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Current issues in the scientific, technical and medical information system

Report of a workshop convened on behalf of the Association of Learned and Professional Society Publishers, the British Library, Blackwell Science Ltd and the Royal Society.

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Introduction

The phrase scientific, technical and medical (STM) information system refers to the means by which information about progress and research findings in science, medicine and technology is communicated by one scientist to another. Until recently the main route of formal communication was by means of articles in learned and professional journals, but electronic methods of information transfer are proving increasingly popular. This is partly because libraries find it increasingly difficult to collect all of the information needed by their readers, and electronic services offer a potentially inexpensive and rapid source of information. Electronic publication is also increasingly popular among researchers because of its speed and accessibility.

The STM information system was the subject of a study completed in 1993, under the direction of Professor Bryan Coles FRS¹, which concluded that the system was crucial to the efficiency and effectiveness of the national research effort. The report identified areas of concern such as the steady decline in funds available for academic libraries which posed a serious threat to the system. It also found that much of the scientific community was unaware of the issues and changes facing the system and of the steps necessary to safeguard their interests.

The 1993 study was organised by the Association of Learned and Professional Society Publishers, the British Library and the Royal Society. Early in 1998 these bodies noted that

¹ The STM Information System in the UK, Professor Brian Coles FRS ISBN 0 85403 477 3

electronic methods of information transfer had developed much faster than expected and that the worrying trends identified by the 1993 study persisted. It was considered timely to review the STM information system by means of a workshop, and in this task they were further supported by Blackwell Science Ltd and assisted by Mr Anthony Watkinson (formerly of The Thomson Corporation) as consultant. The workshop aimed to bring together people involved on a daily basis in the STM information system for a full and frank discussion of current areas of concern and possible future trends. It was envisaged that this would identify areas of concern and might result in recommendations for future work by the sponsor organisations.

The attendees at the workshop included representatives of various links in the information chain, such as journal editors, researchers, publishers (from learned societies and commercial organizations), librarians (from academic and industrial backgrounds) and other intermediaries. As a basis for discussion they were provided with a comprehensive background paper written by Anthony Watkinson which summarised the main issues to be discussed. An edited version of this document will be published shortly in the journal 'Learned Publishing'.

Conclusions

Structure and role of the STM information system

There was general agreement among the workshop participants that the number of articles being written and published continues to increase, that STM publications are larger and increasingly costly, and that the funding of libraries for the purchase of such publications has not increased commensurately.

Some participants felt that the pressure on scientists to publish articles in order to gain grants, tenure or promotion may result in the publication of superfluous material, inflating the number of articles, and therefore the cost, of information. However, it was also noted that in the UK, research assessment exercises require the submission of only four articles from the four years judged and could not therefore be solely responsible for unnecessary publication.

It was accepted by workshop participants that the publication of research articles will continue to serve as the means of establishing precedence in discovery and of career advancement as well as a means of communication, regardless of the means of publication (digital or paper). Currently a majority of primary papers are published in printed format, however participants agreed that standardisation of electronic validation methods will enable a wider acceptance of electronic publication.

Economics of the STM information system

As noted in 1993, while there has been an increase in the funding of research, the resources allocated to libraries have not risen to cope with the ensuing rise in output of new information. Funding has continued to decrease in recent years² and this remains a threat to the STM information system in its current format.

An alternative to relying on funding bodies to pay for increasing costs is for authors to pay the full costs of including their articles in journals (an extension of the page charge principle), with libraries receiving the journals free of charge. This approach has been

² Total library recurrent expenditure in the UK as a share of total university recurrent issue can be shown to have decreased, from a recommended base of 6% to the current level of approximately 3.2%.

adopted by some learned societies but, for wider implementation, calls into question the funding of scientific publication and may require a change in policy of the research funding bodies to allow consideration of the additional expense incurred by the researcher (as is the practice in the US, for example).

At least one learned society, which has usually paid for its other activities (such as meetings) partly from the revenue generated by the sale of its journals, is reconsidering such policies and this may be followed by other societies. An alternative strategy is for bodies representing scientists and librarians to set up their own mechanisms for publishing and thus bypass the commercial market.

There is a lack of adequate quantitative information about the extent of the growth of STM literature, the trends in library funding and the measures taken by librarians to meet the needs of their users. This could be addressed by specific research projects. At present publishers do not have proven and sophisticated business models to aid them in pricing either electronic-only journals or subscriptions that offer both print and electronic formats. Until such business models are developed there will be a high level of risk in embarking on new forms of publishing and financing.

Electronic publishing - future trends

Electronic publishing methods enable information to be brought to the desktop of the scientist, and present such information in ways not possible in print (for example, presenting 3 Dimensional, interactive, illustrations). They enable literature reviews to be carried out with speed and economy by clicking on references within articles that possess electronic links to the cited journals. However, workshop participants agreed that it is also evident that electronic publishing pursued in parallel with print publishing is more costly than publishing in either format alone. Indeed, although electronic publication is generally perceived as a cheap and easy option this is not the case in practice as much of the process (eg peer review) is common to all publishing media.

Concerns were voiced by participants regarding the maintenance of standards and quality control in electronic publishing, particularly in relation to the Internet. The standards applicable to printed journals should be maintained in the electronic environment and mechanisms should be put in place to ensure that articles and papers can be transmitted without distortion, and with proper attribution, from author to reader. Mechanisms must be put in place to minimise the possibility of plagiarism and the theft of material. The workshop participants strongly supported the work already underway on industry standards.

The current STM system operates through a generally accepted set of parameters that have evolved to assess the quality of material published. The system works well and any future developments must meet the same requirements to maintain credibility. The workshop participants concluded that moves aimed at replacing the traditional peer-review of articles submitted to journals (where scientists judge the quality of the work of other scientists in a formal way), with a less organised process (involving the informal review of articles posted on the web), should be discouraged. Formal peer review is an essential element of the evaluation of research findings.

In order to ensure that electronic journals are regarded as a valid means of scientific publication, it is essential that clear methods of marking the definitive version of an article are generally agreed and applied by the STM information system community and there was support for the standardisation of such methods. If electronic-only journals are to be esteemed, it is important that arrangements for archiving be established and the workshop

participants welcomed the efforts of the Working Group on the Legal Deposit of Electronic Materials.

Copyright and Database Legislation

Intellectual property rights are crucially important. Whilst it is important that publishers are able to gain reward from their investment, it is also important that researchers are able to benefit from the publication of their results. Many researchers are concerned that recent and forthcoming legislation (such as the draft EU Copyright Directive and the recent Database Rights Legislation, for example) may undermine their rights as authors. Some authors have chosen to pass their intellectual property rights to Author's Organisations. However, many researchers are contractually bound to give all such rights to their employers.

The licensing of electronic access to information is also an area of concern to researchers. In traditional print publishing, information is sold outright with few limitations on how the purchaser may use the information, provided that the copyright laws are observed. In the electronic environment, access to information held on the server of the owner is commonly allowed under a licence defining the uses that can be made of material accessed. While the need to protect investment is recognised, scientists are worried that commercial interests may limit their access to major databases incorporating the findings of their research, particularly in light of new European legislation.

It is important for researchers to have a means of commenting on such issues which may affect the STM information system. The Royal Society, and other learned societies, have commented on behalf of researchers on recent database and copyright legislation for example, and the participants encouraged such comment. The workshop participants also welcomed the intervention of bodies such as the European Science Foundation and Allea on behalf of researchers at a European level.

Future action on areas of concern

One of the specific remits of the workshop was to consider the possibility of holding a conference, which would aim to educate and influence the scientific community as a whole. The 1993 report had particularly highlighted the lack of appreciation amongst researchers of the issues facing the STM information system. However, it was generally agreed at the workshop that such a conference would not attract working scientists and therefore be ineffective.

One of the sponsors, the Association of Learned and Professional Society Publishers, is conducting a survey of authors submitting to the journals owned by its member societies and the results of this exercise and possible follow-up to it are awaited with interest. It was agreed that any further consideration of the issues involved in the STM information system should take place once the results of this survey have been assimilated.

In summary, the main issues which were of concern in 1993 are still of concern in 1998. In particular, decreased funding of libraries versus increased costs of information provision. The STM information system remains vital to the health of the research base and there will always be a need for the dissemination of authenticated research findings to other researchers. However, advances in electronic methods of dissemination of information, such as databases and linking systems, have occurred at a much faster rate than anticipated. Such technology will be the driving force in how the STM system develops over the next five years.

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