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Trends in Use of Electronic Journals in Higher Education in the UK - Views of Academic Staff and Students

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Abstract

This article examines disciplinary differences in the use of electronic journals by academic staff and students and considers whether library services need to differentiate between staff and students when planning support services for electronic journals. Findings from two research projects are collated, one an in-depth study of academic staff at one UK institution, and the other a cross-sectional, longitudinal sector study (focusing more on student usage). Interviews were conducted with 35 staff (in-depth study) and over 500 students (cross sectional survey). Results indicate that academic staff incorporate electronic journal usage into their working patterns in different ways than students and that these differences may affect attitudes towards support services (library Web pages, Virtual Learning Environments) designed to promote electronic journal usage. Disciplinary differences also need to be considered.

Introduction

The move to an electronic format for journals has affected serials management practices in libraries, and some of those changes affect how library users incorporate 'looking at journals' within their patterns of work. This article examines the views of academic staff and students on the advantages and disadvantages of electronic journals, using data from two research projects. One project examined the use of electronic journals among academic staff in the Faculty of Science at the University of Edinburgh [Bonthron, 2002]. The other project, JUSTEIS (JISC Usage Surveys: Trends in Electronic Information Services) examined uptake and use of a wide range of electronic information services in higher and further education in the UK, with emphasis on student usage. The aim of this article is to discuss how disciplinary differences might need to be reflected in the type of support provided by the library service, and whether academic staff require different support services from those provided for students.

Background

Early studies on electronic journals emphasised the need for electronic journals to emulate the usefulness of print journals [Schwarzwalder, 1998], although acceptance depended on the way they would interface with the user's working environment [Olsen, 1994]. Later studies also emphasise the importance of the interaction between the working habits of the users, the demands of the electronic journal products, and the technological capabilities of the user's system [Stewart, 1996; Pullinger, 1999; and Mahe, Andrys, & Charton, 2000]. At the time, there were technical barriers to their use [Meadows, 1996], and it was thought that the lack of critical mass in particular subject areas was a reason for the reluctance of many academics and researchers to use electronic journals [Jenkins, 1997; Tomney & Burton, 1998; and Pullinger, 1999]. A more recent study [Rogers, 2001] at Ohio State University cites, for example, a change from 200 to over 3000 electronic journals as a move towards critical mass, at which point users would be happy to see print subscriptions cancelled. Qualitative data on usage [Woodward, 1997], although limited by a poor response rate, suggested that academic staff and students disliked reading from a screen, particularly if image quality was poor, and that the quality of interfaces and the ease of use would need to improve if electronic journals were to be used more. Many of the research studies do not address how the journal and periodical literature was used by academic staff, researchers and students in the different disciplines prior to the introduction of electronic journal trials, and some of the differences found [Pullinger, 1999] might be attributed to disciplinary differences [Tomney & Burton, 1998]. More recently, the strength of these disciplinary differences may be seen in the differential uptake of electronic information products [Kling & McKim, 2000] and different publishing models [Kling, Spector, & McKim, 2002], with several of these models attempting to deal with the serials crisis of soaring subscription costs [Halliday & Oppenheim, 2001]. A review [Tenopir & King, 2002] of electronic journal studies from 1997 to 2001 also notes the considerable variation among disciplines in reading habits, alongside an apparent overall increase in the proportion of electronic — as opposed to print — journals used.

Libraries have used various methods of promoting electronic journals to their users and methods used include direct access from the Online Public Access Catalogue [Chaney, Bulliard, & Christiansen, 1999]. Another more general survey of users who were not connected to any electronic journal trial [Pedersen & Stockdale, 1999] found that attitudes varied between those who would be happy to see all journals in electronic format and those who definitely did not want all their journals in electronic format. The problem of providing a suitable interface may require good collaboration between the subject specialist staff and the systems staff [Roes, 1999], and new staff support roles may be required [Ashcroft & Langdon, 1999]. One of the largest cross-disciplinary studies [Rusch-Feja & Siebeky, 1999], with complementary attitude and usage data, indicated the priorities of users for an integrated access system, and some indication of a shift in attitudes. Users claimed that, if budgetary restraints were present, they could do without print journals as long as electronic access to the same journals was provided. An American study [Lenares, 1999] indicated that reluctance of some academics to use electronic journals is simply due to the lack of a respected electronic journal in their field. In some cases, the print version may exist alongside additional articles that are also peer-reviewed but only available online, and examination of citation patterns (for Pediatrics and Pediatrics electronic pages)

showed that for articles published in 1997, 1998, and 1999, the online articles received fewer citations than the print articles [Anderson, Sack, Kjrauss, & O'Keefe, 2001]. Although authors (and their tenure committees) were happy to have such articles included in the list submitted to the committees, online publications still tend to be viewed as second-tier to a limited, although possibly decreasing, extent.

Methods

In-depth study (academic staff in the Faculty of Science, University of Edinburgh)

Sampling

Four departments were selected, purposively to reflect different perspectives of interest to the research. These were:

- Electronics and Electrical Engineering

- Institute of Cellular and Molecular Biology (ICMB)(Biological Sciences)

- Chemistry

- Mathematics (more concerned than other science departments over access to older material).

The Electronic and Electrical Engineering Department had been reliant solely on electronic access to some of their core journals (IEEE serials) for some years, and their views should reflect actual experience of use. As an active research group, the Institute of Cellular and Molecular Biology are high volume users of the journal literature, and speed of access to a wide range of literature should concern them. The Chemistry Department was also concerned about access to their literature, and they had recently taken over responsibility for their Departmental library. Mathematics staff often required access to older literature, and the archiving of electronic journals was expected to concern them.

The research aimed to elicit views of regular, occasional and infrequent users of electronic journals. In order to make an appropriate selection of interviewees, a short electronic questionnaire was sent out to try to identify the range of usage. This produced a low response (0% to just over 30%) in the departments and another approach was used to complement the data obtained, as few infrequent users were identified from the questionnaire. Systematic sampling (every fifth name on a staff list) was used to build up a list of interviewees, and the final list of 35 comprised 4 academics from Electronic and Electrical Engineering, 8 mathematicians, 12 biologists from ICMB, and 11 chemists (around 20% of each department selected). No consideration was given to age or status in the sample. Respondents from one department provided helpful comments on their questionnaire returns. Interviews were also conducted with the three subject librarians responsible for the departments in the sample.

Interviews

Interviews with academic staff were conducted face-to-face over a ten-week period in 2001. The questions varied slightly, depending on whether staff used electronic journals frequently or not. The objective of the interviews was to assess the place of electronic journals within the user's working environment, staff perceptions of the differences between print and electronic journals, whether the library service could provide additional training to make electronic journal usage easier, and whether the library Web pages fulfilled their intended promotional and support roles. Interviews were recorded, and notes were made from the recordings for the analysis.

JUSTEIS research

The JUSTEIS project is part of the Monitoring and Evaluation Framework set up by the JISC in 1999. The project survey work includes interviews with a wide range of students (undergraduate and postgraduate) at higher and further education institutions throughout the UK.

Sampling

This article focuses on data from the interviews with undergraduate (UG) and postgraduate (PG) students, and staff in higher education institutions (HEIs) for the first three cycles (Table 1).

	Participating HEIs	Participating depts	Student (UG and PG) interviews	Student questionnaires	Academic staff interviews	Academic staff questionnaires	Library and information service staff interviews
Cycle 1 1999/00	26	37	121	518	30	57	37
Cycle 2 2000/01	22	35	221	465	22	0	10
Cycle 3 2001/02	18	29	200	353	26	28	9

Table 1: Sample details for JUSTEIS cycles (1999/200 - 2001/2002)

Surveys

Interviews were conducted using a critical incident technique combined with a critical success factors element (and a vignette information problem added in the third cycle). Student interviews were conducted face-to-face, but most interviews with senior library staff and academic staff were conducted by telephone. Questions to students concerned the approach taken in a recent information-seeking incident, awareness, and frequency of use of electronic information services, including electronic journals and collections. Interviews were recorded, transcribed and analyzed using NUD*IST qualitative data analysis software.

Results

Current awareness with electronic journals for academic and research staff

Among those in Edinburgh who used electronic journals regularly (at least once a week and sometimes on a daily basis), electronic journals were used for current awareness, and in a few cases the convenience of the electronic journal will mean that less important articles only available in paper will not be selected.

"First port of call [when searching for new research articles] is always electronic, just to scan or browse. If I definitely need to use, I'll print out from screen."
"If paper isn't available electronically, I'll skip it and find something that is, unless it's very important."

Electrical and electronics engineering staff used the Conference paper facility within the IEEE Journal home page to keep up to date, while Mathematics staff mentioned use of preprints on the Internet as a way of keeping up to date.

Staff routes to finding electronic journals and locating articles

Very little use was made of the library's electronic journal Web page in the University of Edinburgh by academic staff in the sciences. The most common route to individual electronic journal articles was through electronic bibliographic databases (such as those contained in Web of Science, Beilstein, PubMed) to find references to articles, or (preferably) the articles themselves. A few staff noted that the availability of the direct link from the Scifinder database to the article marked prompted them to start using electronic journals.

Embedding electronic journal use in working patterns of staff

Disciplinary differences are apparent (Figure 1), although the sample size is admittedly small. In some departments in Edinburgh, the differences in working patterns, and willingness to embed electronic usage as part of regular working routines, appeared more of a generational difference. In others, the reluctance to switch from print has more to do with worries about access to back issues, concerns that electronic journals were not yet authoritative, and the fact that some staff still liked visiting the library. Those with more specific needs (such as the electronic and electrical engineering staff) were happy with electronic journal provision as the IEEE series fulfilled most of their needs. For others, such as the mathematics staff, the JSTOR facility was useful in providing access to older material. Faculty staff in Edinburgh usually bookmark their favorite journals, and the regular users of electronic journals were not using the electronic journal library Web page for access. The electronic journal library Web page is only used when access is denied on a direct link from the bibliographic database. One department had made viewing of text and graphics on screen easier by insisting that all monitors had 17-inch screens.

One social scientist academic in JUSTEIS mentioned accessing a special list of electronic journals for their discipline on another university site, which had special responsibility for supporting teaching and learning in that discipline. Otherwise, the JUSTEIS findings echo those of the in-depth study in Edinburgh, with academic staff

and research students in the sciences bookmarking sites for bibliographic databases, journal collections and individual journal sites.

There was little evidence that academic staff were using any of the value-added features of electronic journals at the time of the Edinburgh survey. Only 3 of the 35 interviewed mentioned using the regular updating available as part of the table of contents mailing feature. None mentioned linking to the author's Web page. The ZETOC service was mentioned by a few academic staff in cycle three of the JUSTEIS study.

Trends in student use of electronic journals

Student use of electronic journals was assessed from the JUSTEIS data in two ways. Students were asked in the interview to discuss a recent information-seeking incident (which could be for study, or personal purposes), and the sources used. Later in the interview, they were also asked about their awareness of particular information resources. Over the three monitoring cycles (1999/2000 – 2001/2002) there has been an overall increase in awareness of electronic journals, with electronic journals (and collections) in 5th place for regularly used electronic information services in cycle three, from 7th place in the first cycle, and below 7th in cycle two. Cycle three interviewees included proportionally more clinical sciences students than previous years, which may account for some of the observed rise in awareness in cycle three (and dip in cycle two), given the high proportion of such students using electronic journals regularly (Figure 1). Where the Web is making a difference in behavior may be in the use of organizational Web sites. That might suggest that periodical publications, whether technical reports, statistical series, or current awareness newsletters that are found on an organization's Web site, may be useful to students (Table 2). The survey work included a complementary questionnaire survey, which also witnessed a rapid rise in ranking for electronic journals in cycle three.

Table 2: Frequency of use of electronic information services for a recent search by undergraduates (JUSTEIS)			
EIS used in critical incident search	Cycle one undergraduate interviews n=86 %	Cycle two undergraduate interviews n=191 %	Cycle three undergraduate interviews n=160 %
Search engines	64.0	59.2	60.0
Organisational Web sites	11.6	19.4	24.4
Bibliographic databases	9.3	6.9	16.3
OPAC	8.1	6.8	7.5
Own HEI Web site	12.8	8.9	5.0
Email, newsgroups	11.6	4.2	4.4
Electronic journals, and services	11.6	7.9	13.7
Gateways (JISC)	2.3	2.6	0.0
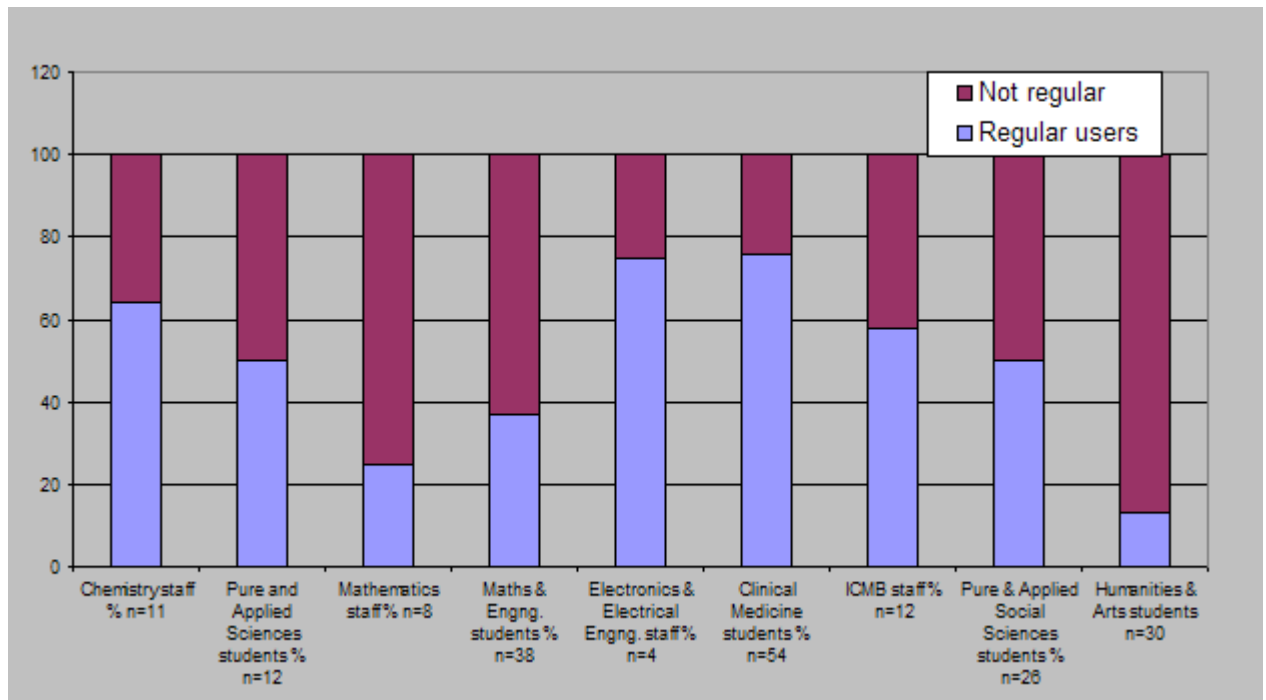
Figure 1: Disciplinary differences in electronic journal usage (academic staff (in-depth study) and undergraduates, cycle three, JUSTEIS).

Undergraduates need to be advised how to access some electronic journals through the databases.

"Probably for one of my assignments which was for a human resource module and the tutor recommended to us various academic journals and texts which are available online, they're online journals. I used Emerald and I accessed three or four journals because we were given specific titles and then for the assignments they recommended using the online texts again." (Business studies undergraduate, cycle three)

When they do find out about electronic journals, some see the advantages of using their time (and money) in a way that suits them and will go straight to the collections as well as searching in the databases first.

"I was trying to find some information about an essay I've got to write, I was using Medline, that and electronic journals, I try to get as many journals as I can electronically because it's just easier and I don't have to pay the university's extortionate photocopying charges! ... and I can email it to myself at home and read it on my computer." (Science undergraduate, cycle one)
"OK, I went onto Web of Science and did a search for resilience... and I got a list of probably be about 90 ones and I found relevant from that, and then went onto Science Direct to see if they had them on full-text, and downloaded them, and the ones that weren't on Science Direct, I went to the actual Websites of the journals to see if they had them there... I usually use Science Direct and just go straight from that." (Science undergraduate, cycle two)
"I didn't like them (electronic journals) at the beginning...because I didn't understand them and nobody explained what you could get out of them...but I like them now

because I've gone and found loads of stuff and downloaded it...It's the Ingenta thing"
(Social sciences undergraduate, cycle two)

The function of the library Web page for electronic journals

Undergraduates interviewed for JUSTEIS rarely gave examples of using the subject trees on a library web page. Those who had been trained in use of an electronic journals web page were prepared to use the page, particularly when searching from home. Undergraduates are looking for full text documents that will fulfill assignment requirements. Lecturers' Web sites or Virtual Learning Environments (VLEs) seem the most obvious place for students to look for material that is directly related to their assigned work. For students who are following a vocational course, there is often more emphasis from the relevant professional body (e.g., the Law Society) on the need for graduates to be equipped with information skills for future employment. The library manager may have to decide where to allocate effort — into library web pages which may be used intermittently if at all, or into support of academic staff and learning support staff in development of VLEs. The effort, of course, is often the maintenance of such course-related sites, and students get frustrated when material is not available as advertised.

"Oh yes, because they'll, for instance a lot of our assignments on our module guides they'll give you websites. You go on to these websites and it tells you not available so you think what a waste of my time. They've given me these websites and you cannot get the information off because they're telling you it's not available to you. So you've sat there for ages, pulling your hair out and you end up having to go in, walk all over the place trying to find the information." (Clinical sciences undergraduate, cycle three)

Middleware research projects such as Angel (Authenticated Networked Guided Environment for Learning, <http://www.angel.ac.uk/inside/index.htm>) may make it easier for academic or learning support staff to gather accessible collections of resources without such maintenance problems. As far as the library's electronic journal pages are concerned, the main users may be students who need additional information about a particular journal (checking availability off-campus, for example). Many students by default will simply search for a journal by name on a search engine search.

Faculty in Edinburgh preferred the direct route of bookmarks to going through what seemed to some of them to be a complex Library Web page to reach the electronic journals they used most.

Discussion

One of the concepts mentioned in the literature is that of 'critical mass' of electronic journals, as a lever to change user behavior, and preferences for electronic journals. The critical mass may be difficult to define entirely in terms of number of journals available electronically. The Edinburgh study found that the proportion of journals available electronically had little direct relationship with the proportion of regular users of electronic journals among academic staff, with 52/99 journals (52%) in Mathematics available electronically, compared with 64/80 (80%) in Chemistry, but

with a proportionally much higher electronic journal usage in Chemistry (around two-thirds of the chemists were regular users, whereas only around a quarter of the mathematicians were). This suggests that the critical point may be somewhere in the region of 60%-75% availability of electronic journals. The critical mass may also be related also to the type of material that is available electronically. In some disciplines, the availability electronically of serial publications, which supply authoritative and current information (e.g., government statistics, technical standards) may provide sufficient motivation to change working patterns of academic staff, who then influence students. In others, professional bodies, or national agencies may provide the necessary lead (e.g., PubMed Central and National Library of Medicine).

Pullinger suggested that the accessibility of the library may be a factor [Pullinger, 1999], but in the Edinburgh study this was not an influencing factor for staff. In JUSTEIS, the main advantage of off-campus access was for students. Increasingly, students have access to the Internet at home, and that is where their main studying environment may be, rather than on campus. Government policies for widening participation and providing lifelong structures mean that easy home-based access to electronic information, and learning facilities may be a factor for students when choosing further education (FE) colleges or higher education (HE) institutions.

For academic staff, access to electronic journals in the Edinburgh study was principally through 'book-marking' of sites on the Internet or using links from the databases, such as Web of Science. It is only when access is denied through this route, that the electronic journal web page will be investigated for access. Staff have — essentially — different purposes for journals and periodicals than undergraduate students whose use of journals may be discontinuous, and limited to those applicable to certain modules. The exception may be courses having a strong vocational element. The evidence from JUSTEIS is limited, and it is difficult sometimes to assess what students have been doing on a search, but there may be a trend for undergraduates to go direct to collections such as Science Direct, which offer a one-stop shop for their needs. Sometimes electronic journals are simply found on an Internet search or by going through other sites that link to journals. The cumulative findings of the JUSTEIS study [Urquhart et al., submitted] indicate that academic staff are the main influence on student use of electronic information services. The problem with promotion of electronic journals is that the staff role model does not transfer directly to the way students are using electronic journals.

Conclusions

Many of the earlier electronic journal trials and evaluations are limited in the validity and generalizability of their conclusions by low response rates from academic staff and students, coupled with the fact that only a few sites at most were studied. The Edinburgh study also found it difficult to trace the staff who were reluctant users of electronic journals. Similarly, JUSTEIS cannot claim to provide a fully representative picture of undergraduate students, although a cross-sectional approach was applied, and few other studies have attempted to use the same methods at a wide range of institutions within the same time period. The studies discussed in this article also suggest that disciplinary differences continue to exist, but that the type and nature of periodical publication needs to be considered as well.

The findings confirm that the working environment of staff, researchers, and students will provide clues for the reasons why electronic journals will be used or not, and which particular periodical publications will prove popular. The differences in the working environments mean that design of access mechanisms, whether through library Web pages, lecturers' Web sites, or VLEs, needs to take into account the different target audience needs and levels of experience. Specialized training by library staff for students also needs to take those differences into consideration.

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