

The uptake of electronic journals by the academic community in the UK and their potential impact on scholarly research and publication.

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Abstract

This paper reports on a survey carried out at the University of the West of England (UWE) into the use of electronic journals (e-journals) by academics and their attitudes towards them. The study is set within the context of the rapid expansion of e-journals and their potential impact on scholarly communication, and compared with previous user surveys reported in the literature. The findings suggest that while there is a high level of interest in, and acceptance of e-journals within the academic community, use of them is limited. Their impact on the role of the library is discussed.

1. Introduction

The proliferation of e-journals over recent years has led to much speculation about their likely impact. While some see electronic publishing as simply a new medium of delivery, others believe it constitutes a force for change which could revolutionise scholarly communication. Tom Wilson (1995) suggested that concepts such as "library", "publishing", and "journal" could become obsolete, while Odlyzko (1995) predicted the eventual demise of the traditional printed journal. Contrary to these claims and predictions, user surveys suggest that e-journals have only had a limited scholarly impact.

The potential for change certainly exists, by virtue of the electronic medium. Developments in World Wide Web technology offer new capabilities which, if fully exploited, would inevitably result in the divergence of e-journals from their paper counterparts, creating new models of scholarly communication. How this would affect the roles of the participants in the communication process, including libraries, is a subject of many debates.

For academic libraries there is an imperative to gauge this impact, since policy decisions made now, for example on matters such as collection management, investment in IT, and staffing, are driven by the type of service we expect to offer in the future.

This study set out to explore the potential of electronic journals to revolutionise academic research and scholarly communication, to evaluate the extent to which this is being realised, with the specific reference to UWE, and to suggest how this will affect the future role of academic libraries.

Methodology

The complete study included:

- A comprehensive literature review to explore the background to the development of the academic e-journal and its future potential.
- A review of previous user surveys.

- A questionnaire survey to ascertain the level of e-journal use at UWE, comparing staff, students and the different faculties.
- An interview survey to examine in depth the attitudes of academic staff to e-journals.

Due to constraints on length, the literature review is not included in this paper, but a copy of it can be supplied on request.

Previous user surveys

Surveys to date suggest that e-journals have had little impact on scholarly communication. Harter's (1996) citation analysis of 39 e-journals across a range of disciplines found that only eight had been cited ten or more times over their lifetimes.

User surveys of the attitudes and behaviour of scholars toward electronic journals and publishing, include those of Waddell (1993), the Café Jus study, carried out at Loughborough University in 1996 (Woodward *et al.*, 1998), Tomney & Burton's study of users in 1996-97 at Strathclyde University (1998), Gomes and Meadows' survey, carried out in 1996, of academic and administrative staff in British universities (1998), and the SuperJournal Project (Dawson, 1999).

In all of these, regular e-journal use was found to be low. However there was evidence of variation according to discipline. At Strathclyde University the greatest use was in Business, and the least was in the Arts faculty.

Factors affecting resistance to, or acceptance of, e-journals

One of the earliest surveys (Waddell, 1993) quotes lack of awareness as a reason for non-use. Six years later it still appears as a factor in the SuperJournal Project (Dawson, 1999), along with, lack of time to try them out, and an insufficient range of titles to match particular research needs. Similarly, in Tomney and Burton's survey (1998), the most common reason given for non-use of e-journals (68.52% of the sample) was lack of awareness of any relevant publications.

The technology itself can be a barrier to the use. The effort of obtaining passwords and uploading viewing software, combined with delays on the network and the numerous screens to navigate through, were identified as significant deterrents in Woodward's survey (1998). Also, most people dislike reading from a screen and will print out articles for reading.

Electronic journals are widely perceived as having a lower status than paper journals. Bell (1997) highlighted this as a major concern for academics, who feel it is important to publish in highly rated print journals for the purposes of the Research Assessment Exercise (RAE), although there is nothing in the RAE guidelines (RAE96 2/95) to say that e-journals are not acceptable.

On the positive side were convenience of access and the flexibility of the medium to include far more information than possible in a printed journal, for example, extensive laboratory reports, giving access to complete sets of experimental results.

Gomes and Meadows (1998) ranked the requirements and expectations of the academic community with respect to e-journals. Top of the list was quality of the articles, closely

followed by the prestige of the journal, since academics want their work to appear in publications that are highly regarded by their peer group. The next priority was speed of publication.

The conclusions of the Loughborough University survey (Woodward et al., 1998) was that, for e-journals to become established, there needs to be simplified access, for example, through a "one-stop-shop" which would allow keyword searching across all the available titles regardless of publisher. More importantly, there has to be a "critical mass" of relevant titles across all academic disciplines.

Survey of attitudes to and use of e-journals at UWE.

Questionnaire survey

The starting point was a questionnaire survey, carried out by the E-journals Project Working Group at UWE library, designed to collect data on e-journal use, non-use, and reasons for non-use. It was e-mailed to 3,400 members of staff in all faculties and around 10% of the student population, selected to represent a range of different types of courses and different modes of attendance.

Results

A total of 375 replies were received representing a response rate of 11%. Of the total, 36% said they used e-journals and 64% did not. The results were broken down to give a comparison of e-journal use by type of user.

**Table 1. Comparison of e-journal use
a) by type of user**

	<u>Total</u>	<u>E-journal user</u>			<u>Total</u>	<u>E-journal user</u>	
		<u>Yes</u>	<u>No</u>			<u>Yes</u>	<u>No</u>
<u>Students</u>				<u>Staff</u>			
Undergrad.	120	30 25%	90 75%	Academic	181	73 40%	108 60%
Postgrad.	25	15 60%	10 40%	Admin.	46	14 30%	32 70%
Research	15	10 67%	5 33%	Other	19	4 21%	15 79%
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Grand Total	160	55 34%	105 66%	Total	246	91 37%	155 63%

NB: Some respondents came into more than one category.

The results show a similarity in the overall numbers of students and staff using e-journals (34% and 37% respectively). However, when undergraduates (25%) are compared with postgraduates and research students (60% and 67%), there is a large difference. Academic staff are more likely to use e-journals than administrative staff (40% compared to 30%).

These results suggest that those involved in research are more likely to use e-journals. Low use by undergraduate students (25%) could also reflect their limited access to suitable machines, since use by administrative staff, who typically have their own desktop PCs, was higher than that of students (30%). At UWE (40%) of academic staff

used e-journals compared to 28% at Strathclyde University, as revealed by an earlier survey (Tomney and Burton, 1998). Whether this is due to institutional differences, or to increasing use over time, is impossible to say.

**Table 2. Comparison of e-journal use
b) by faculty - including the Library**

<u>Faculty</u>	<u>Total responses</u>	<u>No. using e-js, (% total)</u>	
Business	36	23	(64%)
Library	25	13	(52%)
Health Sciences	46	23	(50%)
Applied Sciences	39	19	(49%)
Law	9	4	(44%)
Computing & Maths.	26	9	(35%)
Built Environment	26	8	(31%)
Engineering	16	5	(31%)
Languages & European Studies	11	3	(27%)
Humanities	50	10	(20%)
Economics & Social Sciences	11	2	(18%)
Art Media & Design	10	1	(10%)

At UWE, as at Strathclyde University, the highest use of e-journals was found to be in the Business School, while lowest use was in the Art, Media and Design Faculty.

Table 3. Reasons for non-use of e-journals.

• Lack of knowledge about how to use them	35%
• Lack of awareness - from knowing nothing about e-journals, to being unaware of what is available	30%
• Lack of time to find out	15%
• Access difficulties	6%
• E-journals not needed	6%
• Nothing relevant available	6%
• A preference for paper journals.	2%
• Not interested.	0.3%

Access difficulties were less important than in some earlier surveys, possibly because awareness barriers have to be surmounted before access becomes an issue.

Interview survey at UWE

For this survey subjects were selected from a sub-group of the respondents to the questionnaire. These comprised the 38 academic staff who had claimed to use e-journals and could therefore provide information based on experience. Of these, 15 agreed to be interviewed. Although a comparatively small sample from a large organisation, the range of opinion and experience was very broad. The sample included researchers and lecturers representing all faculties, both genders, a broad age range, and all levels within the academic staff structure.

Semi-structured interview techniques were used to elicit qualitative information about the attitudes and motivations of the e-journal users. The interview questions were based around issues that had become apparent in the literature review.

Responses to the interview questions

Definition of "electronic journal"

The interviewees were unanimous in defining e-journals as electronic versions of print journals. There was some awareness of electronic-only e-journals, and of e-mailed newsletters. One person included the possibility of multimedia, and another, interactive features, but few had any direct experienced of these more innovative features.

Awareness of e-journals

Two thirds of the subjects had become aware of e-journals through the library. Others had discovered them through professional literature, contacts, electronic discussion groups and the Internet.

E-journals used

The e-journals used most, where "using" meant simply browsing and reading, were from collections made available through the library - BIDs ingentaJournals, Emerald and the Ovid Biomedical Collection. Two other collections, OCLC's Electronic Collections Online (ECO), and European Business ASAP, were less popular. The former because "navigation through it is cumbersome" and the latter because it cannot be searched off site and many of its journals comprise only selected items. Two Law faculty lecturers reported being unable to find many relevant e-journals in their subject areas. Examples of specific e-journals quoted included some that were electronic only, and others that were electronic versions of a print journal not stocked by the library. Online versions of newspapers were also popular.

Use of the library's e-journals web page.

UWE library's e-journals web page is designed to help identify and locate relevant e-journals. It lists those subscribed to, alphabetically, by subject and by specific e-journal collections, with active links to the journals, or journal provider. However, only a third of the sample had used it, which calls into question whether users are aware of its existence, or how it could help. A web page is one means of promoting otherwise "invisible" e-journals, but can only do this if it is itself visible and attractive to use.

Advantages of using e-journals.

As in earlier surveys, the main advantage cited was the convenience of being able to access e-journals from desktop PCs. This was followed closely by access to a wider range of journals than the library would otherwise be able to afford or store. The time saved by not having to visit the library, or wait for interlibrary loans, was also welcomed.

Other advantages mentioned were multi-user access, remote access, keyword searching across e-journal collections, and the ease with which the information gathered can be manipulated and stored.

Several interviewees were conscious of the benefits of e-journals in relation to teaching, especially that they cannot be defaced or stolen, and that students increasingly prefer using web-based resources.

The negative aspects of using e-journals

The commonest complaint about e-journals, as in most surveys, concerned the discomfort of reading from a computer screen. This survey also confirmed an overall preference for print material, even where the advantages and future potential of e-

journals were acknowledged. Some attributed this to cultural familiarity with print resources that may be less predominant in the next generation. Others felt that print had aesthetic qualities lacking in e-journals.

The next most cited disadvantages were lack of awareness of what is available and the time needed to explore and locate e-journals.

As in Hazel Woodward's survey (1998), problems due to technology were mentioned, especially the slowness of the Internet, downloading problems, lack of access to sufficiently good equipment, poor graphics, and password problems. Also there is a requirement for IT skills, which not all users have. Several interviewees spoke of the dangers of polarising library users, especially students, into those with sufficient skills and equipment to use the resources and those without. Technology, rather than increasing access, can often be instrumental in adding another layer of inequality.

One person mentioned the problems of long-term storage of electronic material, and the fact that we do not know how it may degrade or become obsolete with time. Another mentioned the archiving issue and the danger of losing the "intellectual record" if nobody takes responsibility for this.

The lack of portability of e-journals was also seen as a negative factor, since they tie you to a specific location, usually an office, where interruptions are likely.

"What would improve/increase your use of e-journals?"

Responses matched many of the observations in the literature. "more e-journals relevant to my areas of interest" supported Woodward's theory that low level of e-journal use was due to lack of "critical mass" in any subject area (Woodward et al., 1998). "one user interface for all the e-journals" supports another assertion by the same author that "what libraries and end-users want is one-stop-shopping" (Woodward, 1997).

"If e-journals were peer-reviewed and therefore had more credibility, I would be more likely to publish in them" was another response. Other comments included, "better equipment", "a better printer", "better access from home", "more confidence with the technology", "subject groupings of e-journals rather than publisher groupings", "an e-mail alerting service when the latest issues of selected journals are published, "better compatibility of the publishers' systems with my own", "more time", "more training".

Publishing in e-journals

Four of the subjects stated that they would submit their papers for publication in e-journals, five said it would depend on the status of the journal, and four definitely would not. Two people were publishing papers on their own web sites and also accessing material directly from other academics' web pages. This suggests that Harnad's "subversive proposal" of "free" scholarly communication (1995) could come about.

Would you recommend e-journals to students?

All the interviewees gave positive responses.

Quality and status of e-journal articles.

E-journal content was generally considered to be of good quality, and in some cases possessing added value. Likewise in Tomney and Burton's survey (1998), the majority

view was that the quality of articles in electronic and print journals was the same. This is understandable since the most commonly used e-journals are simply electronic versions of existing print journals. Nevertheless ten respondents thought that an article published in an e-journal would have a lower status, only two thought it would be the same, and two believed it would be the same so long as the e-journal was peer-reviewed.

The library's role in relation to e-journals.

Overall it was considered unlikely that the library would become redundant, at least in the immediate future. While there are subscriptions to pay, most users expect the library to do this, and they see the library's training and promotional role as being important.

One interviewee described his visit to a university library in the United States, where a culture of electronic provision of journals has replaced print journals. An efficient system was in place, using top quality machines to access electronic resources, supported by an excellent printer service.

The future of e-journals.

E-journals were generally regarded as a positive way forward. The interviewee who had witnessed their use in the US was convinced that, with the right IT infrastructure, e-journals could be successfully integrated into the academic library. Others felt that future improvements in the technology would eliminate some of the current problems, such as difficulties with remote access and poor search engines.

Most saw e-journal use as increasing. Two envisaged a cultural change, brought about by a new IT-literate generation. Another described the culture of e-journal use changing once a critical mass of people begin to use them, and usage spreads among colleagues.

Only three subjects discussed the future of e-journals in terms of their innovative potential. One imagined how linguistics journals, which in print describe sounds using phonetic notation, would be able to incorporate real sounds in an electronic version. One interviewee thought the next generation of publishers would be more creative with the electronic medium. Also, it was felt that people's expectations of e-journals would increase, as they become more aware of the capabilities of electronic medium.

The future potential of e-journals as teaching material for distance tutorials, for self-publication on the WWW, and for enabling libraries to provide access to a wider range of journal literature, was recognised.

Archiving and preservation were mentioned as issues to be addressed in the future.

Conclusions

The overall conclusions drawn from this study were as follows:

1. Most scholarly publications will ultimately be available in electronic formats.

The combination of World Wide Web technology and the serials crisis threatening budgets and journal collections of academic libraries, has created conditions in which electronic publishing is accepted as the way forward. Eventually most scholarly journals will be available electronically.

2. The potential of electronic publishing to revolutionise scholarly communication lies in the following features:

- The ability of individuals to publish their own work on the WWW, making it freely available to the scholarly community.
- The development of pre-print servers in some subject areas, speeding up the publication process.
- The success of some learned societies in publishing high quality peer-reviewed journals which are either free, or at least cheaper than equivalent journals from commercial publishers, and which publish articles much faster.
- The fact that e-journals no longer need to follow traditional journal formats, allowing separate articles to become the units of publication.
- The ability of the electronic medium to transform e-journal content by including links to other materials, multimedia presentations, access to databases, and interactive possibilities.

3. The scholarly impact of e-journals in the UK is low.

As yet there is little sign of a major revolution in scholarly communication. Evidence shows that use of e-journals in UK universities, though increasing, is still very low.

According to Raney (1999), for e-journals to be accepted they must:

- meet the primary requirement of scholarly publication, i.e. quality of content;
- address the problems of the current system, e.g. slowness of publication, spiraling costs;
- provide extras which the old format cannot, e.g. multimedia.

On the face of it e-journals are able to meet all these criteria. Many academics consider there to be no difference in quality between e-journals and print journals. Faster publication of authors' work is possible, although probably only by by-passing the commercial publishers. The same goes for reduction in costs. At the same time the full scope of innovation that can be achieved, by virtue of the electronic medium, is just beginning to be realised.

However, these factors all concern the e-journals themselves and are more likely to be significant once e-journal use is established. Initially, as far as potential users of e-journals are concerned there are other more important factors.

4. Barriers to e-journal use.

- dislike of reading from screen
- lack of awareness about e-journals
- difficulty of locating e-journals
- the technology
- their perceived lack of prestige.

5. Features of e-journals that make them acceptable to the average user.

- improved access to information in terms of convenience, speed, and range of materials;
- increased access possible for simultaneous users and remote users;
- resemblance to recognisable print journals.

The commercial publishers are bringing out more and more parallel electronic versions of print journals, identical to their print counterparts in every respect except the medium of delivery. Their familiar titles act like brand names for academic users, who can immediately judge them in terms of status, and quality of content. Thus they are conferred a legitimacy which electronic-only journals lack, however rigorously peer reviewed. This represents not so much a revolution in scholarly communication, as a preservation of the *status quo* that merely exploits the capabilities of the electronic media as a means of delivery.

6. The factors most likely to bring about change are:

- critical mass
- culture change
- improvements in the technology
- the needs of research
- institutional policy.

Commercial interest in electronic publishing has resulted in an upsurge of e-journal titles in nearly all subject areas. We are now approaching the critical mass required to stimulate e-journal use.

Just as a critical mass of e-journals is necessary to bring about change, so is a critical mass of e-journal users. As more people become familiar with these resources, information about them will spread among peer groups, and be passed on to students, thus bringing about a culture change.

There is also a demographic aspect to cultural change. Having grown up with print sources many of the academics interviewed were not so comfortable with the electronic medium. However students who increasingly make computers their first port of call for gathering information should find themselves perfectly at ease with e-journals.

As technology changes and improves, many of the technological difficulties quoted in the survey will begin to disappear. The main area where improvements would have an enormous effect is in the ergonomic aspects of reading text from a computer screen.

A factor holding back change is academics' concern with the status of the journal. This can override all other considerations, especially in the scientific disciplines. Evidence suggests that this is largely attributable to the RAE since many academics are careful to ensure their work is published in highly RAE-ranked journals, perceived as being the traditional print journals. E-journals will only become an integral part of the scholarly process if researchers are prepared to publish their work in them.

Institutional policy is a factor for change where the library is concerned. Policies, such as developing distance learning courses, create a requirement to meet the resource needs of students on these courses. Electronic journal provision is one way the library can respond to this challenge.

7. The likely impact of change, when it comes:

a) on the academic journals

Because e-journals have evolved through the medium of print they tend to retain the print journal format. Eventually the electronic medium must effect a change on both

format and content of the academic publication. In the short term, in order for them to be accepted, e-journals need to maintain a familiar, recognisable quality.

We are beginning to see a blurring of boundaries between different types of electronic publication. A bibliographic database may link to the full-text of articles. Articles may contain links to other articles, references or collections of data. Interactive features could turn a research paper into something approaching an online conference, and multimedia features could enable a multidimensional quality which could never be achieved in text alone. This supports Wilson's view (1995) that the term "journal" will no longer be meaningful in the context of electronic publications.

The issue of archiving remains to be resolved. How can such diffuse, dynamic and multidimensional material be stored and preserved, and who will do it? The change to electronic communication will demand a solution or we risk losing the intellectual record for future generations.

Whatever happens to e-journals, it is unlikely that print journals will disappear. In the history of technological innovation the new rarely replaces the old entirely.

b) on the publishers

Commercial publishers are naturally concerned to protect both their profits and their role in the scholarly communication process. According to Fred Friend, director of scholarly communication at University College (1998), a real "revolution" in the communication of research, which results in electronic self-publication by researchers, could ultimately destroy the dominant role of commercial publishers by breaking their quasi-monopoly. In the face of such a threat publishers may be forced to confront some of the issues that concern the academic community and find ways to speed up publication and reduce prices. On the other hand there may be opportunities for publishers to work with other organisations to develop new models of scholarly publication.

c) on the academic library

During the 1990s academic libraries experienced profound changes as information resources moved steadily from print to digital. The possibility of this resulting in the death of libraries is remote since there will always be a need for some kind of central service, to manage collections and pay subscriptions, regardless of format.

The main impact is that the library's resources are becoming less location dependent. Access can be from different buildings on the same campus, different sites within the same institution, home or workplace computers, or even from other countries. At the same time library users are becoming more dispersed due to different modes of attendance, wider catchment areas, and distance learning courses. The library is expected to meet the information needs of all its users wherever they are. E-journals are just part of the solution.

E-journal provision is not an easy option. It requires massive financial and organisational commitment from a library to put into place a system that delivers the materials efficiently. As more resources move online, the demand for networked workstations will increase and because future e-journals can be expected to display many more innovative features, these workstations will require greater capacity and a wider range of capabilities than ever before. There will also be staffing and training needs, as a new

range of skills will be called on. Closer co-operation between libraries and IT departments will be essential.

Shared access to common collections of electronic resources may be possible between consortia of libraries, depending on agreements that can be reached with the publishers.

As more and more journals are provided electronically the inevitable outcome will be cancellations of print journals. Consequently the role of the library will move from one of maintaining an archive of materials for its users to facilitating and enhancing access to the electronic resources. One way this may be achieved is through extensive training and promotion activities. As the survey shows, UWE library's awareness-raising activities have already had some impact. It is also important that electronic resources should be seamlessly integrated into the traditional collections and systems to create a truly hybrid library.

Summary

In spite of the capabilities of the electronic medium the majority of e-journals currently used by the academic community are simply parallel electronic versions of traditional print journals. Large numbers of these now exist covering almost all subject areas. The "critical mass", spoken of in the literature, as an essential factor for e-journal adoption on a large scale, has virtually been reached. However, as this and other studies show, the uptake of e-journals is still low. The survey of academics at UWE reveals a generally positive attitude towards them, and an appreciation of the improved access to journal literature they afford. Therefore non-use of e-journals does not appear to be due to the items themselves but to external factors.

The principal requirement is for an institutional culture change, from paper-based to electronic journal use. For this to happen there has to be another "critical mass" but this time of users. An indication of how this may come about was revealed by this study, which showed that the main reason for non-use of e-journals was simply lack of awareness of what is available. Of the people surveyed a large proportion of them said they had been introduced to e-journals through the library's awareness raising, promotion and training activities. This suggests that the library has an important role in the uptake of e-journals. Once a critical mass of users is attained, e-journal culture will spread among peers and be passed on to students. Then, when it is apparent that a large audience is reading them, academics will be more prepared to publish in this medium.

A further culture shift has to occur, from e-journals as simply parallel publications of print journals, to purely electronic format. Only then can the more innovative potential of the electronic medium begin to have an impact. Not until these transitional stages are complete can there be any wholesale adoption of completely new models of scholarly publishing. When this comes about it will transform the relationship between author, user, library and publisher i.e. the whole scholarly communication process.

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