

# **Trends in Scholarly Communication: Output, Access and Use Issues**

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## **Executive Summary**

An extensive literature review and analysis of published data have been supplemented by e-mail questionnaires and interviews with a selection of librarians, academics and publishers. Formal communication, via serials and monographs in both electronic and print forms, as well as more informal communication, via electronic discussion groups for example, were included. Results from the three approaches are very similar – the statistical analysis complemented the findings of the literature review, which were reiterated by those interviewed.

### **Journals**

Most of the existing literature relates to journals in scientific subject areas, rather than monographs or arts and humanities subject. Title output continues to rise and remains dominated by print media, although the number of electronic titles is increasing rapidly. Views are mixed, with some commentators seeing the printed journal in terminal decline, while others regard its demise as being some way off.

Both the number of titles and average cost of serials have risen, particularly in the science, technical and medial fields. The rate of increase amongst UK publishers varies by discipline, but there is a lack of recent data – the most recent survey was carried out in respect of 1998. Overall, average title prices have risen three times as fast as general inflation since 1988. There has been a corresponding fall in the average number of full rate subscriptions to titles in all subjects.

Developments in electronic publishing are seen as being at different stages in different subject disciplines. The range of options has expanded, and some traditional media may be in decline. Librarians felt that the electronic revolution had had a significant impact on dissemination, not only in terms of new publishing models, but also in facilitating access to traditional resources.

Key factors for authors in deciding where to publish are the peer review process, seen as fundamental for quality control, and the impact factor of the journal. These are seen as benefits of the traditional print publishing process, and electronic journals are viewed with more scepticism in these areas. The reputation of electronic-only journals in general remains an issue, with authors seeking a compromise between speed of publication and prestige. The research assessment exercise in UK universities has led to an increase in the number of poor quality papers being submitted to journals, and the peer review process is seen as preventing sub-standard material from being published.

### **Monographs**

Less consideration has been given to monographs in the literature, and again there is no consensus of opinion as to their future. Electronic books have as yet had little impact, with reference works on CD-ROM becoming established, and some move towards increasing availability of student texts in this format. Users are seen as reluctant to read from the screen,

although this may be overcome by familiarity with the medium. Libraries generally have a more positive attitude.

Monograph publishing is increasing in the UK, although there is some evidence that it may be in decline in the US. The average price of UK academic books has risen only slightly faster than general inflation since 1988.

## **Informal communications**

Interviewees felt that the formal and informal fora for scholarly communication were becoming blurred due to increasing use of electronic communication and discussion networks. In particular, these have enabled increased participation, particularly for new scholars, in what was previously a relatively exclusive 'club'.

Pre-prints are rapidly becoming an acceptable form of scholarly publishing, particularly within the sciences. There is little consensus in the literature, however, with regard to the threat to commercial publishers of increasing e-prints.

## **HE purchases**

In the UK, total spending by HE libraries on information provision is increasing slightly faster than general inflation. Spending on books remains relatively stable, with increases on serials and electronic information. Electronic resources remain a relatively small part of HE library acquisitions expenditure, however.

In the US and Australia, libraries are now spending significantly more to acquire fewer titles than ten years ago. In the UK, the trend is complicated by the introduction of bundled print/electronic title deals by NESLI. Prior to the widespread acceptance of such deals, the total number of titles being taken by HE libraries was relatively stable; it has since shown signs of a slight increase. The average price paid has fallen, possibly reflecting a tendency towards less expensive titles, but complicated by the number of effectively 'free' titles included in bundled deals.

Title acquisitions and spending on books have remained steady, which coupled with slight price increases has led to a fall in the average price paid per title. There has been a rapid investment in electronic media, both in terms of resource spending and infrastructure.

## **The future**

There is little consensus over possible models for the future, with as many being suggested as articles reviewed and people interviewed. Most interviewees saw changes as positive, but this was not a unanimous view. It was felt that traditional journals would need to adapt, transplanting their current advantages into a more flexible - and affordable - model. Electronic resources were currently purchased at the expense of print – both journals and monographs – and new models were needed making electronic resources more affordable.

The key issues were seen as being the increasing cost of journals, the complication of balancing print and electronic acquisitions in the current model, the archiving of digital material, and the ability of scholars to identify and locate quality material in its final form. For publishers, there was a realisation that the decline in income resulting from falling subscriptions cannot continue to be met by increasing cover prices. There was a desire to work with academics, and an appreciation of the need for cooperation between all key stakeholders to develop alternative models

The outlook for the scholarly monograph was less positive. It was felt that there would be an inevitable decline, more rapid in scientific disciplines than in arts and humanities. Electronic publication and print-on-demand were suggested as possible ways forward in this area.

## Introduction

This Report documents a small-scale project undertaken for JISC to investigate various aspects of scholarly communication and information management as they affect the UK research community. The work was predominantly desk-research based, drawing on a range of statistical data available to LISU and a great deal of relevant literature, and this was supplemented by a selection of opinion gathered from leading specialists through e-mail exchanges and telephone interviews.

Current issues of communication and publishing as well as researchers' use of publications were examined and some indication of future trends explored. The capacity of the higher education sector to keep pace with developments, in terms of information acquisition and access was also a feature. The study concentrated on the formal aspects of scholarly communication, but the informal exchange of information between scholars was not entirely neglected.

As will become apparent, these are times of great change in scholarly communication and many challenges and opportunities present themselves. The electronic world has opened up new possibilities and new problems. There are serious resource implications to the successful creation and dissemination of research information. It is also apparent that there are some almost intractable issues to be faced and there appear to be no easy answers. Scholarly communication has reached its present state over many centuries and it would appear that the most progress will be made through evolution rather than revolution, and with all partners in the communication chain recognising each other's special interests and capacity to contribute. Like running water, information for scholarly communication will find a way to flow. What can be shaped and influenced is its volume and pace, and the ease with which it flows.

## Project desired outcomes and methodology

The Project set out to identify, assemble and assess the available evidence with respect to the:-

- Current trends in scholarly publishing output
- Impact on future developments in scholarly publishing output
- Current trends in the use of scholarly material
- Impact on future developments in the use of scholarly material
- Current trends in the UK higher education community's capacity to acquire and/or facilitate access to scholarly publishing
- Contrasting trends in publishing with trends in the capacity to acquire and/or facilitate access to scholarly publishing

A systematic review of published material on scholarly communication and publishing trends as well as access and use issues was undertaken. Published material was identified primarily through *Library and Information Science Abstracts* and this source was supplemented by the world wide web and the documents and reports held in LISU's collection as well as material

in the University's Pilkington Library. The extensive statistical data accessible to LISU were also analysed for relevant material on trends and issues and a commentary written.

Additional information was gathered directly from a selection of specialists drawn from the different domains of the scholarly communication 'chain'. They included academic scholars, publishers and librarians. Questions were drawn up for each domain and participants were offered the option of responding by e-mail or telephone. LISU is most grateful to those who took part for giving up valuable time to assist and sharing their expertise and experience. The questions that were used and the names of respondents are appended (*Appendix D*).

All the evidence gathered was evaluated and synthesised and the main messages emerging from the work assembled in a general summary.

## Review of the Literature

This section features current trends identifiable in the literature in relation to scholarly communication and how these might affect its future.

For the purposes of this review the emphasis is on formal scholarly communication which is generally taken to mean serials and monographs in both paper and electronic formats, although it does not preclude such publications as review papers. Halliday (2001) found that half of questionnaire respondents thought that “*scholarly communication should not be treated as a homogenous practice as behaviour varies between communities or disciplines*”, which is a sentiment worth considering when assessing the research. The literature tends to stratify into two discipline related areas namely – the sciences and technologies [STM] and the arts and humanities. The majority of published references tend to cover the STM area and especially serials and initiatives that appear to threaten or undermine the traditional role of the commercial publishers.

Although there have been a number of developments in recent years with regard to electronic publishing (whether by learned journal publishers or individual authors in the form of pre-prints or self-printed monographs), there is a sense that the situation with regard to scholarly publishing is not about to change overnight. Alongside those urging academics to move away from paper and commercial publishers to electronic only formats, there are those expressing more moderate sentiments in suggesting that change in this arena is slower than initially expected.

## Background

The rising costs of traditional journals and the opportunities presented by the Internet concerned the authors of the Follett report (1993) as they observed that libraries faced pressure from “*rapid inflation in the costs of printed materials*”. Research since then is still very much concerned with these, and other related issues.

## Serials

The phrase ‘serials crisis’ is a well known one, but the basics are worth repeating here as a means of understanding current research and debate: both the number and cost of serials have grown especially those in the science, technology and medicine (STM) fields. At the same time library managers have found their budgets stretched as they try to acquire such titles for their collections, with the effect that they buy fewer journals and this means less material for researchers to use, at least in the US (Buckholtz, 2001). However, figures for the UK would contradict this assertion (*see pages 27-29*). In turn this squeezes the publishers who raise prices; “*When journal costs force libraries to cut back on subscriptions, the journals that do remain in circulation make up for falling subscriptions with higher rates*” (Buckholtz, 2000). Houghton (2001) notes that between 1986 and 1998 journal subscriptions by Australian universities declined by 37% whilst expenditure increased by 263%. In the US, American Research Libraries (ARLs) spent 124% on average more to acquire 7% fewer titles in 1996 than they did in 1986 (Enserink, 1997 in Tinerella, 1999). In the UK, Trends in Journal Subscriptions 1998, notes that the trend towards publishing more journals continued from the

previous survey (1997) and the average price per editorial page increased in all subject categories, especially in pure science (Watkinson, 1999).

### **‘Serials Crisis’ and ‘Scholarly Rebellion’**

This situation has angered some academics who feel publishers are making profits from their work whilst their own libraries are unable to buy the journals in which it is published:

*“Universities and colleges quite literally give research to commercial publishers. In exchange, publishers charge libraries exorbitant prices to process it in published journal form. Commercial journals rely on faculty and other researchers for virtually all of the substantive content and editorial work related to production of their titles. Faculty submit articles, they sign over to the publishers their rights under copyright, they participate in the system of peer review, and they edit the journals' content. Universities and colleges cooperate in this process through their support of faculty research and their tenure and promotion expectations. While no one would object to this arrangement if a given publisher charged reasonable prices and made reasonable profits, many publishers have taken advantage of the position of libraries in the current system”* (English, 2000).

This ‘crisis’ has precipitated the emergence of a number of initiatives and bodies set to challenge the status quo and establish new forms of scholarly communication and publishing, responses which some have termed the ‘scholars rebellion’ (Kutz, 2002). The obvious example is SPARC, the Scholarly Publishing and Academic Resources Coalition *“an alliance of universities, research libraries, and organizations built as a constructive response to market dysfunctions in the scholarly communication system”*. This aims to stimulate competition amongst STM publishers, thus making journals more accessible but not free (Kutz, 2002). On this side of the Atlantic SPARC Europe is seeking to achieve similar results and is gaining a steady following. Other initiatives have included BioOne, for example, of which SPARC is a partner, *“an electronic aggregation of bioscience journals from dozens of small societies”* (Johnson, 2000). The journals of these small societies are now available electronically whilst arguably without such assistance they may not have been able to make that investment. BioOne is searchable, archives its journals and offers consortia pricing.

In 2001 SPARC published *Declaring Independence: A Guide to Creating Community-Controlled Science Journals* that assists editors and members in evaluating whether their journal serves its community and alternative publishing options (Buckholtz, 2001). More recently this was complemented by *Gaining Independence: A Manual for Planning the Launch of a Nonprofit Electronic Publishing Venture*. SPARC has been concerned with STM publishing but aims to consider the field of humanities in 2002.

The response to the ‘crisis’ is ongoing and a recent development came with the founding of the International Scholarly Communications Alliance (ISCA) in 2002 consisting of research libraries world wide aiming to *“establish equitable access to scholarly and research publications”* (CURL, 2002).

## Library Managers and the Serial Crisis

After struggling with escalating serials prices over many years by introducing rounds of cancellation exercises and 'adjusting' budgets, often to the detriment of monograph purchases, much of the library community accepted that the struggle to maintain adequate conventional collections was almost a forlorn one. The idea of following an access philosophy of managing, with a reliance on inter-library lending and document delivery to supplement a diminished core collection of journals emerged. This contrasted with the holdings philosophy that had prevailed, at least in the larger research libraries. The literature reduced the dilemma to one of 'just in time' versus 'just in case'. The addition of networked access to articles could introduce a further option – 'just when you like' (Davies, 1998).

A relatively recent attempt to optimise access at reasonable cost has involved library managers forming into consortia for the purpose of negotiating prices and access arrangements with publishers. Both stand to benefit from economies of scale and market stability. In the UK, the NESLI (National Electronic Site Licence Initiative) was developed to facilitate this approach. The NESLI Managing Agent functions to negotiate on a national basis and to co-ordinate delivery of e-journals to higher education institutions in the UK. (Woodward, 1998). A study by LISU to assess proposed publishers' deals on behalf of NESLI noted "*The nature and detail of some of the deals examined are very complex, perhaps unnecessarily so!*" Some publishers were offering electronic access only, some allowed libraries to choose individual print titles whilst others would not permit alterations to print subscriptions (White & Davies, 2001). Frazier, Director of Libraries at the University of Wisconsin urges caution regarding the purchase of bundled journals (2001) arguing that although such deals offers short-term benefits such as greater information access for library users, in the long term these kind of contracts weaken librarian's ability to influence scholarly communication in the future. An interim evaluation of the NESLI operation conducted by the Human Sciences and Advanced Technology Research Institute at Loughborough University concluded that: "*The over-riding view was that NESLI has achieved much in a rapidly-changing and complex environment.*" Moreover, it discovered widespread support for the NESLI approach, although difficulties had been identified in aspects of its detailed operation (Richardson et al, 2000).

## Print

The demise of the printed journal was viewed as imminent in recent years with the emergence of alternate publishing means, mainly that of publishing electronically, however recent research suggests that this is some way off. Odlyzoko (2002) notes that the decline in print journal subscriptions is a gradual one arguing that if attrition in subscriptions is at 3-5% per year, it will take "*between 14 and 24 years to lose half the circulation*". Research into UK-based scholarly publishers found that the majority of respondents did not agree that the sales of paper-based products were damaged by electronic products, which as the authors point out "*contradicts the fears that electronic products 'cannibalise' printed products and their revenue streams*" (Oppenheim, Greenhalgh & Rowland, 2000). However that there is some life in the print serial is not to deny the growth of electronic publishing in a variety of forms; the electronic journal which accompanies its print relation, electronic-only journals, e-prints, preprints and self publishing.

## Digitisation of old materials

A development related to both print and electronic publishing has been that of digitising old serials as an alternative to storing back copies of print journals and facilitating better access, for example, JSTOR (Journal STORage) a project begun in the US that was launched in the UK in 1998 on behalf of JISC. Murphy (2000) notes that usage of the service in the UK has “*increased dramatically*” and recent figures suggest the service overall will continue to thrive; between January and September 2001 over six million articles were viewed with over a thousand institutions participating. Interestingly the organisers of JSTOR note that it is more cost efficient to subscribe to their service than for libraries to hold print copies but they have found that libraries are less concerned with the archival aspect than the access JSTOR provides for students and scholars:

*“ the primary reason for JSTOR participation seems to be not the potential savings associated with central archiving but rather the benefits associated with providing better and more convenient access to the literature for faculty and students ”* (Guthrie, 2001).

## Electronic Publishing

An electronic journal can be defined as “*strictly a journal in which all aspects of preparation, refereeing, assembly and distribution are carried out electronically*” (Prytherch, 2000). However the term tends to include print-first journals - those in which the printed version is accompanied by its electronic copy.

## Volume of electronic publishing

*“The number and availability of scholarly (scientific) electronic journals is increasing dramatically and will continue to do so in the future”* (Tenopir & King, 2000). In the US and Europe, Tokizane (2000) notes that “*Electronic journals are becoming the core of all science and technology information*”, with more than 4,000 electronic journals distributed in the US and Europe. There is a perception that electronic publishing is on the rise in the UK and Watkinson (1999) notes in *Trends in Journal Subscriptions 1998* that many publishers were launching electronic only journals possibly because they see print in decline; “*The word ‘terminal’ was used*”. Tenopir & King (2000) argue that it is hard to know exactly how many electronic journals there are but suggest that in terms of scientific material print still dominates.

## Scholarly Electronic Journals

Electronic journals have often been touted as the solution to the serials crisis and assumed to be low cost; Sosteric, Shi & Wenker (2001) believe e-publication “*offers a way to bring a new equilibrium to the scholarly publication system*”. The reality has tended to be a little more complex. As Sosteric, Shi & Wenker (2001) report traditional publishers are ‘paper-first’ and have tended to produce electronic versions in addition to the print versions which means “*the potential cost savings and efficiencies may not be realized because the newer technologies tend to be tacked on to existing infrastructure or applied in inappropriate ways*”(see also Tenopir & King, 2000). This observation is reiterated by Tomlins (2001) “*as we should all know by now, the electronic edition is no cheap add-on*”. Publishers argue that they require finance to fund electronic journals; 76% of the 187 scholarly journal publishers

who responded to a 1999 study by Greenhalgh were producing electronic journals without profit (Rowland, 1999).

There is still debate as to whether electronic journals have the same impact as print journals. For example, a study by Harter from 1996 found that “*electronic serials have had less impact in a variety of fields than similar print counterparts*” (Tinerella, 1999). This finding was reiterated by Rowland (1999), “*The fact remains that users, like authors, have some doubts about the intellectual quality of material published in electronic journals*”. Tinerella (1999) however felt that this situation was changing:

*“Without question, the quality of digital serials has increased significantly since they first appeared. Many electronic journals use the same review processes, employ chief editors and review boards with specialized subject knowledge, and are affiliated with professional associations”* (Tinerella, 1999).

More recently Peek (2001) argues it is to the electronic journal that most authors turn first.

Free scholarly electronic journals have also been regarded as an alternative to the costs of commercial publication. Research into their prevalence in the UK could not be located in terms of identifying any trend. Concerns about such publications seem to revolve around their longevity and quality as illustrated in a study by Crawford (2002). He found that of 86 titles available in 1995, 49 were still publishing six years later; a finding he considered surprising since it is difficult to maintain a refereed journal without revenue and because publication in such form is not related to tenure. Notably most of the free scholarly electronic journals he located were humanities and social sciences publications and were university or association affiliated which suggests that their survival is dependent on such cooperation (Crawford, 2002).

Edward J Valauskas (2000) offers an example of successful Internet publishing with the journal *First Monday* noting that Internet journals have become more like print but with the advantage of “*timeliness and global reach*” (editorial review is “*measured in days and weeks, rather than months or years*”). *First Monday* has an editorial collective of three main editors and an editorial board providing some reassurance of quality whilst offering a search facility and ease of use and access. Furthermore, contributors to *First Monday* retain copyright of their article and many have later reappeared in other journals and books.

## **Humanities Serials**

It is argued that it is the journals in humanities that suffer at the hands of the price increases in STM journals and “*are among the first cut when libraries need to make room for cost increases on STM journals*” (Buckholtz, 2000). The adoption of free scholarly electronic publication is often suggested as the way forward for humanities and social science scholars. Rowland (2002), for example, argues that since humanities and social sciences have less research funding than science, they might find more appeal in free scholarly communication, whilst academics in biomedicine are less likely to have objections to commercial publishers because money is not as much of an issue (*see also* Crawford, 2002).

## Preprints, E-Prints and Post prints

Tomaiuolo & Packer (2000) note that preprint generally referred to a manuscript that had gone through peer review and awaited publication in a traditional journal; if it was accessible over the WWW it was an e-print. However that definition is a now a wider one:

*“Preprints also cover papers that authors have submitted for journal publication, but for which no publication decision has been reached, or even papers electronically posted for peer consideration and comment before submission for publication. In fact, preprints can also be documents that have not been submitted to any journal”*  
(Tomaiuolo & Packer, 2000).

The usage of e-print has been a popular alternative to mainstream scholarly publishing for the last decade. The development of the Los Alamos National Laboratory preprint archive in 1991 has lead some to argue it is the way forward. *“Will they replace, as some of their more vociferous proponents claim, the entire system of scholarly publishers?”* (Boyce, 2000).

Advocates of preprints argue that they disseminate research results immediately (Boyce, 2000; Carim, 2002), whilst critics point out that this might create situations where misleading or wrong information is being published because *“being first now counts more than being thorough”* (Boyce, 2000; *see also* Tomaiuolo & Packer, 2000; Carim, 2002). In terms of status, preprints let the community know where expertise resides (Boyce, 2000) but they do not assist in issues such as tenure and promotion. A further problem with preprints might be plagiarism (Tomaiuolo & Packer, 2000). It has been suggested that there might be problems because metadata is not in a standard format or the use of keywords is inconsistent, however recent papers suggest that interoperability is an issue receiving attention, for example, the Open Archives Initiative which:

*“develops and promotes interoperability standards that aim to facilitate the efficient dissemination of content. The Open Archives Initiative has its roots in an effort to enhance access to e-print archives as a means of increasing the availability of scholarly communication”* (Open Archives Initiative, 2002).

### Use

According to Tomaiuolo and Packer (2000), preprint usage is high. They refer to a report by Youngen looking at citations to preprints which concludes, *“The growth rate in citations reflects not only the authors’ acceptance of the e-print, but the publishers and editors (acceptance) of the manuscripts as well”*. Furthermore, the inclusion of preprints by some indexing and abstracting services serves to further reinforce their popularity (Tomaiuolo & Packer, 2000).

A simple search on the search engine Google™ retrieves hundreds of ‘hits’ for preprints, and in the UK it would appear that many academic library catalogues offer hypertext links to such services. This is an indication, albeit not a particularly precise one, that preprints are rapidly becoming an acceptable form of scholarly publishing, especially within the sciences.

## The future for e-prints

There is some divergence on this issue. Whilst Tomaiuolo & Packer (2000) suggest, "*The electronic preprint may come to replace the paper-based draft of most research articles, just as most print journals are now at least available electronically*", Boyce (2002) is sceptical that preprints are the way forward and questions whether scholarly publishing is that simple, "*Good publishing is harder work than most people realize*". In the UK, Harnad has personified e-print activity with the cognitive science archives at Southampton University. Harnad (1999) suggests universities should establish their own archiving initiatives arguing that this is a small investment when compared to annual serials costs. Amidst attempts and consideration made at the University of Nottingham in setting up an e-print archive, Pinfield (2001) argues that e-print archives do not have to include preprints if there are doubts as to their credibility. However, he notes that in the case of physics, preprints are very much the order of the day and would be appropriate (*see also* Carim, 2002). He goes on to suggest, "*An e-print archive should include material that is most useful for its users*". As a threat to commercial publishers opinion is again divided, for whilst O'Connor (2000) argues "*The use of preprint servers offers a threat to electronic journal publishers*", Rowland (1999) notes that publishers do not feel threatened, and Carim (2002) suggests that publishers will have to wait to see how successful e-print servers become.

## Use: Print and Electronic

It is difficult to compare the use of printed journals with that of electronic journals and although neither measurement is an exact science the electronic journal does at least provide a more reliable form of measuring use as the number of times an article is consulted can be counted (Schlike, 2001), although this data may not be accessible to libraries if databases are commercially owned (Hughes & Buchanan, 2001). The basis on which measurement of use are made tends to vary from supplier to supplier and this causes problems of comparability if assessments of the use of competing titles are needed. Luther's *White Paper* (2000) offers a comprehensive review of the issues.

Rowland (1999) notes that "*the number of people - academic staff and students - regularly using electronic journals in UK universities seemed disappointingly small*", based on analysis of a number of studies investigating electronic journal use in the UK, in contrast to the "*large number of visits that some electronic journal websites record*". In relation to print, a recent study at the University of Technology, Sydney, Australia, based on re-shelving counts and observation, found that in-house print journals were used one third as frequently as monographs (O'Connor, 2000). Tenopir & King (2000) found from readership surveys that scientists are reading approximately 10% of material from electronic journals.

The advantages of electronic journals include the availability of search facilities, the availability of hypertext links to other material and the use of multimedia for example, which constitute added values print does not have (Frankel et al, 2000). In this electronic environment Berin (2002) argues that it is the article as opposed to the journal which is the more important, based on the findings of the Pricing Electronic Access to Knowledge (PEAK) project in the US which found "*customers appreciate the flexibility of picking and choosing articles*". Furthermore, this environment has made instantaneous document delivery a reality through library subscriptions to online journals and databases. Odlyzko (2002) notes that some libraries have purposefully replaced journal subscriptions with document delivery

or inter-library loans which he suggests hinders use, as having to wait deters people: *“usage of document delivery services is lower than that of journals available right on the spot”*. Instantaneous delivery, however, may be a positive move for the user in search of ‘instant information gratification’ (Bennett, 2001), such that Lynch suggests publications not available in full-text immediately *“will become kind of second-rate in a sense, not because their quality is low, but just because people will prefer the accessibility of things they can get right away”* (in Odlyzko, 2002). From the library’s perspective online access to separate articles may be cheaper than current inter library loan and document delivery practices (Tenopir & King, 2000).

Ease of access may lead to increased use; Odlyzko (2002: 11) notes, *“experience shows that when easy electronic access is provided to large bodies of material not normally available in the library, there is demand for it”*. However, this may not necessarily be read from the screen, as one study found that students felt reading from a screen was not very comfortable and preferred to print articles for reading (Rowland, 1999. *See also* Tenopir & King, 2000).

Facilitating easier access to other electronic material is the mission of CrossRef run by the Publishers International Linking Association Inc., a non-profit enterprise (Pentz, 2001). CrossRef enables publishers to provide a full system of reference links in an article by looking up Digital Object Identifiers (DOIs) to create full-text links to journal articles (Pentz, 2001) or as Kutz (2002) notes it *“functions as a sort of digital switchboard”*. DOIs are *“tagged to article metadata supplied by the participating publishers”* and have been designed to *“ensure interoperability among different user communities”* (Kutz, 2002). A DOI is always associated with a specific article and should help make linking easier as this practice grows; a benefit passed on to the user.

## **What do academics want from scholarly publishing?**

### **Peer review**

*“Authors’ main concern... is with quality control, through peer review”*  
(Rowland, 1999).

A study of academic authors in the UK by McKnight and Price (1999) noted, in relation to this issue that *“There seems to be some confusion over the nature and extent of peer review in the electronic domain”*. Although the Follett Report in the UK (1993) had recommended research councils give refereed electronic journals the same weight as their paper counterparts some respondents in the McKnight and Price study (1999) had not published in electronic journals because of their perceived low status. Respondents in their study were positive about peer review; *“the majority (94%) indicating that peer review was important for paper-based journals in their field”* whilst a much smaller proportion thought peer review was important for electronic journals (46%) which might suggest that academics are content to see non peer reviewed electronic journals. However, the authors point out that 42% of respondents did not answer this question *“possibly because of the lack of awareness of electronic journals in their field”* (McKnight and Price, 1999).

*“Peer review is the quality control mechanism which acts as a filter on the number of articles published”* (McKnight & Price, 1999). From the view of editors and referees it might be

argued “*expense and delay are on the rise*” (Tomlins, 2001) since peer review is unpaid and yet scholars face more demands on their time with the effect that delays affect production and ultimately journal costs. Time delay associated with traditional journals has also been cited as one reason academics are pursuing alternate means of publication. Carim (2002) suggests that the process of peer review itself requires review, noting that not only is it “*time-consuming*” but anonymity may not be the best option; for example, if a reviewer is in competition with the author of a paper and points to the example of BioMed Central where reviewers are named.

Rowland (1999) notes the study by Brown and Swan (1999) which considered authors from many countries who had published in UK-based journals. Most (80%) of the respondents were ‘Science’ and listed ‘communication with my peers’ as the most important reason for publishing (39%) with career advancement, second (26%). A factor considered important in achieving these aims were firstly peer review (59% selected ‘very important’) with publication in high impact-factor journals second (57%), retrievability was third (47%) and speed of publication, fourth (43%). Choice of journal was influenced by its reputation (75% chose ‘very important’) and other factors such as international reach (57%) and inclusion in abstracting and indexing services (53%). Interestingly only 4% thought price was ‘very important’. Apfel (2001), writing of the members of the Acoustical Society of America (ASA), reiterates these sentiments when considering what members want in a journal: first, a recognition of the quality of content; second, wide dissemination, ready accessibility and stable archiving; third, rapid dissemination of articles; and fourth, that the material is searchable and linkable to relevant articles in the literature.

A more recent editorial by Rowland (2002) argues that the title of a journal is still important when authors make judgements about the journals they wish to submit material to; “*publishers’ or aggregators’ names cannot compete as ‘brands’ with the titles of well-established journals with eminent editorial boards and tough refereeing standards*” (see also Hyams, 2002).

## **Impact factors**

The impact factor<sup>1</sup> of a journal would still seem to have some influence on an author’s decision concerning to which journal to submit their work (Rowland, 1999). The impact factor has implications for publishers, librarians and researchers. Publishers regard it as a tool for marketing and competition whilst libraries utilise it for collection development purposes and authors use it to ensure they are submitting to the best in their field (O’Neill, 2000). That impact factors are based on such criteria as peer review and timeliness further reinforces their importance to scholars.

Carim (2002) notes the criticisms of the current impact factor situation suggesting that indicators such as other scholar’s responses to articles might go some way in providing a better indication of an article’s value. The introduction by BioMed Central of the F1000 factor is viewed by Carim (2002) as a suitable example of such an approach and is based on the ‘must read’ level of a paper decided by BioMed’s research alert services ‘Faculty of 1000’.

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<sup>1</sup> Devised by Dr Eugene Garfield and Dr Irving H Sher as a way of ascertaining a journal’s influence on a particular discipline (O’Neill, 2000).

The use of bibliometric data, such as impact factors and other measures has a strong following but is not without its critics, however. Amin and Mabe (2000) have offered a useful description and a considered criticism of some aspects.

### **Research Assessment Exercise (RAE)**

The issue of scholarly communication is linked to that of the Research Assessment Exercise (RAE) in the UK. In particular, it would seem that it has contributed to academics favouring publishing journal articles as opposed to monographs (Walford, 1999). Academics are required to submit four publications within an allotted time for consideration and may have to rush to get their material published in time, since for the purposes of the RAE articles must be published as opposed to being merely accepted. It is here where electronic journals might assist authors as articles can be submitted closer to the RAE deadline (McKnight & Price, 1999). The effects of the RAE on publishing would seem to be “*an increase in the amount of substandard material being submitted to their journal in the run up to an RAE deadline*” from new authors, such as recently employed teaching staff, although editing and peer review are successful in preventing substandard submissions from being published. The increase in article submissions adds to the pressure on editors and referees and yet the RAE does not influence journal sales (Walford, 1999).

### **Copyright**

Recent debate centres on whether authors should retain copyright on their scholarly output. At present authors transfer rights for the duration of the copyright declaration before publication proceeds, once the work has been consigned to a publishing house universities have no recourse to this output because they allowed authors to retain copyright of their work, “*This is despite the fact that their authors conceived the ideas, conducted the research, and gained promotion on the basis of that publishing effort*” (O’Connor, 2000). However, access by academics and students to this copyright material is permitted through the principle of ‘fair use’ for “*legitimate academic purposes*” (Farrington, 2002). The ALPSP Study by Brown & Swan in 1999 found that when asked about copyright most authors did not object to the current copyright arrangements (57%). However, in relation to preferred systems, 40% favoured copyright retained by authors with full publishing rights granted to publishers, whilst 38% preferred the transfer of copyright to publishers with personal redistribution rights retained by the author (in Rowland, 1999). CogPrints, the e-prints archive at Southampton University, UK, is opposed to the transfer of copyright to publishers. A comprehensive study of modern intellectual property issues, as they affect academia, has recently been undertaken by Farrington (Farrington 2002).

### **Archiving**

This issue of archiving electronic scholarly content is a contentious one at present in that it is discussed but little appears to have been resolved. The debate seems to revolve around who is responsible for preservation, maintenance and access for digital content and who will pay - the publishers or the libraries? Gardner’s study (2001) of the impact of electronic journals on library staff at American Research Libraries notes that “*Libraries access rather than own their e-journals, therefore when they have to cancel a subscription if is not clear that they will have continuous access to back issues already paid for*”. Gardner (2001) highlights some initiatives publishers are undertaking in relation to archiving, such as that by Elsevier Science, which has said digital archives of its e-journals will be transferred to another host if

it cannot maintain them whilst university libraries such as Harvard and Yale are collaborating with commercial publishers to develop archives for e-journals.

Anderson (2002) suggests that responsibility for archiving digital content rests with publishers. He argues for the formation of ‘useful archives’, a:

*“networked archive of sufficient depth, breadth, and accessibility as to temporarily supersede and obscure the cross-generational archive (items preserved for future generations) and even eliminate the need for much current inventory (sporadic use)”* (Anderson, 2002: 86).

However, Treloar (1998) found that libraries involved in collaborative projects felt that publishers would be unlikely to take on the responsibility of archiving without an obvious source of finance. The literature implies that there is still no real agreement on the issue of archiving digital content and a code of practice effective from January 2000 only covers off-line electronic publications such as CD-ROMs (Fox, 2002). Fox notes that the long-term costs of digital archiving are *“far from clear”* although the Cedars Project in the UK has been exploring this issue.

Muir & Davies’s review (2002) of recent developments pertaining to legal deposit of digital materials in the UK, notes that current legislation refers to print materials only. Problems in drafting legislative proposals for legal deposit include the difficulty in agreeing definitions for the digital environment and whether the legal deposit of digital materials is achievable. They conclude, *“At the moment, it seems that as far as the legal deposit of digital materials is concerned, there are many more questions than answers”* (Muir & Davies, 2000).

## **The Future?**

Research into the opinions of UK-based scholarly journal publishers revealed that they saw both paper-based products and the Internet/online as holding the greatest opportunities in the future (Oppenheim, Greenhalgh & Rowland, 2000); over 75% of respondents saw these as a major opportunity by the end of 2000. As Valauskas writes:

*“Many would argue that traditional journals will not disappear, that the future will be populated with a rich mix of traditional printed journals, existing side by side with Internet-only scholarship and other media to be invented”* (Valauskas, 2000: 109).

A study by Brown and Swan (in Rowland, 1999) thought that electronic publishing with peer review will grow (51%) whilst 44% considered conventional publishing will grow. A smaller percentage felt that electronic publishing without peer review and posting to electronic databases would increase, 27% and 26% respectively (Rowland, 1999). The importance placed by authors on peer review, whilst appreciating the opportunities offered to readers and other authors by electronic publication, would suggest that it is this situation which requires attention and action:

*“Reform is required to the institutional incentives facing authors, in order to (re) align the goals of publication and dissemination, and the interests of authors and readers”* (Houghton, 2001: 175).

It might be argued that the future of scholarly publishing is very much dependent on which discipline one refers to, Rowland (2002) postulates that *“perhaps the future will be diverse with different disciplines going in different directions”* but with the electronic journal featuring strongly - both science-based and humanities-based authors in the McKnight & Price study (1999) perceived electronic journals as here to stay (77.3% and 80.8% respectively).

Suggestions for future scholarly publishing models frequently include libraries working in conjunction with universities. One popular example of this is EPIC (Electronic Publishing Initiative at Columbia) that involves academics, university press and library staff in electronic scholarly publishing (Wittenberg, 2001). EPIC projects include *Columbia Earthscape*, an online publication for research and teaching resources. Similarly, Treloar (1998) details a number of case studies of collaborations or partnerships involving libraries publishing electronically, for example, the Internet Library of Early Journals (ILEJ) in the UK, a joint project between Birmingham, Leeds, Manchester and Oxford universities, which is digitising older serials. Tinerella (1999), however, cautions against the use of the library as the future of scholarly communication arguing:

*“For the vast majority of libraries, trying to replace commercial businesses by publishing their own research electronically is an impractical solution that will consume too many of their already thin staff and economic resources”* (Tinerella, 1999).

Another possible option is that of academics as publishers. Authors in the McKnight & Price study (1999) were appreciative of the advantages multimedia offered them as authors but were concerned that they did not possess the requisite skills to produce such content; in fact less than one-fifth thought they had the skills to produce such content. Alternatively academics could pay to have their material published in the knowledge that it will be available free to the user such as the BioMed Central model (Hyams, 2002). In this instance, researchers are asked to pay \$500 per article published for a service that provides rapid peer-reviewed publication, free access and archived material whilst authors retain copyright. However in relation to the UK, Hyams wonders who would pay for a similar kind of service. Other models might include establishing a facilitator of content such as the J-STAGE (Japan Science and Technology Information Aggregator, Electronic) project, the aim of which is to help publishers of academic societies create and publish electronic journals with a range of tools and then to distribute content on the WWW (Tokizane, 2000).

## **Monographs**

### **Current trends**

The monograph offers the scholar a vehicle through which to disseminate research in a fuller, more developed format. Such specialist material has always found a place, especially, but exclusively, in the arts and humanities but the demand for them is however limited and this has an important influence on publishing economics. It may be regarded as a subset of academic book publishing which will also include textbooks and related learning material.

As with scholarly publishing generally, the literature is often contradictory regarding trends. Recent discussion has painted rather a poor image of the printed book as out-of-date and in

decline (Darnton, 1999, Lipscombe, 1999, Poe, 2001) as the age of the e-book dawns. The reality is that conventional book publishing output continues to grow and that includes academic publishing (*see page 25*).

It has been argued that as the prices of serials have increased libraries have reduced the numbers of monographs acquired. In the US, Darnton (1999) notes that large research libraries have reduced their monograph spending over the last ten years by 23%. He goes on:

*“Faced with the decline in orders from libraries, university presses have virtually ceased publishing in the fields for which there is the least demand. And scholars in those fields no longer have an adequate outlet for their research”* (Darnton, 1999).

## **Electronic Monographs**

The growing significance of electronic journals in the field of scholarly communication leads quite naturally to the consideration of the position of the electronic book, which may be defined as,, “... a text analogous to a book, that is in digital form to be displayed on a computer screen” (Feather and Sturges, 1997), electronic books may be disseminated through various means, the most significant being CD-ROM (Compact Disc-Read Only Memory), the Internet and dedicated, portable reading devices.

The term ‘e-book’ is often encountered in consideration of electronic books, and is a slightly ambiguous term used to describe a text available in electronic form. The term is also increasingly being used more specifically to describe a text which requires the use of e-book software and/or hardware to be read (Ormes, 2001).

Despite the increasing significance of electronic journals in Higher Education libraries, electronic books have been slower to make an impact in the area. Reference titles presented on CD-ROM have been very successful and useful in academic libraries (for example, *British National Bibliography*, *Dictionary of National Biography*, *Index to Theses* and the *Oxford English Dictionary*), and non-copyright texts have for many years been available over the Internet through Project Gutenberg (2002) and other similar schemes.

However, electronic textbooks and the technology to deliver them to students have only become available relatively recently (Wilson, 2001), and can be seen at work in the main online providers: netLibrary (2002), Questia (2002) and ebrary (2002). There are obvious technical and commercial advantages related to producing and using books electronically, for example, the storage of many and multiple copies of a title in a small space, the ability to make use of multimedia capabilities, and so on (Wilson, 2001). General views within libraries seem to be that electronic books are the way forward, but a lack of direction up to now has hindered progress towards their wholesale acceptance (Brewer, 2002). There are also difficulties to be faced from the point of view of users - it has been shown that people read at around a 25% slower rate from computer screens than from print on paper, and many (if not most) prefer to print and read digitised material rather than scroll through text on a screen (Wilson, 2001). Such issues are being addressed by Project EBONI (Electronic Books ON-Screen Interface), which is aiming to investigate how electronic books can be delivered to the end-user in a form which maximises their usability, and intends to produce a set of best practice guidelines for the publishing of electronic textbooks (Wilson, 2001).

In the UK, the work of Lonsdale & Armstrong on the JISC Electronic Libraries Programme (eLib) is useful in relation to scholarly electronic monographs. Their study also considers the position of scholarly monographs in general. Lonsdale & Armstrong (2000) found that North American university presses are active in publishing electronic monographs with partnerships often fundamental in such developments, for example, the Committee on Institutional Cooperation (CIC), an academic consortium of the Big Ten universities and the University of Chicago. In the UK, however, just four university presses were hoping to produce electronic monographs on an individual basis. Of the 80 UK publishers identified for the purposes of their study, 23 published electronic monographs, whilst 57 did not. An exploration of reasons for not wanting to publish electronically revealed a perception on the part of publishers that this medium was inappropriate for scholarly publishing - it was untraditional and there was a lack of demand in some fields such as the Humanities. In terms of small scale publishing initiatives, such as academics publishing monographs themselves or with their institution's library, Lonsdale & Armstrong (1999) found little evidence of this in the UK, and of the 76 returns they received, 29 libraries were uncertain as to activity in this regard in their institution.

At the time of the study CD-ROM was the dominant form of electronic monograph publishing (60.87% CD-ROMs and 8.7% complete web texts) but the authors felt that this was something which would change in the future especially since in the US 42.1% of electronic monographs were published as web texts (Lonsdale & Armstrong, 1999).

A more recent study of the scholarly monograph by Watkinson (2001) considers the future of the monograph and describes demonstrator projects for electronic monograph publishing. Watkinson reveals in the Report's Executive Summary that:

*"...there is a crisis in supply essentially because there is a crisis in demand."* He goes on further *"It is clear that most publishers are considering electronic monographs very seriously as part of a general move in attempting to realise the potential of the medium"* and asserts that *"However it is also clear that there are few thought-through policies in existence as yet and very little experience to go on."* He concludes that *"... there is no electronic solution to the crisis ..."* (Watkinson 2001).

## **Electronic monographs and authors**

In keeping with the discussion of scholars and the production of electronic journals, it is argued that electronic monographs also place demands on authors (Armstrong and Lonsdale, 2000). They note that *"the advent of electronic publishing pushes down Web authoring skills on academics who may not have the time or the inclination to learn them"* (2000: 25). This, they argue, might affect output.

Self publishing of these electronically is one suggestion from Darnton (1999) in response to university presses' inability to publish such studies as monographs, although he recognises the limitations of this approach:

*"Certainly, we can dump unlimited numbers of dissertations onto the Web. But as a rule, this kind of publication provides mainly information, not fully developed scholarship, at least not in most of the humanities and social sciences"* (Darnton, 1999).

## Future

If academic publishing of monographs is in decline then self-publishing is an option for scholars. Poe (2001) details his efforts in getting his latest scholarly monograph (Russian History) published observing, *“The printed monograph is dying”* after being routinely rejected and going on to publish his book himself with the book available as Print on Demand. Based on his experience Poe goes on to suggest:

*“The old model - big university press, big print run, big publicity campaign, big losses – is deader than Elvis. It just isn’t working for anyone. A new model is presently emerging. It will be hybrid in character, combining the best of the new electronic and print media. Monographs are already born digital and they will soon be delivered digitally to the particular audiences that need them. The university presses may do this, or it may be done by scholarly societies, or even by individual scholars”* (Poe, 2001).

The electronic option may be the future for the Humanities and Social Sciences. A US study of the use of ‘Questia’, a commercial online searchable collection of 35,000 electronic scholarly monographs in Humanities and Social Sciences, found that users (mainly undergraduates) both searched for and read books online:

*“Furthermore, the number of page views within books is higher and more smoothly distributed than was expected, indicating that perhaps readers are willing to read or browse for a longer period of time within each text than might be expected”* (Hughes & Buchanan, 2001).

## Conclusion

A review of the recent literature considering scholarly communication reveals a divergence of opinions ranging from those who reject the traditional scholarly publishing model whilst hailing alternative models, amidst those who reflect that change in this arena will be slower than anticipated with innovations in place alongside traditional means of dissemination.

Peer review, as a stamp of quality remains highly respected by academics and indicates that the future of scholarly publishing must engage with this requirement<sup>2</sup> from the ‘academic as author’ perspective. For the academic as reader, the literature suggests usage of electronic journals and articles will expand; users want instantaneous access and delivery, *“They want them quickly, and free of charge or at low cost”* (Rowland, 2002).

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<sup>2</sup> Although it is acknowledged that not all scholars agree on this point (see Odlyzko, 2002).

## Analysis of Published Statistical Data

There is a range of data available monitoring both the provision and use of scholarly information. Data on provision are complicated by the desire for commercial confidentiality on the part of many publishers; however, data on the total number of journal titles available and their average prices, and figures on the average prices of academic books are published. There is much interest in electronic dissemination, both via e-journals and databases; however reliable and comparable statistics on electronic resources are rare. Many of the figures presented here therefore combine print and electronic resources.

The second section is concerned with the uses made of scholarly information, and is restricted to use by and through libraries in the HE sector in the UK. This is drawn from SCONUL returns, and in some areas a lengthy trend can be established. Acquisition and use of scholarly material by individuals, and via public libraries, special libraries and the British Library is less well documented, and not considered here.

The final section in this chapter compares the available trends of provision and use, and looks at some of the other factors which may be influencing the model, and so have a bearing on any future developments.

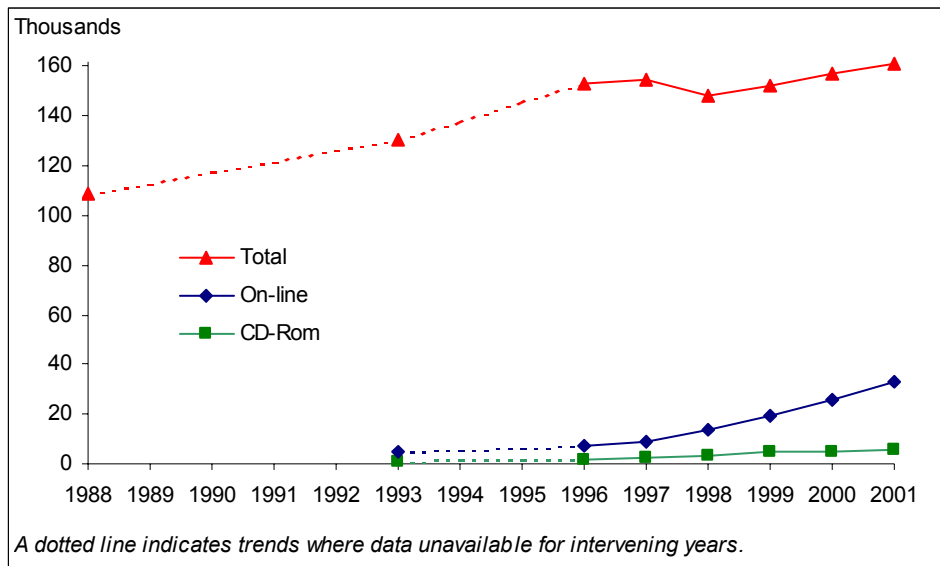
No attempt has been made to formally analyse and model the trends described and no predictions into the future are suggested. A wide range of sources has been consulted, and details are given in the bibliography. There is a mix of UK and international data, and definitions are not always directly comparable between the various sources.

### Trends in scholarly publishing output

#### Serials

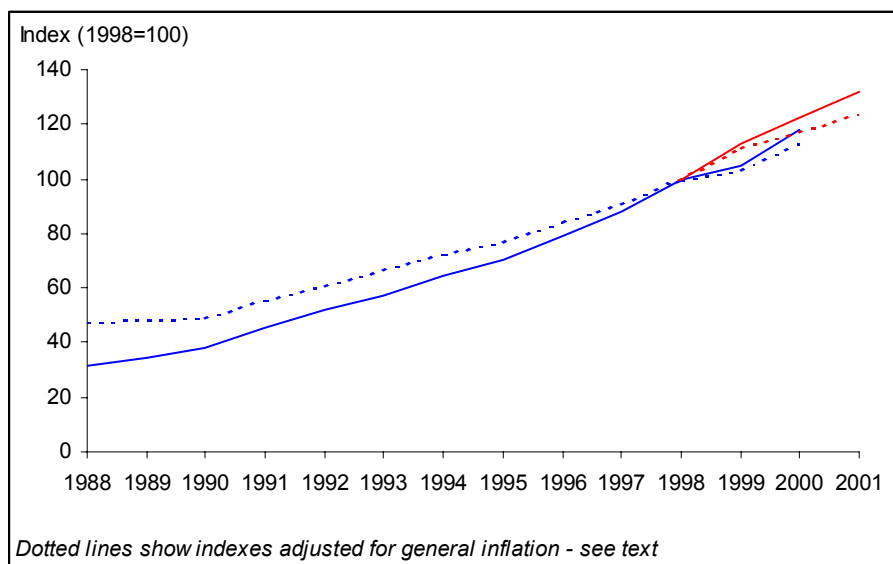
Fig 1 shows the increase in the number of serial titles published since 1988, taken from *Ulrich's International Periodicals Directory*. Titles included in the published figures but known to have stopped publication in the previous three years have been excluded from this graph – the number ranges from 3,302 in 2001 to an estimated 12,000 in 1996. The trend is clearly an increasing one. Of particular interest is the increase in on-line journals, from 3,838 in 1993 and 5,517 in 1996 to 27,083 in 2001. The increase in CD-Rom titles has also been significant – 880 in 1993, 1,963 in 1996 and 5,577 in 2001 – but this has not ‘taken off’ to the same extent as online titles.

**Fig 1 Number of serial titles**



As well as increases in the number of titles, the average price of journal subscriptions has also been increasing for some time. Data on periodical prices have been published in the *Library Association Record* for a number of years, courtesy of Blackwells. Following their merger with Swets, figures are no longer calculated on the same basis – Fig 2 therefore shows both series, including a small overlap. In order to give figures which are comparable, only UK periodicals are included in Fig 2, and both series have been indexed to 1998=100. The solid lines in Fig 2 show the indexes at current prices; dotted lines indicate figures which have been adjusted for the general rate of inflation, using to the Retail Price Index. Prices have more than trebled over the period shown, and there is no sign of any slowing of this trend.

**Fig 2 UK periodical price indexes**



*Trends in Journal Subscriptions 1998* is the most recent report available of a formerly annual series of surveys of the output of the learned journal industry in the UK. Key figures of interest include trends in the number of titles shown by subject category, journal launches and

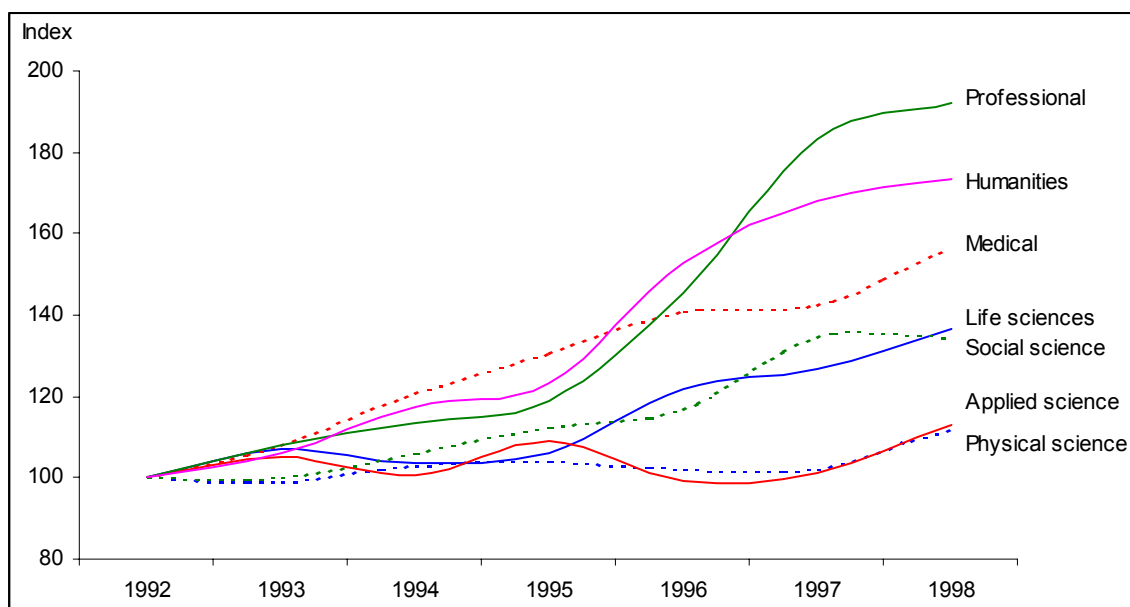
cessations, average price per page and subscription information. There are also extensive questions on electronic journals and their relationship to the print editions, but no analysis has been included here. The nature of the survey is such that it is impossible to establish trends from the statistics presented, and the position is believed to have changed dramatically since 1998.

Fig 3 shows trends in the number of titles published by subject. The reports give data on percentage increases based on a constant sample of publishers in consecutive years, and these figures have been used to construct indices for each subject. There was little change in the numbers of physical and applied science titles before 1998. The greatest increase has been in the number of professional titles, which almost doubled between 1992 and 1998.

The reports give figures for the total number of journals launched and ceased by responding publishers. No attempt is made to gross up these figures for the whole market, and because the respondents differ each year, it has not been possible to give any accurate indication of trends from the published data. The absolute number of titles reported is low, and represents only a small percentage of the titles published by the survey respondents – 3% launched, 1% ceased in 1998, for example.

Table 1 shows the numbers of titles reported as being launched and ceasing publication in each survey report, together with the change from the previous year. In general, more journals are launched than cease publication in any year. Over most of the period covered, the rate of new launches was falling although there are notable exceptions to this pattern. The rate of cessations has increased year on year throughout.

**Fig 3 Trends in number of titles by subject**



**Table 1 New launches and cessations/mergers**

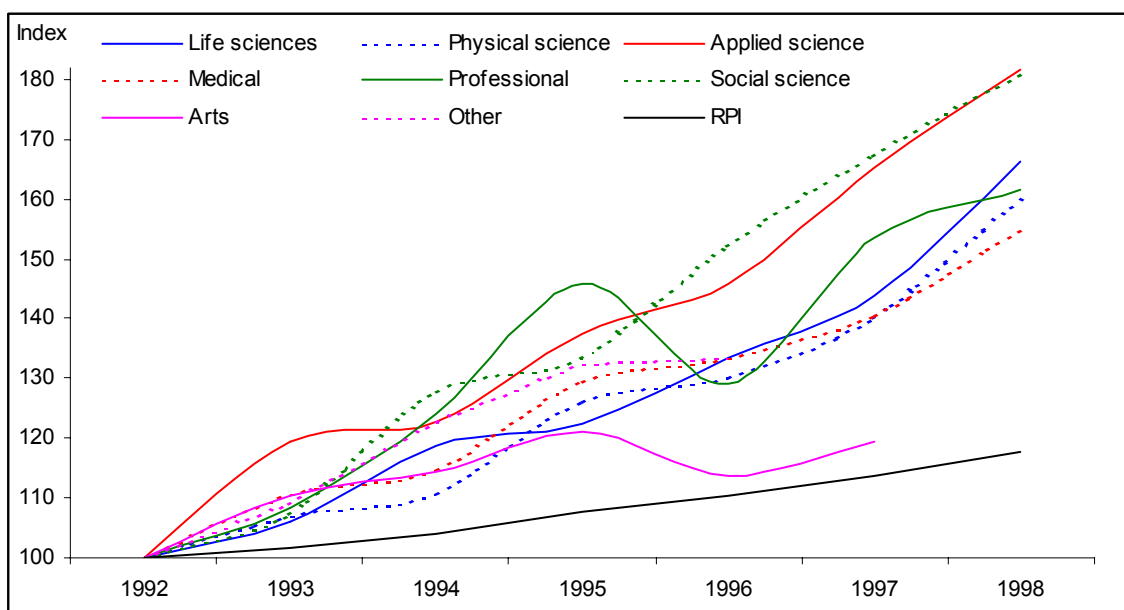
	Number of new titles launched			% change	Number of titles ceased/merged			% change			
1992	59				7						
1993	49	28		-17%	12	8		71%			
1994		21	18	-25%		10	7	25%			
1995			46	47	156%		13	8	86%		
1996				43	34			13	7	63%	
1997					27	15			8	7	14%
1998						35				10	43%

*Numbers are not comparable between surveys*

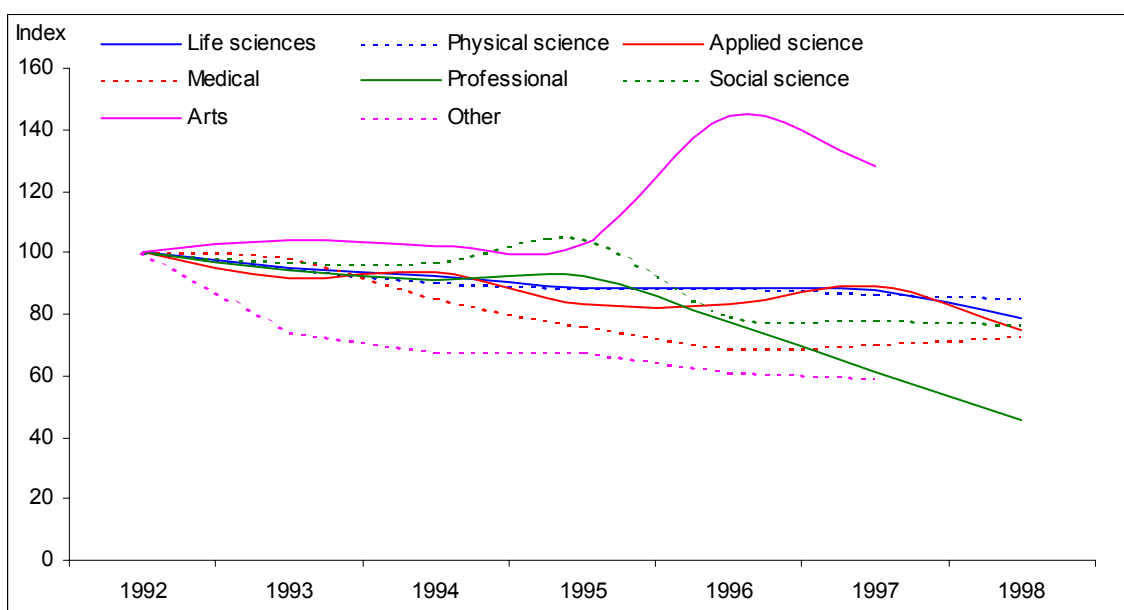
In terms of prices, a key figure not available elsewhere is the average price per editorial page. Again data are given in each report for two consecutive years based on a constant sample of publishers, and have been indexed for presentation in Fig 4. The Retail Price Index has also been shown, for comparison purposes. Figures for Humanities titles (here split into Arts and Other) are not available for the most recent years covered due to a lack of data in these subjects. All subjects have increased their page prices by more than the rate of general inflation. There is considerable variation between subjects, with Applied science and Social science recording the most dramatic increases, and a rather inconsistent pattern for professional titles.

There is extensive analysis of subscriptions in the reports, including in the most recent, data on renewals. The figures presented here are those most consistently available throughout the period – the average number of full rate subscriptions per journal. This excludes subscriptions included with professional society memberships and copies supplied free of charge or at other concessionary rates. As before, figures have been indexed to give a more accurate indication of trends, and no recent data are available for Humanities journals (Fig 5). It is unlikely to be coincidence that the subject with the greatest increase in the number of titles (Professional) also shows the greatest fall in full rate subscriptions per title. Conversely, Applied science and Physical science journals have maintained their level of subscription, with relatively little increase in their number of titles.

**Fig 4 Average price per editorial page**



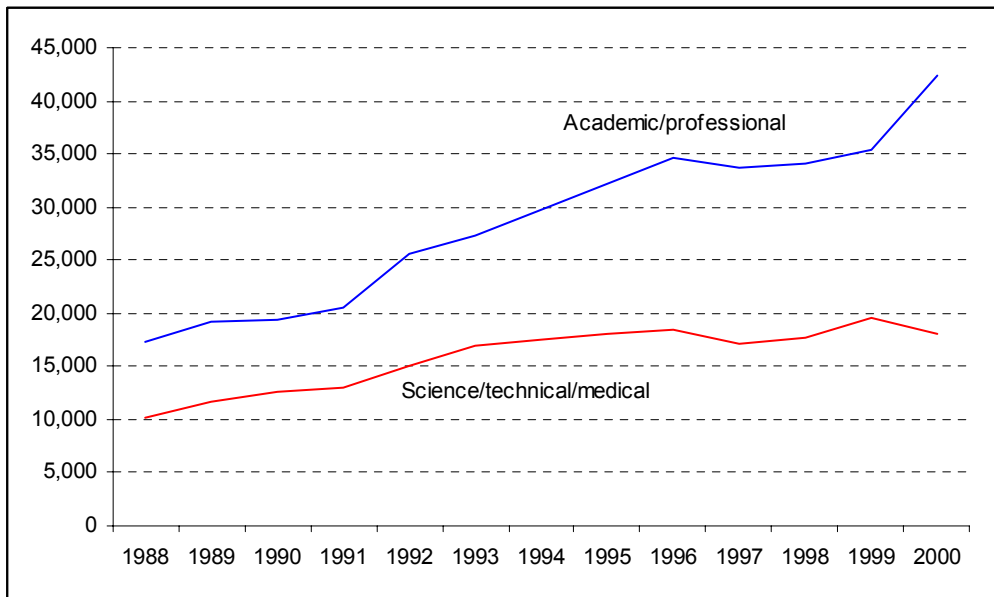
**Fig 5 Average number of full-rate subscriptions per title**



### Monographs

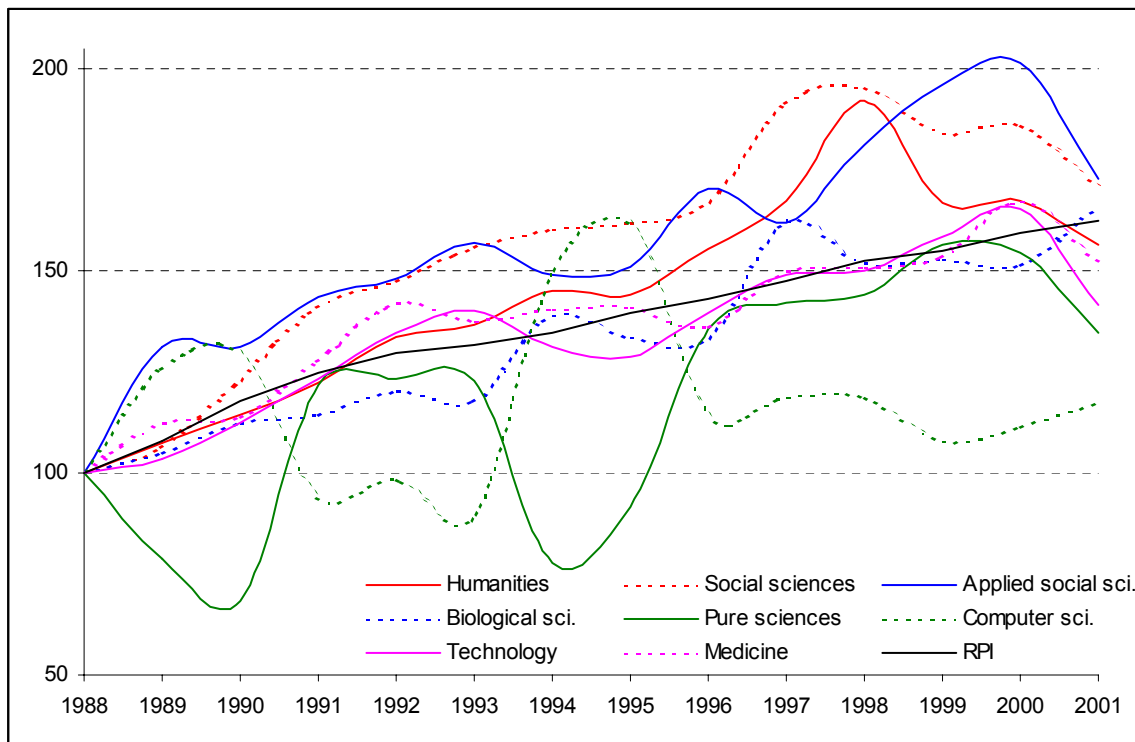
Data are not readily available on the number of scholarly monographs published. Figures produced by Whittaker and published in *The Bookseller* give broad totals for science/technical/medical and academic/professional titles, and these are illustrated in Fig 6. A more detailed subject list of 138 categories covering all titles published in the UK is also available, but this does not distinguish general non-fiction titles from the more specialist scholarly output in any subject. Fig 6 shows that the number of STM monographs published has increased by 43% over the last ten years, and the number of academic/professional titles by 118%. (These figures include reprints and new editions as well as new titles.)

**Fig 6 Number of UK monograph titles**



Data on the average prices of academic books published in the UK and US are published bi-annually by LISU. Fig 7 illustrates the trends in annual average prices for books published in the UK in eight broad subject areas, together with the Retail Price Index for comparison. Whilst there are considerable differences between, and fluctuations within, subjects, in general terms the increases in academic book prices have been broadly in line with more general inflation rates in the UK, and considerably less extreme than increases in periodical prices.

**Fig 7 Index of UK academic book prices**

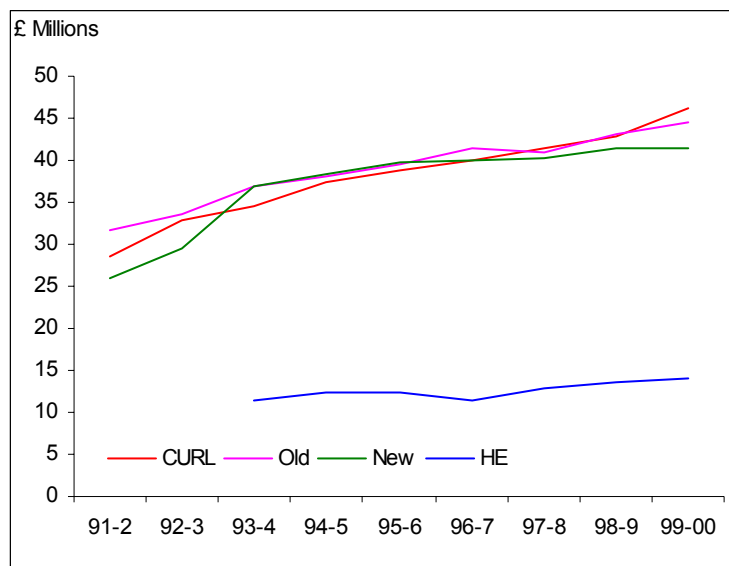


## Trends in HE capacity to acquire/fund scholarly publishing

Data in this section are taken from the LISU database of academic library statistics, based on universities' and colleges' annual returns to SCONUL (the Society of National, College and University Librarians) and HCLRG (the HE Colleges Learning Resources Group). They therefore cover only the activities of libraries, and do not take account of acquisitions by individual departments and academics. The most recent data currently available are for the 1999-2000 academic year.

Fig 8 shows estimated total expenditure by the UK higher education sector on information provision<sup>3</sup>, adjusted to 1999-2000 prices. It shows a clear increase in resources, which is linked to the growth in student numbers over the period. It also shows relatively similar levels of total spending in each of the three key university sectors – members of the Consortium of University Research Libraries (CURL), other pre-1992 universities (Old) and post-1992 universities (New). Spending in HE colleges (HE) is considerably lower, and shows less increase – there has also been less increase in the total number of students in this sector than in universities.

**Fig 8 Total expenditure on information provision**



### Serials

The next three graphs are concerned with library purchases of serials. There has been some inconsistency within SCONUL over the treatment of electronic journals – whether they should be included as serials or electronic resources. The figures shown here include electronic journals where possible. Data are currently not sufficiently reliable or complete to present separate data on print and electronic media.

Fig 9 shows there has been a general increase in the number of serial titles taken by academic libraries, particularly in the new universities as they seek to enhance their research position. The greatest increases have been in the most recent two years, and are a consequence of the

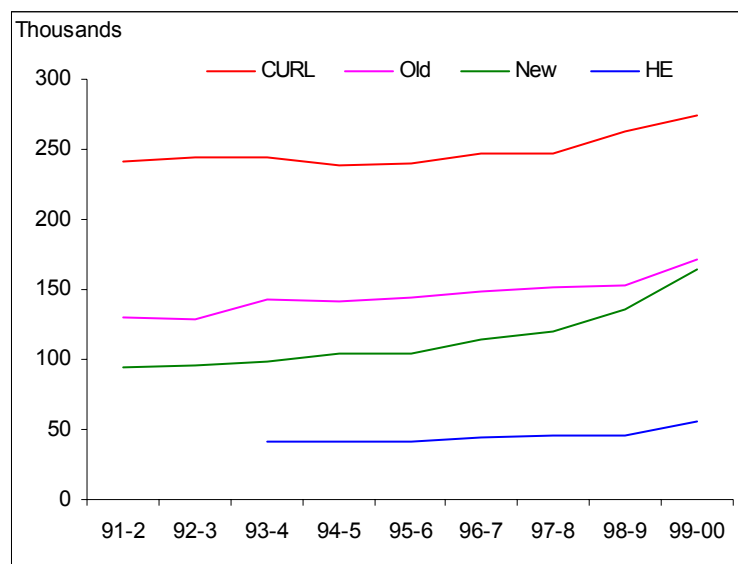
<sup>3</sup> Includes books, periodicals, electronic resources, inter-library lending and binding

increasing number of bundled print/electronic journal deals being offered by publishers under the National Electronic Site Licence Initiative (NESLI – *see page 8*).

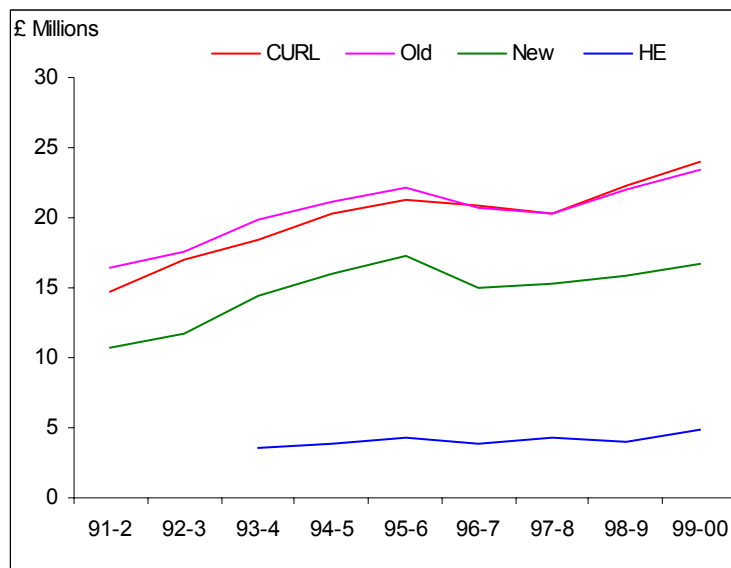
The dip in expenditure shown in Fig 10 is an artefact of the data collection methods, with the transfer of expenditure on electronic journals to electronic rather than serial spending. It does not, however, detract, from the general trend showing increasing expenditure on serials. The figures have been adjusted for inflation using the Retail Price Index.

The final graph (Fig 11) combines these two elements, and examines the average price paid per title, again adjusted for inflation. Total titles include those received at no cost – free titles, and those obtained by gift or exchange; in the case of the CURL libraries it also includes titles received by Oxford and Cambridge universities by legal deposit. The absolute level of the figures should not therefore be taken as an indication of average journal prices, but used only for the general trends exhibited. The impact of bundled deals is clear, particularly in the case of the new universities, which have increased their numbers of titles most dramatically through this means.

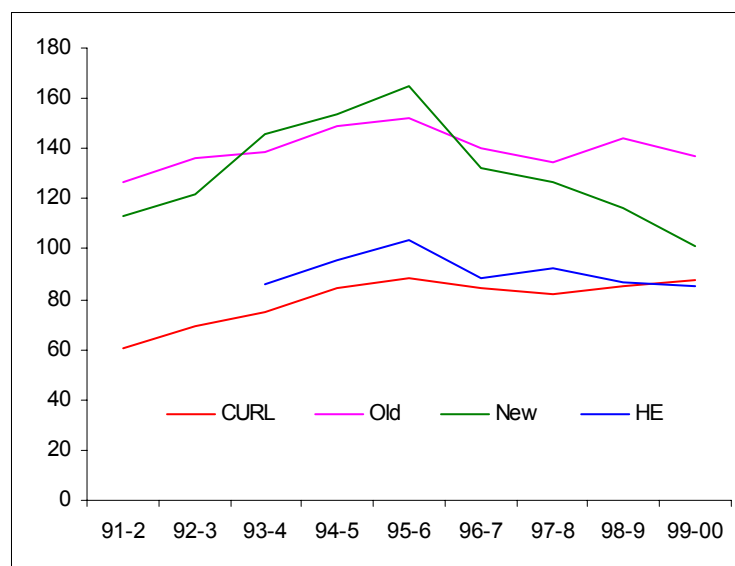
**Fig 9 Total current serial titles**



**Fig 10 Total expenditure on serials, at 1999-2000 prices**



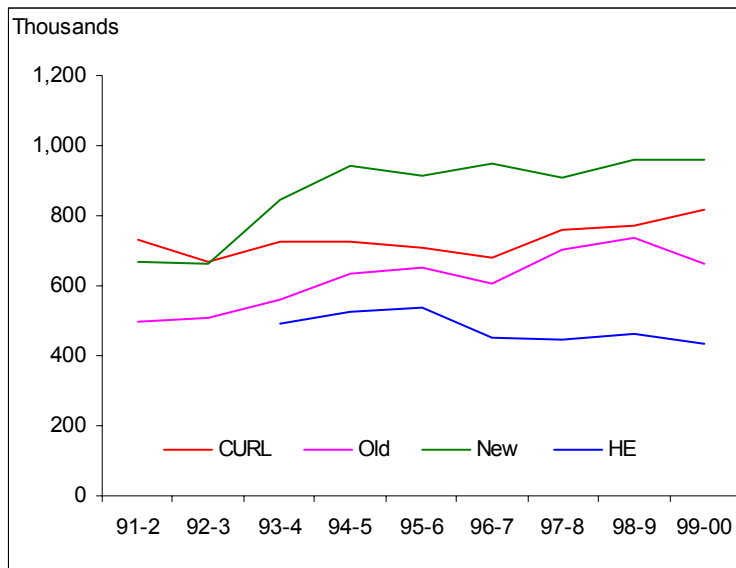
**Fig 11 Average price paid per title at 1999-2000 prices (£)**



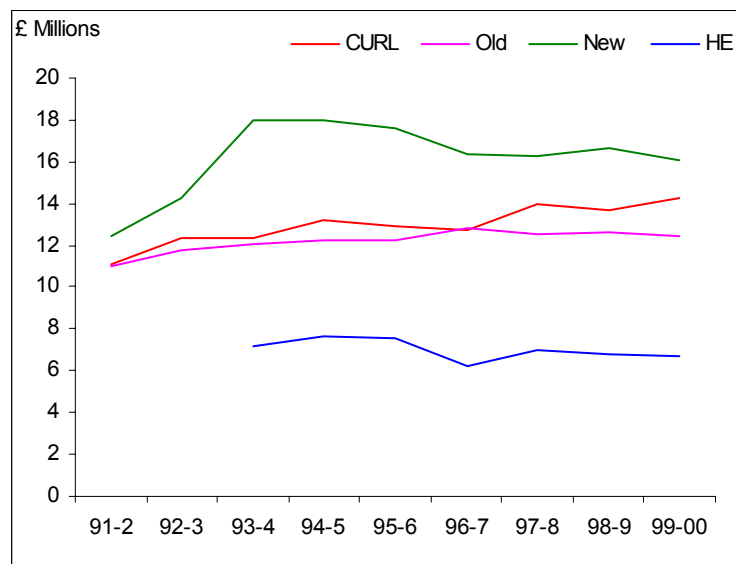
### Books

The next set of graphs is concerned with the purchase of books and other materials by academic libraries. In this case, there is a slight trend towards increasing book purchases, following increases in student numbers. However, in the old and new universities in particular, spending has not increased at the same rate, and the average price paid per book has fallen. As with the figures for serials, the data on acquisitions include books received at no cost, so the average prices paid will not reflect the average cost of books, particularly for the CURL members.

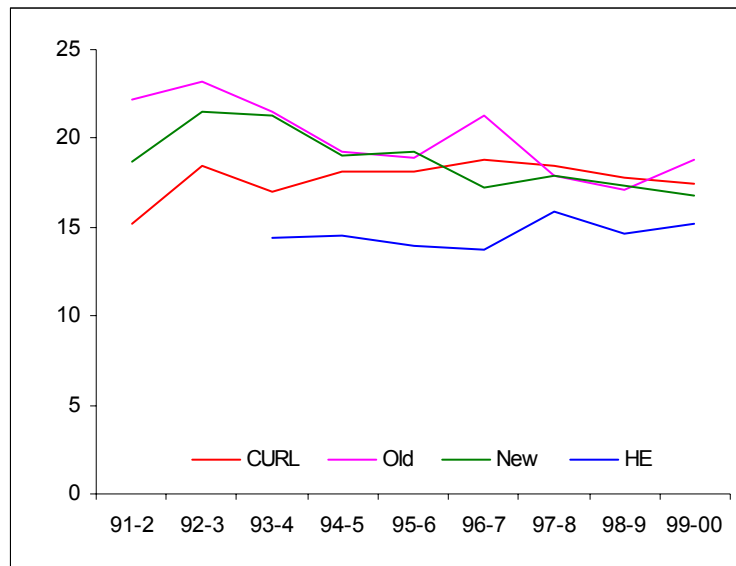
**Fig 12 Trends in book acquisitions**



**Fig 13 Total expenditure on books at 1999-2000 prices**



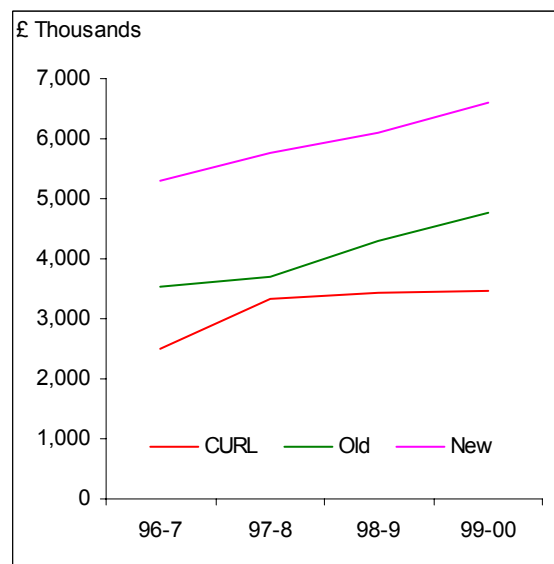
**Fig 14 Average price paid per book at 1999-2000 prices (£)**



### Electronic resources

Data on electronic resources have not been collected consistently over the whole period, but some limited data are available for the university sector from 1996-97, and these are shown in Fig 15. These figures include some spending on electronic journals, resources acquired on CD-ROM, and on-line resources including bibliographic and full-text databases. The increase in spending in this area is marked, although it still accounts for a relatively small proportion of overall academic library expenditure.

**Fig 15 Spending on electronic resources at 1999-2000 prices**



### Summary and conclusions

While some of the statistics available to monitor the field of scholarly publishing are becoming dated, the trends they present are clear. It is not possible to predict future

developments from them, as new initiatives (such as the NESLI deals in recent years) can affect patterns of purchasing and use.

### **Serials**

The number of titles being published has been increasing steadily, although this increase is not uniform across all subject groups. The number of subscriptions per title reported by publishers is falling, and this corresponds with the library data indicating a relatively stable number of titles paid for, with the increases of the most recent two years being largely due to the large numbers of titles included in print/electronic bundles.

An increasing proportion of titles are now available electronically. Academic institutions have embraced this change, adopting technologies and facilitating the use of electronic resources with campus networking agreements and site licensing of resources. The number of workstations provided in libraries has increased, and there is increasing cooperation, and indeed convergence, between libraries and computing services departments. One consequence of this increase in the availability of electronic resources is a fall in the number of physical visits per user to libraries in the academic sector.

While the academic library sector has increased its expenditure on serials, and taken advantage of the many bundled print/electronic packages available to enhance title provision, it is notable that spending has not kept pace with increases in periodical prices. The historical data (i.e. for the period before the advent of NESLI and other similar bundled deals) suggest that libraries were reducing subscriptions to more expensive titles in favour of more economical alternatives, in order to maintain a breadth of coverage within budgets that were not – and are not – increasing in line with prices. This is corroborated by the data from publishers on the falling average numbers of full rate subscriptions per title, also indicating that the restricted resources available are being applied to keeping up with price increases, and not subscribing to new journals unless cancellations are also made. While there is no immediate indication of a slowing of library expenditure on periodicals, there is also no sign of slowing in the rate of price increases.

### **Books**

Much of the academic library market for books is related to undergraduate teaching rather than research, although it is likely that the research impact of monographs is greater in some subjects than others. The number of titles published continues to increase, although in the science/technical/medical area there is some indication that the rate of increase may have slowed.

Book prices have been increasing only slightly faster than general inflation, and there is considerable variation between subject categories. Academic library resources for books have also kept pace with inflation, and the level of book acquisitions and the average prices paid have been steady. There is no indication from the trends that this position is about to change. It seems likely that this ‘steady state’ is made possible by increasing student numbers (but see below).

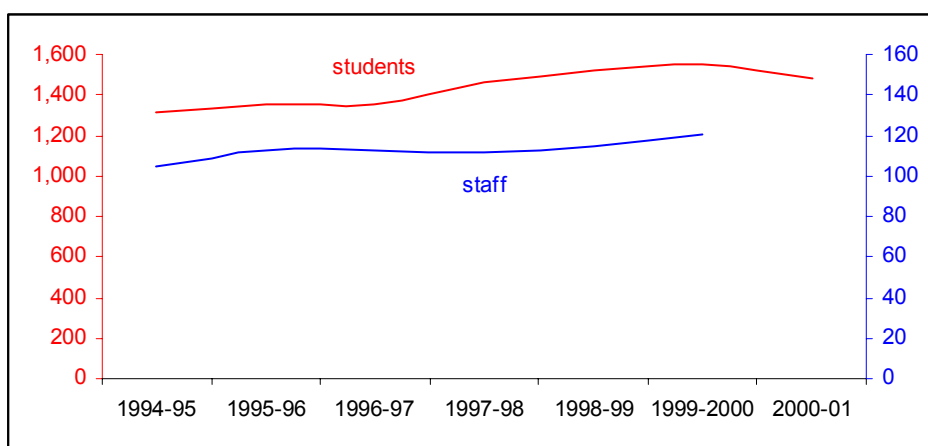
### **Other factors**

One important factor affecting access to scholarly publishing, not considered above, is inter-library lending and document delivery. It might be thought that increased access to electronic

databases might lead to an increase in inter-library transactions. This is not borne out by the figures, however, and inter-library loans as a percentage of all loans have been falling in all sectors. A number of factors are likely to be at work here – increases in costs per transaction have led to falls in use in some areas; increasing title availability through full-text databases removes the need for ILLs from those journals; direct ordering of documents from the desktop bypasses the library, and the statistics. It may be of relevance to note that the total number of requests received by BLDSC has fallen in each of the last two years for which figures are available.

Much of the academic library sector’s ability to pay for scholarly publications is linked to income generated by students, and as numbers of students increase, overall university funding also grows. Increasing student numbers also imply increases in the number of academic staff employed to teach them, and these are both providers and the ultimate consumers of much scholarly information. Student and academic staff numbers are heavily influenced by government policy, and it is notable that, for the first time in a number of years, the total FTE student population fell in 2000-01

**Fig 16 FTE students and academic staff ('000)**



Source: HESA

### Research Spending

Some indication of the driver behind scholarly output may be gleaned from examining the published data regarding research spending in the UK. Sources of funding for research are many and varied. They include Research Councils, government departments, charities, international organisations and agencies (including the European Union) as well as businesses. Moreover, a great deal of scholarly research is undertaken outside of the mainstream academic sector in independent research organisations and industry and commerce and these institutions contribute in part to the volume of published material although not all of the outcomes of such research are disseminated.

Statistical data are available on higher education research funding and on the overall research spend in the UK. The picture, as described in Tables 2 and 3 below, is one of steady growth in research spending. In its wake, the scholarly material to be disseminated (and read is also growing and accumulating.

**Table 2 – Total UK Research Funding for HE and Funding from Research Councils  
£000**

<b>Year</b>	<b>Total HE Funding</b>	<b>Research Councils</b>
1994/1995	1,453,122	496,774
1995/1996	1,553,693	531,867
1996/1997	1,642,336	525,143
1997/1998	1,733,279	533,599
1998/1999	1,834,692	559,606
1999/2000	1,973,416	604,286

Source: HIGHER EDUCATIONSTATISTICS AGENCY *Resources of Higher Education Institutions*

**Table 3 – Total UK Research and Development Spending - £m**

<b>Year</b>	<b>Total</b>
1992	12,689
1993	13,541
1994	14,046
1995	14,172
1996	14,470
1997	14,758
1998	15,553

Source: OFFICE for NATIONAL STATISTICS *Annual Abstract of Statistics 2001*. London, HMSO

## Summary of Specialist Opinion

This Section represents the distillation of the outcomes of soundings taken from a small group of specialists including academic scholars, publishers and librarians. They were surveyed for their views and experiences on scholarly communication and were invited to respond by e-mail or telephone. Each was asked five general questions, as well as two additional questions more specific to their domain. The interview schedules are included as Appendices A, B and C respectively, and the list of respondents appears in Appendix D.

### Definition of scholarly communication

The majority of respondents gave answers focussing on the authoring, publication and use of academic research material amongst scholars, for the purpose of communicating knowledge and facilitating research in the academic community. Librarians seemed the most likely to adopt this broad definition, whereas academics tended to emphasise the authoring and publication aspects and were also more likely to mention informal communication. One respondent saw scholarly communication as involving mechanisms that were distinct from those relating to teaching and learning.

It was widely regarded that scholarly communication has both formal (journals, monographs, conferences) and informal (e-mail and face-to-face debate) forms. One respondent summed it up well – “...it includes what they ask each other, as well as what they tell each other.” There was also a feeling that the distinction between the formal and informal is perhaps becoming less marked with increasing electronic communication. However, several interviewees did not consider informal communication to be part of the scholarly communication under discussion. One respondent mentioned that scholarly communication includes communication in ‘invisible colleges’ and ‘virtual colleges’, and that electronic networks had opened up the traditional ways of accessing research information inside a community. Another claimed that scholarly communication excludes communication internal to an institution. In any event it was generally agreed that scholarly communication goes beyond what takes place in journals and books. It can take a variety of forms, many of which have been discussed earlier in this study, such as conference proceedings, reports and research monographs.

The process of peer review was commonly accepted as a fundamental part of scholarly communication, offering as it did a valid and visible means of quality control.

### The changing picture of scholarly communication

Respondents agreed unanimously that scholarly communication is indeed changing, although one publisher argued that it is “*not changing as much as one might think*”.

All of the interviewees mentioned the increasing use of electronic technology - frequently referred to as the “*Electronic, or Digital Revolution*” - as one of the most significant changes. This had opened up so many possibilities including; electronic publication, electronic peer review, the creation of e-print archives, e-mail correspondence and electronic discussion groups. It was felt that the range of options for scholarly communications is becoming wider, and suggested that some traditional methods are, perhaps, in decline.

It was pointed out that, of course, the changes brought about by new technology vary between disciplines, a matter that is given consideration on page 10. Indeed, one respondent was keen to emphasise that, *“Although these (electronic) developments are strong in some areas, they are almost unheard of in others.”*

Several respondents made the distinction between informal communication, where e-mail and discussion groups have had a major impact, and formal communication, where e-journals have brought considerable change. The evolution of e-journals in formal scholarly communication has seen conventional journals ‘sliding’ from being a standalone journal to being a publication that is part of a database.

More specifically, it was described how in informal communication e-mail and the capability to send attachments have superseded photocopying and the exchange of documents by hand. Moreover, the ‘democratisation’ of informal scholarly communication was mentioned; new and established scholars are equally able, through e-mail and discussion lists, to participate in exchanges in virtual invisible colleges. Such avenues tended to be more exclusive in the past.

The changing picture of scholarly communication is also characterised by the increasing volume of material available and the often enhanced access to this material. For example, informally, academics and researchers can access information *“to a different kind of discourse, at a different level”* than ever before. This has facilitated the widening of audiences and interdisciplinary research. Indeed, it was voiced that *“the ability to find out for yourself has put a lot of power back into the hands of the scholar”*. Significantly, some saw the role of the information intermediary as becoming less significant.

Along with the evolution of commercial e-publications, ‘alternative’ dissemination initiatives such as SPARC, the *Budapest Open Archive Initiative* and the *Los Alamos Physics Laboratory Archive* have established themselves and are considered by some to have *“broken the mould”*. These initiatives are discussed in more detail in the earlier *Review of the Literature* section.

It is interesting to note that the majority of respondents seemed to regard the changing picture in learned communication in a relatively positive light, but this optimism was not unanimous, however. One respondent referred to the situation as *“turmoil – there are so many things changing at once”*, although conversely, one publisher asserted that, *“There is less of a crisis in scholarly communication overall (except for the overload of material), than in scholarly publishing, which has many problems”*.

Notwithstanding the changes taking place, it would seem that there were also constants. One important aspect remains unchanged, notably the *“vital importance”* placed upon peer review, which was voiced by the academic interviewees as both authors and readers, and by a publisher. Allied to this attitude, several comments were made that the reputation of e-material remains an issue with many academics and there is sometimes a reluctance to publish solely in e-journals. There is often a tension apparent in the trade-off between being published quickly and inexpensively (in an e-medium) and being published in a (more conventional) prestigious source. However, it was recognised that things are changing.

## **The most significant problems currently facing scholarly communication**

The majority of respondents, but particularly librarians, identified the increasing cost of journals and the problems of sustaining availability associated with this as being one of the most important problems. Some respondents (not publishers) felt that publishers incessantly increase prices and that their profits were too great.

There were anxieties about the current state of scholarly communication and one respondent felt that the current model was unsustainable for the future. Scenarios contemplated included a big ‘player’ such as Elsevier becoming a near monopoly provider or new, and as yet unidentified, alternatives emerging. It was thought that whilst initiatives such as SPARC and Pre-print archives, such as the Los Alamos Physics Database will contribute towards a solution, they will not solve the problem. Close working between librarians and publishers was called for in the future. However, one respondent sought to highlight what was felt to be the “*current complicity*” in the relationship whereby librarians do not resist price increases for journals sufficiently forcefully.

It was claimed that the acquisitions model is not as simple as it once was, when journal subscription cancellations enabled budgets to be balanced. Librarians are now having the balance print holdings with electronic titles, with the pressure of ensuring that the right titles are acquired with the money available. It was claimed that, paradoxically, this is not always easy with the bundled electronic access deals now becoming prevalent and which NESLI represents a way forward. The deals open up access to more titles at a relatively marginal cost but they may not necessarily be titles that are wanted. Another major problem with deals such as NESLI is the inclusion of ‘no cancellation’ clauses that hamper the facility to make budgeting decisions.

## **Archiving**

Concerns were also expressed regarding archiving and digital preservation. One academic respondent voiced the issue that “*as far as e-journals are concerned, publishers aren’t interested in digital preservation*” and it was felt that this attitude puts, in turn, the onus on academics and librarians to do something. Some of the problems with preservation were identified as:

- Storage capacity required and the associated cost
- Technology drift and the need regularly to refresh data to ensure that it retains its usability/readable (The problem is exacerbated by material incorporating multimedia, links to additional data and special software, and raises the question of ‘legacy technologies’)
- Completeness of the archive.

It was suggested that archiving of informal communication is also an issue. There is a danger of the digital equivalent of notebooks and working papers of the past having no preservation, and it was strongly felt that they not be overlooked in terms of charting research progress.

## **Sustaining Peer Review**

As noted earlier, peer review was regarded as fundamental to scholarly communication, and one respondent asserted that the need for formal publication is “*the ultimate driver regarding acceptability of a model or system*”. It prompts consideration of whether the behaviour and expectations of the scholar can be changed. In the current competitive climate this was regarded as unlikely. Alternative models and initiatives, such as SPARC, were discussed but it was argued that there is a query over whether they are really a cheaper method. Pre-print stores, were regarded by one respondent as “*a less convincing model*”.

## **Technology**

Interestingly, one respondent identified the technology and specifically, the ability to use it as the most significant problem currently facing scholarly communication. It was stated that “*the potential of electronic information as opposed to the reality of how it delivers is an issue*”, and that it is “*less seamless*” than it is commonly supposed. Furthermore, the sophistication of technology is not carried through to facilitate adequate information access. This would seem to be an issue that is not often featured in the current literature.

## **Coping with The Amount of Information**

‘Information overload’ featured frequently in the responses, particularly in terms of the ability to identify and locate quality material in its final ‘quality assured’ version. One respondent reflected upon the perceived urgency of publication and the tendency for proliferation, in part, brought about by pressures such as the Research Assessment Exercise (of which more later) instancing that scholars are “*more likely to publish six journal articles rather than one monograph*”. The scholarly community knows no national boundaries and it was recognised that “*the issue is a global one*”.

## **Site licensing**

Some concerns were raised about the difficulties of achieving access on a broader scale because of the different agencies involved and the constraints of legal contracts. Higher Education institutions are able to enter into access deals, but more widespread access is difficult, according to one academic. It was felt that the marginal cost of widening access would not be high, so mass access should be possible as models in Finland and Denmark demonstrate. It was felt that complex public funding arrangements for different agencies and sectors tend to hamper such developments in the UK.

## **The outlook for the journal**

Several respondents maintained that journals, in some guise or other, will remain the major medium for scholarly communication. Put simply, one respondent concluded emphatically that “*the journal is not going to die*”. A librarian identified the outlook as being “*very positive*”, and a publisher added that the future for the journal is “*pretty secure*”. Significantly, none of the respondents saw the complete demise of the traditional journal, but more its adaptation. The print journal’s redeeming features were commonly identified in terms of the status and reputation of established journals and the quality assurance that comes with the peer review process. People’s approach to journals would seem to be highly culturally and historically embedded. This attitude was emphasised by one academic who claimed that the strengths embedded in the journal will continue to hold, and with it so will

respect and demand for the journal. What would appear to be being contemplated and desired is the transplanting of all the virtues and tradition of the scholarly journal to a more flexible, manageable and affordable model.

The idea that the “*journal may break down and that the article will be the vehicle*” was mentioned, but the desirability of aggregating or coalescing articles around a common identity with an editorial board and mechanism for quality control was regarded as durable and continued to be attractive. Hence, in a developing electronic scenario the article might become the entity for delivery but only within a broader framework. The Los Alamos Physics Laboratory Archive was instanced as an example where pre-prints reside within a mechanism that has a clear and established identity. One respondent remarked with concern that “*Breaking things down to article level would lose something*”.

### **The outlook for the monograph**

Opinion relating to the outlook for the monograph seemed, on the whole, less positive. It was felt by many that the volume of monograph publishing is set to decline, because of its expense and “*slow motion*” nature. Several interviewees did, however, emphasise that the future of the monograph will almost certainly be subject dependent, and made a distinction between the STM fields and the Arts and Humanities. It was asserted that monographs “*may survive longer in History, for example, than in Physics*”.

One respondent argued that the monograph had posed a problem for conventional publishing economics for a long time, and that a publisher might, albeit flippantly, define a monograph as “*a book that doesn't make any money!*” It was stated that part of the problem stemmed from the fact that the market for learned monographs lies almost exclusively in academic libraries and their budgets have come under strain because of spiralling journals costs. It was felt that monograph purchasing budgets were badly curtailed.

Interestingly, there were quite ambivalent views raised regarding the outlook for e-monographs as a subset of e-books.

Several interviewees felt that the e-monograph has an uncertain future, although one went on to add that electronic production “*may allow print on demand publishing and thus make it economically viable for longer*”. In fact, one librarian felt confident enough to say that electronic production (enabling print on demand) “*means that a good monograph need not go out of print – ever*”. Respondents generally seemed to have more confidence in e-printing on demand than e-monographs, although it was acknowledged that the future is uncertain. One respondent saw e-publishing as a better solution to the economic issues applying to printed monographs than adopting a ‘print on demand’ approach because with the latter method, fixed costs still remain high.

## **Academic's view of scholarly communication issues**

### **Finding and accessing scholarly information**

A number of issues were raised by academics regarding problems both in finding and accessing information.

To some extent the advent of the Internet brings opportunities and obstacles for the scholar seeking and using information. There is much that is useful and the growth of pre-print and similar sources offers a new and speedy avenue for dissemination. However, it was felt that given that much useful research material is on the Web, the search tools available are “*quite inadequate*”, and material is not properly indexed. On the other hand, one respondent put forward a contradictory view claiming that with modern search engines, “*...finding information is easy; the problem is accessing the papers*”. This would seem to be increasingly problematic with the proliferation of journals and the capacity of institutions to acquire a relatively limited range. The search tools for the more formal material published conventionally or electronically did not attract criticism. It would seem that access issues vary significantly between disciplines and the different types of materials sought.

### **Factors influencing how and where academics disseminate**

As might be expected, the main considerations raised revolved around:

- The reputation of the journal and its impact factor
- The target audience
- The nature of the subject

The reputation of the journal, notably its impact factor, was seen as an important feature that influenced where academics choose to publish material. Other components that made up a journal’s reputation included the authority and standing of the editorial board and the managing editor.

In addition, the target audience would seem to be an important consideration, at least for some. One respondent put it succinctly “*I will publish where the people I want to see my work will see it*”. It was suggested, however, that this might not necessarily hold true for all academics, especially those still needing to establish their position in a field. They were more likely to be concerned with the ‘visibility’ and academic credibility of titles.

One respondent claimed that they avoided publishing electronically, and tended to be sceptical about the quality of web-only material, adding that many scholars share this opinion, “*especially older scholars*”.

Interesting, the monograph is still seen as an important method for dissemination in some areas of knowledge. It was regarded by one respondent as:

*“the main route to a wider audience (backed by more popular forms of dissemination) which is important in disseminating knowledge beyond the academy to life-long learner”.*

Conferences (and their proceedings) were also seen as an important channel for dissemination and an additional means of establishing a reputation in a subject.

There seemed to be a general agreement that the Research Assessment Exercise had influenced the situation as well in terms of the need to publish in respected journals with high impact factors, and to have an increasing volume of material published.

## **The future challenges for scholarly publishing**

One of the key issues for the future is seen as the “*breakdown of the existing model*”, and how well any new model would stand up. One respondent surmised that “*there may be a period of anarchy and chaos ahead*”, with lots of separate initiatives being established, adding that it was impossible to predict what model or models will emerge or which agencies will succeed.

Other issues identified included

- The time demands of dealing with “*an increasingly disorderly information world*”.
- Attempts by corporations to capture free dissemination for private profit, thus threatening to exclude much of the developing world.
- The sustainability of the peer review system, with an increasing amount of scholarly material to be refereed by a relatively limited number of experts.

## **Publisher’s view of scholarly communication issues**

### **Key opportunities for the publishing industry in scholarly communication**

It is felt that there are “*great opportunities in the electronic world for publishers to get as close as they can to their end users*”. This follows through a general marketing concept that the closer producer and consumer, and the better they communicate, the better a product can be tailored to user needs. Thus, opportunities are identified to develop added value in publishing output that supports the scholar in terms of item retrieval and selection, for example. It is, however, important and worth noting that publishers do not want to by-pass intermediaries, such as librarians.

Other key opportunities specifically identified were:

- The scope for mutual economies of scale, brought about by an increasing number of journals available as bundled deals, and through consortia arrangements.
- Enhanced retrievability of material and linking to related sources and items. It was thought that linking is a major value-added feature being developed by publishers that is highly valued by the academic community. Several respondents cited CrossRef as an example (*see page 12*).
- Opportunities to add new added value to cope with the information overload, such as reviews, commentaries and summaries.
- It was added that such commentaries might well have to be carried out by professionals, because academics no longer have the time.
- Improved speed in making material available.
- The prospect of co-operating, as opposed to competing with the pre-prints and open access culture being developed by academics, such as SPARC.

In summary, there would seem to be a general feeling that the publishing industry is moving beyond the debate about how to make the technology work, towards thinking more about useful value-added applications. This was referred to as the “*post-technology era*”. Moreover, publishers appear anxious to stress how publishing is “... *not just about keyboarding*” but that a great deal of business acumen, organisation and creation of added value are involved. It was acknowledged that perhaps the contribution of the publishing industry was not always made sufficiently apparent and that the remedy lay with publishers. A candid, and perhaps overly self-critical view regarding the importance of not only adding value, but also ensuring that it is known that value is being added, emerged from one respondent. – “*We’re probably responsible for the hole we’re in because we never bothered to make it [added value] clear before*”.

### **Funding and resourcing challenges of scholarly communication**

The major challenge facing scholarly publishing was seen as the steady decline in journal subscriptions that has taken place over some time. Some titles have reached a critical point in their viability and there appeared to be a realisation that simply raising the prices for remaining subscribers was not a sensible option. There was recognition that “*the current situation can’t go on ... some journals will go!*” Satisfactory solutions to the dilemma were hard to define. It was claimed that electronic publishing does not necessarily do much to ease the economics of the situation because electronic methods do not actually save much money overall once general editorial and quality mechanisms, access control, system maintenance and preservation and archiving costs are taken into consideration.

There appeared to be a genuine desire to work with the academic community to develop future models. There is seen to be a need for publishers to promote and market their contribution more effectively, perhaps through publishing trade associations and agencies. To some extent, new funding models were identified as a solution to some of these problems, although it was recognised that “*it is hard to see the way in which the problems can be resolved*”.

An important point was made regarding the fortunes of learned societies as they are affected by declining journal subscriptions. The loss of income from reduced sales of journals has a serious impact on their other activities, such as conferences, scholarships and research promotion.

### **Future challenges for scholarly publishing**

The key issues identified included:

- The ever-increasing output, which in turn places greater emphasis on the processes of selection in terms of quality and relevance, as well as the need for more and better indexing to enable users to select from a larger pool of material.
- Learned society funding problems, already explored earlier (*page 39*), which “*threaten to penalise the learned community indirectly*”.
- The preservation and archiving of the totality of scholarly output, and version control of this output to ensure that the authoritative text can be identified. It was noted that

preservation and archiving has been explored by a joint AAAS and ICS Working Group<sup>4</sup> as well as by the Digital Preservation Coalition. Voluntary deposit has also been undertaken by publishers in co-operation with the national libraries

- The education of users to make best use of the materials available. More research into how users retrieve information was thought necessary.
- Quality issues and especially maintaining the quality of material. Of particular concern was ensuring that informal communication, especially on the Internet, did not somehow ‘dilute’ the quality of what is available.

For one publisher, a solution to these issues was expressed as a need “*to facilitate the whole information chain*”, so that material can be created, distributed and found/retrieved with ease. Indeed, it would seem that little can be achieved without the co-operation of *all* the key players in the scholarly communication scenario.

## **Librarian’s view of scholarly communication issues**

### **The impact of electronic information on traditional research resources**

All the librarians responding thought that the ‘electronic revolution’ had had a significant impact on research dissemination. Not only did it enable new modes of scholarly communication, but perhaps more importantly it facilitated access to traditional resources. It was widely felt that traditional scholarly communication methods are being adapted successfully to electronic delivery channels and that this will continue in the future. It was remarked that “*there is less need to visit the library*” to obtain information, but one respondent added the cautionary note, that electronic information needs to be well managed if it is genuinely to increase access to traditional material.

The consequences of the greater flow of information engendered by electronics were not overlooked by librarians. With an increasing amount of material becoming available some considered “*information overload*” to be a serious issue and one respondent made the point that it ceased to be manageable. Moreover, both the volume of output and the need to cope with it were assessed as having far-reaching implications for library resourcing and management.

Although electronics may have increased the amount of information available, as far as the more conventional material was concerned it was argued that acquisitions of printed materials have suffered at the expense of their electronic counterparts. Library budgets, it was claimed, simply cannot stretch to accommodating electronic resources without detriment to print acquisitions. The NESLI was quoted as an interesting example of how the availability of electronic information is both altering the model of acquiring scholarly material and having an influence on traditional resources.

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<sup>4</sup> Defining and Certifying Electronic Publication in Science: A Proposal to the International Association of STM Publishers. Originally Drafted October 1999; Revised March and June/July 2000. Prepared by an International Working Group, Co-Chaired by Mark S Frankel, American Association for the Advancement of Science, USA and Roger Elliott, International Council for Science, UK  
<http://www.aaas.org/spp/dspp/sfrr/projects/epub/define.htm>

## **Funding and resourcing challenges of scholarly communication**

Most of the librarians identified the following as key issues

- An increasing proportion of budget spent on e-resources, at the expense of print materials because there is no additional funding available. Although resource scarcity is by no means a new issue there is a feeling that *“e-information has exacerbated the competition for financial resources”*.
- The current need to provide both print and electronic formats in a ‘hybrid’ scenario.
- The *“desperate need”* to develop new economic models for purchasing e-resources to render them more affordable.
- Library purchasing resources need to be tailored to the needs of the institution rather than driven by the options that are emerging through consortium purchasing.
- Uncertainties in archiving (and access to archived material) make librarians (and academics) wary about ‘abandoning’ printed materials for the time being.
- Information overload and the management of the resources available.

Some discern inherent instabilities encroaching into the scholarly communication system as a result of these challenges. From a library perspective a specific example of tension in the system derives from the role of British Library which has traditionally acted as a key support for UK libraries regarding access to scholarly material. It is uncertain whether, with the proliferation of sources and in the new networked scenario with shared local access to material, that the BL can sustain support for the scholarly community in the way it has done in the past. One respondent concluded that *“the totality of the system is suffering an instability”*.

When librarians were asked how the assorted challenges facing scholarly might be resolved, several solutions were proposed. It was noted that in some cases librarians are attempting to persuade researchers to adopt a different approach to disseminating their work and are being encouraged to consider using initiatives such as SPARC. Co-operation between the key players in provision and access – libraries, agencies and publishers - was seen as essential. Consortium purchasing, for example, was generally viewed favourably although there were issues surrounding who stands to benefit most from such arrangements. There was, of course, the underlying sentiment that prices were far too high and that a key aspect of any solution lies with the publishers if only they could be persuaded to adopt more appropriate (that is cheaper) pricing models.

## **The challenges facing scholarly communication in the future**

It was generally felt that the future for scholarly communications as far as librarians were concerned would entail a difficult ‘balancing act’ in terms of meeting the sometimes conflicting demands and needs of all of those involved. There was also a feeling that *“the roles of intermediaries between author and reader have to be re-defined”* in the new electronic scenario.

Librarians were also conscious of the dramatic changes taking place in scholarly communication and shared the uncertainty of respondents from other domains. As one respondent surmised “*Will the learned journal survive? If not, what will happen?*” One respondent touched upon a serious issue relating to the expectations of researchers and their capacity to select appropriate information and exercise discrimination. The view was advanced that there might be trend towards over-reliance on electronic material and an attitude that if material is not in electronic format then “*it doesn’t exist or isn’t important*”. It was considered that such an attitude could be harmful for scholarship in the future.

## **Review**

As might have been anticipated, a range of attitudes and opinions, sometimes contradictory, emerged from these consultations with specialists. The summary seeks to capture accurately what was stated. A great many issues exercise the entire community. At the forefront are the changes, challenges and opportunities wrought by the digital present and likely future, the burgeoning volume of material in all formats that needs to be disseminated, and the resource implications of managing a process that is the lifeblood of successful research endeavour. There is much common ground not least in the recognition that there really are problems that need urgent solutions. Moreover, there would appear to be a lot less polarisation between the various sectional interests than might be anticipated, or feared. The overall sentiment that emerges is that there is a general willingness to engage with the challenges of facilitating efficient and effective scholarly communication appropriate to this Century.

## General Overview

A great deal of material and evidence has been assembled and analysed for this study and many issues have emerged. The main conclusions about the key issues are noted in this final section. They centre on the output from scholarly activity, the affordability of the entire process of scholarly communication, the changes and challenges brought about by electronics, the quest for alternative dissemination models and the prime importance of scrutiny and assessment of output to achieve quality assurance.

Research endeavour in a range of disciplines is proceeding apace within the private and public arenas. The frontiers of knowledge are being rolled back by research that seeks answers to vital questions, solutions to problems, novel insights, creative processes or that is just curiosity driven. Though there appears never to be enough money to support all the worthwhile research there is a great deal being achieved. As a consequence the amount of information being disseminated and needing to be assimilated is considerable. Much of this exchange of information takes place informally – scholars compare, consult, query, as well as announce, and the new electronic conduits enable them to do so more readily. It is, moreover, rare that much ‘old’ knowledge can be dispensed with, so the sum total is growing significantly through an incremental process. The imperative to ensure that the scholarly communication system in all its facets is sufficiently robust and flexible to cope with the flow of knowledge and to fulfil the needs of researchers and the wider society becomes urgent.

To some extent, the evolution of the scholarly communication model with its emphasis on the learned journal and the academic monograph is a story of successful adaptation to the needs of an expanding population of researchers with the desire both to disseminate widely and to subject themselves to academic scrutiny. By contrast, Isaac Newton, Robert Hooke and others were able to rely on exchanging letters and notes through couriers. That the model has survived for so long is a cause for some satisfaction. Part of its longevity lies in the fact that, for some time, there were resources available to sustain it in the shape of library budgets and scholar’s time. It can be argued that the model has become unstable and to some extent unwieldy. There is general recognition that as present constituted it suffers a crisis of affordability. As the key purchasers of scholarly publishing output, academic libraries have experienced financial constraints that have eroded their capacity to acquire the range of ‘conventionally’ published material, especially in terms of serials titles that are desirable. The serials crisis has been well documented. The glib solution of just pouring more money into acquisitions budgets is neither tenable nor realistic. One attempt to meeting the stresses was the development of an access versus holdings approach to information resource provision. It signalled a recognition that almost no library could be self-sufficient and relied on an underpinning of inter-library lending and document delivery to sustain access, as opposed to the ‘traditional’ collection building approach to provision. A more recent approach sees library managers recognising their identity as a homogenous market and entering into consortium purchasing agreements with publishers to that takes advantage of the networked electronic options available. The NESLI is an example in the UK. To some extent such arrangements facilitate access to a much larger range of material and they open up new access paradigms, but at a cost which may be beyond the reach of some institutions. Moreover, whether such arrangements offer long-term solutions to affordability is still to be seen, and questions have been raised regarding their impact on the broader context of scholarly communication.

Developments in electronic technology have brought huge benefits to scholarly communication. The combination of powerful, compact and affordable computers, sophisticated software, usable interfaces and efficient telecommunications has transformed the situation. The Internet has opened up a formidable array of information sources and facilitated scholarly exchange on a global scale. The move to electronic publication has opened up new opportunities for widening access in terms of range and depth of content and in terms of scholar's location. Thus have emerged electronic journals, e-preprint services, and even a few e-monographs. These developments are not without cost and they often represent an addition to those that already exist in the 'conventional' communication system. Furthermore, the technical infrastructure that needs to be embedded to facilitate electronic distribution represents another expense. There are anxieties about the volume and quality of material rendered available through electronic means and quality assurance in the new scenario undoubtedly represents a challenge for all involved, as is discussed further below. However, it would appear that the dividends of electronic communication and publishing are beginning to be reaped.

The growing concern with the costs of conventional publishing coupled with the 'freedom' offered by electronic communication has stimulated the scholarly community to explore alternatives. The 'scholarly rebellion' is a manifestation of such a situation. The creation of a reservoir of scholarly material by physicist at Los Alamos signalled an intention not to be trammelled by commercial publishing which was followed by others. The SPARC initiative represents an example of a coalition of scholars seeking to keep the best of the conventional journal whilst attempting to reduce the costs of overheads and in the process relegating the commercial publisher. Some, including publishers would assert that the savings may not be spectacular if the costs are made transparent. Elsewhere, entire editorial boards have abdicated the commercial scene and established alternative journals of standing; a case of voting against excessive (as they would see it) publishing profits with their feet! Anxieties remain about the quality and sustainability of some of the initiatives. It is not at all clear that any of the new initiatives offer a perfect answer to the future of scholarly communication. However, the activities have served to draw attention to the magnitude of the problem that confronts the entire community.

The imperative of ensuring the quality and integrity of what gets disseminated is an issue that exercises all those involved in scholarly communication. Scholars, publishers and librarians, as well as others such as academic administrators and funding bodies all have an interest. It may, moreover, be argued that the issue extends beyond the mere 'parochial' boundaries of scholarship – a society that bases its policy making and strategy on research outcomes and recommendations has to have confidence in its reliability. The classical mechanism for quality assurance is the peer review process and this has served the community tolerably well for some time; particularly in the area of 'conventional' publishing. The burgeoning amount of information now being made available through electronic networking raises anxieties regarding quality. Put bluntly, almost anyone can become a 'publisher' on the Internet. How is the quality and status of what is to be found there measured and indicated? For some scholarly output on the Internet, the model of peer review is being transplanted with success. Peer refereeing may even be speeded up through electronic exchange of submitted manuscripts. Some scholars, however, still appear to view the all-electronic alternative with a degree of caution when it comes to quality and reputation. This is likely to change as the new media gain acceptance and as editorial boards demonstrate their commitment to them.

Whatever the future shape of scholarly communication, people must have confidence in its quality yardsticks.

It is clear that the environment surrounding scholarly communication is undergoing great change and that the process is in a state of flux, if not turmoil. The topic represents a fusion of the technological, economic, cultural and social. These dimensions are sometimes in tension to the extent that progress in developing desirable new models that might work better is hindered. There is no denying that the present state has identifiable problems that threaten both the capacity to disseminate research information on the one hand and the provision of reasonable access to it on the other. They centre on the volume of scholarly output, how its quality can be assured, how it can be afforded, how easily it can be identified, retrieved and used and how it can be preserved as a source of record. Many agencies are seeking solutions and developing measures to ameliorate the situation but it would appear that no perfect answer is emerging as yet. It may well be that a combination of solutions will need to be applied. Here the relationships between stakeholders in the system are important and the evidence regarding attitudes to co-operation is mixed. What should give cause for optimism is that scholarly communication has in the past always functioned, perhaps not perfectly, but at least sufficiently well for the outcomes of research to permeate through into improving the human condition.

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## **APPENDIX A**

### **Academics - Questions**

1. How would you define *scholarly communication*?
2. Do you think scholarly communication is changing?  
In what ways?
3. What do you feel is the most significant problem *currently* facing scholarly communication?  
How do you think this might be resolved?
4. What is your opinion of the outlook for:-
  - (a) the journal?
  - (b) the monograph?
5. What do you see as the key difficulties in finding *and* accessing scholarly information?
6. What are the main factors that influence how, and where you disseminate scholarly information?
7. What challenges do you think face scholarly communications in the future?

## **APPENDIX B**

### **Publishers - Questions**

1. How would you define *scholarly communication*?
2. Do you think scholarly communication is changing?  
In what ways?
3. What do you feel is the most significant problem *currently* facing scholarly communication?  
How do you think this might be resolved?
4. What is your opinion of the outlook for:-
  - (a) the journal?
  - (b) the monograph?
5. What are the key *opportunities* for the publishing industry in the developing scholarly communication scenario?
6. How is the publishing business affected by the funding/resourcing challenges of scholarly communication?  
How might they best be resolved?
7. What challenges do you think face scholarly communications in the future?

## **APPENDIX C**

### **Librarians - Questions**

1. How would you define *scholarly communication*?
2. Do you think scholarly communication is changing?  
In what ways?
3. What do you feel is the most significant problem *currently* facing scholarly communication?  
How do you think this might be resolved?
4. What is your opinion of the outlook for:-
  - (a) the journal?
  - (b) the monograph?
5. Do you think that the growth of electronic information has had an impact on traditional research resources?
6. How is your library affected by the funding/resourcing challenges of scholarly communication?  
How might they best be resolved?
7. What challenges do you think face scholarly communications in the future?

## **APPENDIX D**

### **List of Specialists Consulted**

Professor Michael Anderson: Senior Vice-Principal and Professor of Economic History -  
Edinburgh University; and Chair - RSLP Steering Group

Toby Bainton: Secretary - SCONUL

Professor Colin Creaser: Professor of Chemistry - Nottingham Trent University;  
and President Elect – Royal Society of Chemistry, Analytical Division

Kathy Ennis: Professional Adviser - CILIP

Geoffrey Ford: University Librarian - Bristol University

Fred Friend: Director of Scholarly Communication - University College, London

Professor John P Feather: Professor of Library and Information Studies –  
Loughborough University

Tom W Graham: University Librarian - University of Newcastle

Ronald Milne: Programme Director - RSLP

Mary Morley: University Librarian - Loughborough University

Sally Morris: Secretary General - ALPSP

Professor Charles Oppenheim: Professor of Information Science - Loughborough University

Geoffrey Smith: The British Library

Graham Taylor: Director - The Publishers' Association

Dr Hazel Woodward: University Librarian & Director of Cranfield University Press -  
Cranfield University

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