for the print, 4) the pay-per-use model, 5) pay per potential user, based on an institution's size, 6) charge per connect time, which may include additional charges for download, 7) acquisitions on demand, which means pay on a per-article basis, 8) bundling or packaging, where a group of electronic journals are priced together at a discount price, 9) consortial pricing, for a group of libraries (Nisonger, 1998, p277, 278).

The cost of serials solutions' basic service is based on the total number of electronic full-text journals a library is tracking through their service on an annual basis. Serials solutions provide consortial pricing information, which can be found on their Website. Multiple-year subscription discounts for individual subscriptions are also available (Sitko, Tafuri, Szczyrbak and Park, 2002, p179).

Economic Model: Libraries need to develop mature models for the provision of electronic information, so that they can make meaningful comparisons between the costs of print and electronic resources. While a library will need to provide the necessary shelf-space for print resources for which it will not have funds, the e-version will require an investment in an appropriate IT infrastructure, which the

library may have to fund. Therefore, a library manager should be able to have a set of management tools to compare all the costs of electronic versus print, or access versus holding. With the move towards desktop access to information, it is becoming irrelevant to the user where the information is located, either within the library or across the world. Libraries need to provide, through access, the same reliability of service as they have traditionally provided through holdings, and this requires the development of new economic models. MA/HEM (Methodology for Access/Holding Economic Modeling) is an example of a software product, which is intended to allow libraries to make such comparisons and to help them in evaluating alternative strategies for the provision of information (Breaks, 1999, p14).

There are a number of new business models emerging, which will present new challenges for libraries, including: pre-payment for articles; package pricing by discipline; transactional or pay per view access; and micro-pricing, where charging is based on information accessed. These new models will either replace the options now available, or in a more likely scenario increase the options for access (Schulz, 2001, p449).

Policy-Making and Decisions for EJ: Collection policies are changing to reflect the complex array of criteria and issues driving selection decisions. It is crucial that libraries create a clear framework for selection decisions, as these decisions have a strong impact on the other divisions of the academic library. Weintraub's study identifies a new form of collection policy, the genre statement, developed at Cornell University's Albert R. Mann Library, which is designed to aid the library organization as a whole in coping with the shift to digital publishing. The subject scope collected by a library is addressed in the general collection management and development policy statement.

A genre statement supplements the general collection policy statement by addressing the type of material collected, not the subject. It means describing the process of evaluating and selecting a genre of material, if it is full-text, data, or bibliographic information. The first stage in developing and using a genre statement, which has been very useful for the Albert R. Mann library, is selecting EJ and clarifying their selection decisions for other divisions of the library.

The second stage governing the need for a genre statement is to have clear selection and evaluation criteria for specific forms of electronic information. Thus the Mann library bibliographers can easily survey the current state of electronic resources and serve library patrons. Also, it helps in the creation of a Full Text Resource Assessment Tool (FT-RAT), which explains the functionality of full-text resources, and delineates the boundaries of what would be acceptable, unacceptable, or ultimately, optimal characteristics for the library.

The last stage is to systematize a selection procedure, which takes into account the work done by other divisions of the academic library. The genre statement sets standards for selection, so that other divisions of the library understand the importance and quality of the electronic resources with which they are dealing, and helps clarify the role other divisions of the library play in providing access to these resources (Weintraub, 1998, p2).

EJ Collection Development Policies: Guiding principles for collection development policy is an important issue now especially with the growing range and number of EJ. Without selection decisions for e-resources there will be unfocused groupings of resources that may not support the mission of the library. An explicit collections

policy will prevent the library from purchasing a random set of resources, which it then cannot support. A collections policy will also help the library to head off the inevitable resistance to change from within the institution. However, most libraries are still in their infancy as regards providing access to electronic information and therefore need to proceed in a measured and structured way by isolating the collections management issues of electronic information. As print and electronic resources reach more of a balance, a fully integrated collections policy will be appropriate. Collection policies for e-resources would deal with subject coverage at the broadest level to support all the major research areas with the major bibliographic databases. Alternatively the library may like to be selective and target some specific subject areas in order to effect cultural change. Therefore the selection policy would address: Information formats and their technological implications both for library and institution, management and staffing issues in supporting electronic resources, the policy statements: whatever is in them, they have to be flexible and interpreted within the context of local needs, priorities and culture, the provision of the major bibliographic datasets, which match the subject profile of the institution that has teaching as its primary mission, the collections policy: this would be part of an institutional information strategy which aims to place the management of library mediated information resources, both in print and electronic, in an institutional context, the balancing of user needs for electronic information resources (Breaks, 1999, p4, 5).

Weintraub explains the principles of collection development and evaluation for e-resources that are being used as follows :

- The resources should follow the same general guidelines as print resources.
- They should be scholarly, well organized, and have appropriate dates of coverage for the subject area.
- Usefulness and demand for the resources should compensate for the work required for the library catalogue and support it, it is important for librarians not to choose useless resources, even if the journal is free, because the selections will have an impact on the work of other staff members.
- If two versions of a resource are available online, each version should have some clear advantage if they are both selected (Weintraub, 1998, p2, 3).

According to Nisonger the guidelines applicable to networked EJ are based on six criteria: quality and content, relevance, reliability and stability, cost and copyright, hardware and software (Nisonger, 1998,p283).

Greenstein has made a framework for developing data policies, which is based upon the life cycle of a digital resource, from its creation through to its management, access, and use. Also, collection managers should understand how practices adopted at any stage of these, may be adopted at others whether earlier or later in the life cycle. These important stages that define the framework include data creation, data selection and evaluation (e.g. where data resources are included in a collection by acquiring, mirroring, pointing to, or otherwise acquiring access to them), data management, data disclosure (how information about a collection's holdings is made available to end users), data use, and data preservation (Greenstein, 1997, p25).

Vogel has clarified the collection development policies for integrating electronic resources by defining three functions, the referential, the generative, and the rhetorical. The first step will be included in the evaluation procedures. The second step identifies the generative function, which is served by the collection development policy by providing guidelines to the selectors on how to move the library collection toward the goals of the policy, which will be included in EJ selection policy. The last

step is the rhetorical function, which should be considered when libraries begin shifting toward greater usage of e-resources. The collection development policy should be an ideal arena in which to challenge any resistance faced from various constituencies. When e-resources are incorporated into the collection development policy, the purchase of e-resources becomes a part of the funding priorities of the library the integrated policy provides selectors and library administrators with written guidelines grounding their actions when they are challenged by those who may resist the incorporation of information technology into the library (Vogel, 1996, p66, 67).

1.5 EJ Selection Policy and Collection evaluation

Choosing among formats, identifying what is available, analyzing costs, understanding licenses and other legal concerns, interpreting service implications, considering preservation, preparing equipment and facilities, and developing local approaches for acquiring, cataloguing and processing electronic resources introduces new challenges. Selecting an e-resource is not as straightforward as selecting a printed resource and involves a large number of additional issues apart from the appropriateness of the information content of resources. As the details of the selection criteria are developed, there needs to be a check-list in place which identifies the range of issues that will need to be brought to the decision-making (Breaks, 1999, p5).

Johnson suggests the following set of particular considerations that should be addressed when selecting electronic resources, once a decision to purchase is likely: network, hardware and software compatibility; availability of network, hardware and software resources; availability of electrical and telecommunications lines; quality of interface (ease of use for library users and staff); quality of retrieval/search engine; training implications; potential use (size of user community and frequency of use); reliability of vendor and availability of vendor support; availability of documentation; licensing considerations; treatment of graphics, formula, and other non-standard characters (Johnson, 1996, pp14-28).

Breaks adds that it will be very important to ensure the full responsibility for decisions to purchase is taken by the stakeholders in the library, and there may be a need to establish a standing committee/working group on electronic resources with wide representation, in order to co-ordinate selection decisions. It is important to be aware that the process of acquiring, delivering and supporting e-resources involves staff from all parts of the library, including systems, acquisition, cataloging, preservation and readers services. Selection decisions should be taken by technical staff to insure that the infrastructure is adequate and that there is sufficient expertise to provide technical support for the new dataset. It is also necessary to ensure that the public service staff members are not only aware of new datasets but also have the necessary skills to support users. Many things can be addressed in advance of purchasing e-resource, quality of data, access and support issues can be identified (Breaks, 1999, p5).

Nisonger describes selection as the most basic function in collection development, which means deciding to ease patron access to a particular EJ. He defines the selection of electronic journals as, fee-based EJ, taking out a subscription, signing a license agreement with the vendor, or deciding to access on a pay-per-use basis. Furthermore, selection could also mean deciding to facilitate patron access to an electronic journal by including it in an organized arrangement of electronic publications on a library's gopher or World Wide Web site (Nisonger, 1996, p233, 234-1998, p273, 274).

Vogel suggests that the selection policy serves as a training document that guides the selectors in their daily activity in selection, collection evaluation and weeding. A comprehensive collection development policy may include prescriptive information on resources to consult when reviewing new materials, comparable collections to consult when evaluating the current collection, and guidelines to consult when performing weeding operations. It is very important that all selectors become knowledgeable in the selection of e-resources in reference to their respective subject area. A strong collection development policy, which incorporates e-resources, can be a valuable starting point in this education. A collection development policy, which does not incorporate review sources on e-resources in its prescriptive information directed to selectors, may lead to a library to miss vital information produced in an e-format. If a selector follows guidelines for selection provided by a policy, which ignores e-resources, it is possible key information will be inadvertently eliminated from the library collection and not made available to library patrons (Vogel, 1996, p66, 67).

The Selectors of EJ: There are two approaches for EJ selectors; the first one is based on format; the other one is based on subject. In the former approach an EJ would be selected if used by separate staff with expertise (specialists) in automation and e-resources rather than the same staff (the same bibliographers) that select traditional materials. In contrast, the same collection development staff that select traditional resources would do the subject-based approach selection of EJ; e.g., the history bibliographer would select EJ in history (Nisonger, 1996, p234-1998, p274). For some time, libraries have been using different approaches to EJ selection, and EJ are more likely to be selected by committees than are print journals, and less likely to be selected by individual bibliographers (Parang, 1994, p5 in Nisonger, 1998).

EJ Selection Criteria: Weintraub points out that in Mann library's genre statement, there are some specific criteria for evaluating EJ. The first criterion is the quality of e-resources, which can be evaluated in three ways: content, completeness, and continuity, which are derived from the quality standards for print journals.

- 1- Librarians evaluate the contents of EJ by giving priority to refereed journals, which review research and report that describe new methods of investigation.
- 2- The completeness of EJ is evaluated by whether the electronic editions accurately and completely reflect the contents of print versions, or provide value-added features.
- 3- The continuity of EJ is evaluated by a commitment to continuous online publication. The delay in collecting e-resources also allows time for the inevitable reorganization and reconfiguration of the site to occur.

The second issue in selection criteria is the standard for functionality, access and organization, cost, and archiving (Weintraub, 1998, p3, 4).

Nisonger considers whether one should use the same selection criteria for EJ as for the print ones, or different criteria. Although, the traditional selection criteria for print journals also can be applied to EJ, but other criteria could be added. These additions would be to ask two questions:

- 1- How does a library budget for the EJ?
- 2- And what process is used in selecting EJ? (Nisonger, 1996, p234).

Weintraub suggests that the selection strategy should be included in the genre statement that will explain how the bibliographers responsible for the EJ find journals. It lists alert services for new journals and lists of established journals. This part should be updated each year, shared with other librarians interested in EJ, and prove helpful in training new librarians to select EJ. A bibliographer must find that the most useful strategy for selecting EJ begins with web sites (Weintraub, 1998, p4).

Nisonger states that there is a three-stage process in the selection of EJ, which could also be used in print selection. This is: 1) identification, 2) evaluation, and 3) selection. The first stage is to identify the existence of a particular item. Identifying EJ can be difficult because there is not good bibliographic control of what is available on the Internet. Useful tools can be mentioned: The ARL Directory of Electronic Journals, Newsletters, and Academic Discussion Lists and Computer World's On Internet (An International Guide to Electronic Journals), and New-Jour in Listserv (lists new EJ in various stages of planning). There are also some other methods to identify EJ on the Internet including the following: 1) serendipity when surfing the Internet, 2) staff and patron suggestions, 3) reviewing the EJ provided by other libraries, 4) publishers advertisements, and published reviews 6) electronic resources*.

The second stage is about using the term evaluation in a Micro rather than Macro sense, which means how one evaluates a specific item rather than the entire collection. The traditional factors for evaluation can be used for evaluating EJ: subject content, language of publication, accuracy, indexing, authors' credentials, editorial board membership, publisher's reputation, whether it is refereed, and overall scholarly quality. Furthermore, one can add for e-format whether it is online, CD-ROM, or networked; technical compatibility with the type of equipment (the library's hardware); the amount of training required; the amount of maintenance required; vendor restrictions; the user interface; and whether the journal is archived.

The third stage is selection, a decision is made concerning whether the item should be selected for your library or not. Such factors as: user needs, the institution's curriculum, informal collecting priorities, the collection development policy statement are the dominant considerations. The cost and terms of licensing agreement for fee-based journals, budgeting considerations, and its relationship to other items already in the collection would come into play in the selection decision. It is important for librarians to notice that evaluation and selection do not necessarily correlate with each other. An item might be the best thing ever written on any specific subject, but library managers decide not to select it because their patrons are not interested in it.

Nisonger lists four options that libraries should consider in choosing an EJ format: subscription to a print version, subscription to an e-version, subscription to both the print and electronic versions, no subscription but access through commercial document delivery service. The last option meets the patron information needs more (Nisonger, 1996, p234, 235, 236-1998, p274-276).

EJ Collection Evaluation: Libraries, as a service, have always been concerned with measuring their performance in meeting the needs of their users, and of ensuring that the resources they select are of use to their clients. Due to the pressure on resources, funding bodies, and users of libraries services have become more demanding of a demonstration of value for money. The interest in performance measurement has been intense, which has led to a more focused search for efficiency of operation, together with the concern for the needs of users, which has focused libraries on addressing

*Ulrich's International Periodicals Directory, available online at http://www.sciencedirect.com/science?_ob=RedirectURL&_method=externObjLink&_locator=url&_cdi=6587&_targetURL=http%3A%2F%2Fwww.ulrichsweb.com%2FUlrichsWeb%2F

measures of effectiveness. It is important to mention that performance measurements for print collections differ from those for electronic ones. There is a need for the development of management information systems for electronic library environments. One of the critical issues on this subject is the need to focus on the impact of electronic resources on staff and users in academic institutions and also to know which services are of the greatest value (Breaks, 1999, p6).

Nisonger refers to evaluation in the macro sense where the focus is on the entire collection rather in the micro sense, which focuses on the evaluation of specific journals. Two major unsolved issues concern: how to count EJ among current subscriptions in library statistics, and the need for new collection evaluation methods. The first issue will need the library to answer some questions. Does it have to pay for a subscription or access right? Catalogue it? Archive back issues? Provide access to it through www site? A standardized method therefore needs to be consistently used by all libraries in order to facilitate valid comparisons among libraries.

The second issue is still not achieving a large movement towards evaluating EJ. Nisonger suggests that the literature review concerns only micro evaluation, i.e., how one evaluates a specific e-resource, and little on macro evaluation – how e-resources impact on an evaluation of the entire collection. He also makes clear that collection evaluation methods have been divided into collection-centered and client-centered methods. The first method focuses on the collection itself, whereas the other method analyses how well user information needs are being met. There are three fundamental aspects to collection evaluation: ownership, availability, and accessibility. The ownership method measures the items that the library actually owns. The availability method measures whether the particular item is available for use when a patron needs it. The accessibility method measures the time it takes for a patron to obtain a needed item. Obviously, the concept of ownership is not relevant to EJ, but availability and accessibility certainly would be (Nisonger, 1996, p 235).

Vogel describes the referential function as one of the important steps, which will serve the collection policies. It will provide a description of the current collection and the future direction of collecting. Librarians have a baseline to refer to in evaluating the collection at any point in time and in evaluating purchasing patterns in a particular area. When e-resources are included in the policy, they are also included as a part of the breadth of the library's coverage of any particular subject area. Without this incorporation, a library may purchase additional materials on the same work. The selectors look only at the breadth of the print collection, excluding e-resources from collection development policies, as materials to be consulted in determining the coverage of the collection (Vogel, 1996, p 66).

Vogel also enumerates three primary priorities that must be considered when evaluating an individual resource for inclusion in the library collection: relevance, quality, and timeliness of the materials. These priorities should be addressed in collection development policy and provide guidance to selectors in determining whether the resource adequately fulfills prescriptions for inclusion in the library's collection (Vogel, 1996, p 68).

The first issue is relevance, which means that materials that are significantly related to the information needs of the libraries patrons, would be deemed relevant materials. When exploring the relevance of particular e-resources to the library collection, it is necessary to focus policies on the content of materials rather than the

format of those materials. However, e-resources have often been treated as either a separate entity in collection development policies or had entirely separate policies created for them. A more useful approach is to treat them as another of the many varieties of packages for information. The collection development policy must include language that gives guidelines for determining the relevance of the particular e-resource in question based not only on what other related e-resources are already part of the library collection, but also the content of the print and non-print components of the collection (Vogel, 1996, p69, 70).

The second issue is quality, which means that determining the quality level of a particular resource considered for inclusion in a library collection is a function of the desired depth of collection. Collection development policy should distinguish between small collections and a comprehensive one. For a comprehensive collection selectors need to include nearly all materials on a subject and make it available in e-resources and also in print resources. A basic collection needs selectors to include only a select group of materials on a subject. Quantity for that kind of a collection would be determined by use. Vogel argues that e-resources require their own methodologies, more than circulation and citation that are used for print resources, to study usage level. These may include machine-generated usage statistics or user questionnaires. Many computer menu programs provide statistics on access to individual resources, which can be a very effective tool for selection especially if used with vendor-provided demonstration subscriptions. He adds that there are factors other than usage such as ease of use (e.g. availability of table of contents, page numbers, clear instructions), accuracy of information (e.g. reputable publishers, background of authors, and appropriate citations), and attractiveness of presentation (e.g. sharp photographs, smooth video, and colorful on-screen layouts).

All the quality factors, according to Vogel, could be considered relatively equal, but when accuracy of information is addressed it is discovered that there are occasional misspellings in the e-resource that disrupt its search functions. Therefore, review sources are important in the selection of e-resources, in the collection development policy, to determine quality levels of materials. Many review sources currently include reviews for print and electronic resources, which may be useful in comparing materials in the same format and across formats. Reviewing sources to explore quality of materials will prevent occurrences that could happen when integrating print and non-print materials with e-resources to a library collection (Vogel, 1996, p71, 72).

The last issue is timeliness, which means that library materials are timely when they are appropriate for the time period. This is in contrast to the not timely, which dwells in the past or is lacking somehow in appropriateness for the current time. A current publication date does not insure timeliness. Most librarians look at the copyright date of particular print materials as a key item in the evaluation process for inclusion in the library collection. However, examining a copyright date is more difficult when evaluating e-resources because there is no standard location for copyright information. Therefore, libraries that exclude e-resources from their collection development policy may face special timeliness problems. The information can be accessed now from any location with access to the system (e.g. Internet and WWW). If the library excludes e-resources from consideration in its collection development policy, it will be excluding this most current and most timely of information.

Another issue related to timeliness is weeding, which is removing out-of-date, in-correct, or damaged materials from library collections to help maintain timeliness

for print, non-print and for e-resources. Many e-resources are periodically updated in operation (e.g. adding new search features), or in the information included. A resource, which is no longer supported by its original vendor and will no longer be updated, is a candidate for weeding out from the library collection (Vogel, 1996, 72 - 74).

On disposing of material through free electronic duplicate exchange lists* libraries associate informally to assist each other in disposing of unwanted serial back issues, while at the same time filling gaps in serials holdings. In 1994 Readmore, Inc. began offering free online serial duplicate and want lists. Using this service, libraries can perform the traditional duplicate exchange functions on the Internet more quickly, with less effort, and can reach a much wider audience (Diedrichs, 1999, p328).

1.6 Conclusion

The above review of literature in the field of EJ has highlighted the development of the concept in 1993, when the research focused on the provisions and types of e-journal, to 1999 when the focus shifted to EJ management and evaluation. This review has tended to rely more on earlier studies for theoretical framework because they have established certain principles that have not changed basically. The current studies thus have concentrated more only on the applications of these principles.

During this review it was found that in managing EJs, librarians often faced problems that are primarily related to choice of format, sources, contents, bibliographic control and library holdings. The researcher as a library professional was enlightened by this relatively exhaustive review in understanding the most common problems in EJ collection management as being related to budgeting/pricing, staffing/training, and the lack of application of international guidelines in EJ evaluation. The methods and models, suggested by experts in this review for solving these problems, have also helped the researcher in selecting the problem and the methodology for the present study. The experience of reviewing the work of experts in the field has helped the researcher know the changes in the organizational system essential for EJ management. One of these important changes is the introduction of new technical jobs such as knowledge engineers, collection services librarian and electronic serials librarian for EJ collection management.

The researcher also got acquainted with the availability of tools such as serials solutions, Journal Webcite, TD Net, and Cybrarian that are necessary in developing an effective strategy for EJ management.

Finally, it must be mentioned that the researcher has personally gained wide knowledge in the EJ collection management policies that are particularly related to standards, criteria, and guidelines. This will not only help the researcher in developing academic and training programs necessary for generating skilled personnel but also in suggesting strategies for evaluating EJ policies.

*Electronic duplicate exchange lists

BACKSERV <<http://www.readmore.com/electron/backserv/backlist.html>>

BACKMED <<http://www.readmore.com/electron/backserv/backmed.html>>

DEU-L <http://www.shsu.edu/~lib_www/deu/deu.html>

ASEE/ELD Duplicates Exchange <<http://www.ummu.umich.edu/library/ASEE/duplicates.html>>

NEEDSANDOFFERS-L <<http://ftplaw.wuacc.edu/listproc/needsandoffers-1/>>

Teri's WEB PALACE <<http://www.mercer.edu/swilley/dupmain.htm>>

USB E (United States Book Exchange) <<http://www.usbe.com/>>

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