ELECTRONIC JOURNALS’ USAGE AND USER STUDIES: A LITERATURE REVIEW

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This article aims to present an overall picture of the studies that have been done in the area of usage and users’ studies of electronic journals in recent years (2004 onward) till present, in a way that will be of value to researchers. This review is presented under three headings and nine subheadings.

Originality/value – The paper provides a picture of electronic journals usage and users studies. It is valuable for students, teachers in library and information science field and especially researchers who want to do research in this field.

KEYWORDS/DESCRIPTIONS: Electronic journals, User studies, Journal use study

1 INTRODUCTION

The literature search is a key starting point for any research process and it assists the researcher to identify previous and present research projects and provides valuable knowledge for the understanding of the theoretical and methodological issues surrounding the research topic. Although usage and user studies of electronic journals appeared in the literature in the late 1990s, this article attempts to present a comprehensive review of usage and user studies of electronic journals in recent years (2004 onward) because there are other previous literature reviews (King and Tenopir, 2001; Tenopir, 2003a; Kling and Callahan, 2003; Rowlands, 2007; Jamali, Nichólas, and Huntington, 2005) and it will be supplementary. This review has a different perspective chronologically and provides sample, research design, methodology and conclusion. It is presented under three headings and nine subheadings.

2 USE OF ELECTRONIC JOURNALS

2.1 Use of Electronic Journals by Different Users

Torma and Vakkari (2004) demonstrated relations between digital library use by university faculty, users’ discipline and the availability of key resources in the Finnish National Electronic Library (FinELib), by using nationwide representative survey data. The results showed that the perceived availability was a stronger predictor of the frequency of use of its services than users’ discipline. Regardless of discipline, a good perceived provision of central resources led to a more frequent use of FinELib. The satisfaction with the services did not vary with the discipline, but perceived relevance was the key predictor.

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In a similar study, Abouserie (2006) surveyed on use of electronic journals by Library and Information Science faculty members at the School of Information Science at the University of Pittsburgh. The study showed a difference in using various information sources, where the study found variability in the sources used according to rank and gender. Also, there was a variance satisfaction with electronic sources, where faculty members were most satisfied with index and abstracts and Full Text Databases and Electronic Journals. Faculty members considered electronic journals highly creditable, most accurate, highly reasonable and most supportive and convenient to meet their needs.

In a study by Borrego and Urbano (2007), the behavior of the users of a package of electronic journals using the data of consumption per IP address was studied. They analysed the data of consumption at the University of Barcelona of 31 electronic journals of the American Chemical Society (ACS) in 2003. Data of sessions, articles downloaded and abstracts viewed were analysed. Most of the consumption was concentrated at a few IP addresses, and most of the users made little use of the information available. There was found to be a greater dispersion of the consumption of electronic information than of information on paper. Finally, it was determined that the number of abstracts viewed was a good predictor of the number of regular users of a journal.

2.2 Use of Electronic Journals in Developing Countries

Naushad (2005) examined the use of electronic information services (EIS) among the users of the Indian Institute of Technology (IIT) Library in Delhi, India. Both questionnaire and observational methods were used for data collection where 300 valid samples were collected. The analysis of data collected covered awareness of EIS services, use of e-journals, advance search facilities, acquaintance with electronic information sources, the purpose of using e-information, problems faced by the users while using EIS, infrastructure facility available and satisfaction level of users. The study found that Boolean logic and truncation were the most often used search facilities by IIT users. Lack of printing facilities, terminals and trained staff were the major reasons that would discourage users from accessing the EIS. The survey also revealed that some 60 percent of users faced difficulties while browsing e-information.

Search habits of Internet users at the Medical University of Isfahan (MUI), Iran were investigated by Asemi (2005). Data were collected by using a questionnaire and follow-up interviews with Internet users from five faculties. Results showed that all the respondents were using the Internet frequently because all faculties had provided connection to the Internet. Fifty-five percent of respondents searched for scientific information through the Internet because the university library had provided access to various databases and online journals for all students and staff. They used the Internet in different ways, such as accessing to online journals, downloading software or text, chatting, discussion, E-mail services and for finding related references. The analysis revealed that 54 percent of Internet users always found useful information on the Internet. Thirty-one percent of respondents believed that quality information was available on the Internet and finally, 35% of the studied population used print, online and offline form of information for updating their subject knowledge.
In their study, Afaq and Mahmood (2005) investigated the use of library and information science (LIS) journals (electronic and paper) in two developing countries, i.e., Malaysia and Pakistan. The targeted group includes two sets of graduate students from Departments of Library and Information Science, each in an academic institution from one of the two countries. Findings of that survey questionnaire showed that LIS journals had as their objective the provision of guidance in the education and learning process of LIS students and the provision of leadership in the practice of librarianship. The profession needed to have a heightened awareness of LIS journals and required fast and easy access to that body of literature. For developing countries that objective could only be met through help of developed nations who could provide improved means to access LIS journals more efficiently and more effectively in both paper and electronic format. Atilgan and Bayram (2006) also reported the results of a survey on the use of e-databases at Ankara University. They surveyed faculty in 2002 to determine the level of awareness of digital library resources, particularly journal articles, along with their usage rate, and to evaluate the preferences of faculty for specific electronic databases. They distributed a questionnaire to researchers at Ankara University. The main findings were that the majority of respondents indicated that they knew that digital library resources exist in Ankara University. Many of the faculty members (88 percent) used electronic databases. Full professors and research assistants placed second after associate and assistant professors in the use of electronic databases, although they placed first in level of awareness of the digital library. The most preferred databases had been Web of Science, Science Direct, and EBSCO.

In a related study, Raza and Upadhyay (2006) measured the usage of e-journals by researchers at Aligarh Muslim University (AMU, Aligarh, India). They distributed a questionnaire to a sample of seventy-two researchers at AMU. The response rate was 72 percent. The findings showed that the researchers were aware of e-journals in AMU; many research scholars accessed e-journals from their departmental labs and computer centers, for both research and to update their own knowledge; most of the researchers used both printed journals and e-journals; a large number of researchers were storing e-journal articles by downloading them onto discs; and lack of training and slow downloading were the problems faced by the researchers while using e-journals. That study ended with the statement that e-journals would not replace the traditional print format but rather complement it as a new medium of communication.

In a questionnaire survey, Asemi and Riyahiniya (2007) investigated the relationships between awareness and use of digital resources among students in Isfahan University of Medical Sciences, Iran. A total of 250 students were selected randomly as a sample. The results showed that 70 percent of students were aware of digital resources, but only 69 percent of them have used them; 62 percent were aware of offline databases, whereas only about 19 percent used them through the Central Library LAN network. About 70 percent were aware of online databases, accessible via the Central Library web site, and about 53 percent of respondents have used them. In total 87 percent of students felt that the available data resources met their information needs. Students had less use of offline databases, attributed to factors such as infrequent periodic orientation and lack of education on use of offline databases and fewer terminals connected to the
server in the Central Library. Users were faced with problems like low speed connectivity and shortage of hardware facilities.

Atakan, et al. (2008) studied electronic databases usage at Ankara University Digital Library to encompass the assessment of the effectiveness of the digital library and the value of multidisciplinary databases in terms of user preferences and use frequency by academic ranking. They compared the results of two surveys carried out in 2002 and 2005. Findings were consistent that positive results have been observed in two studies conducted in two years, 2002 and 2005. According to the results of the current survey, increased numbers of the faculty members of Ankara University knew about the existence of the digital library. Many of the faculty members used electronic databases. The most preferred databases had been Web of Science, Science Direct and EBSCO. When use of the electronic databases was analyzed, in respect of faculty rank and level of awareness, associate and assistant professors, assistants were ranked first.

A questionnaire survey in astronomy and astrophysics libraries and information centers in India was carried out by Deshpande and Pathak (2008). The study tried to create a substantial body of knowledge about the factors that influence the success of electronic journals, and to share this knowledge with that in the fields of astronomy and astrophysics in order to help facilitate change. Structured questionnaires for users (Academic Members, Post-Doctoral Fellows and Research Scholars) containing 40 different questions were used. The purpose was to identify the basic minimum infrastructure necessary to provide users access to electronic journals and to facilitate easy response in all major A&A organizations in India. Findings showed that the increasing use of the electronic information-seeking environment had produced changes in the practice of science.

Istanbul University faculty were surveyed to examine their use of electronic journals in particular to determine whether the users would be pleased by the cancellation of the printed or parallel published journal subscriptions in favor of the e-only journals by Dilek-Kayaoglu (2008). It was a Web-based user study. The majority of respondents supported the transition from print to e-only. The faculty in the fields of natural sciences and health sciences gave the strongest support for the transition from print to e-only, while the humanities and social scientist gave the least support, respectively. Three-fifths of the respondents, regardless of discipline, reported that the major barrier to use of e-journals was the lack of sufficient subscriptions in their discipline.

Galyani Moghaddam and Talawar (2008) studied the use of scholarly electronic journals at the Indian Institute of Science (IISc). The survey method was questionnaire. The results showed that a growing interest in electronic journals among the users at IISc. Electronic journals were mostly used for research needs and PDF was the most preferred format. The fact that users had free access to electronic journals at all hours from their own computers seemed to be the most appealing feature.

2.3 Use, Acceptance and Awareness of E-journals among Different Users

Medical science faculties at the University of the West Indies were surveyed by Renwick (2005). The findings showed that seventy-three percent used computers daily, and 82% felt that
their computer literacy level was average or beyond. Overall, it was found that faculty had high awareness of the electronic resources available. Many respondents felt that e-resources were important, and, though many felt that they were competent users, 83% were self-taught and many still expressed a need for training.

Borrego, et al. (2007) presented the results of a survey on the use of electronic journals by the academic staff of the universities belonging to the Consortium of Academic Libraries of Catalonia (CBUC). The results showed that a high proportion of staff were aware of the collection of electronic journals and that there was an increasing preference for the electronic to the detriment of the printed format. The collection of electronic journals was highly valued and most users expected to increase their use of them during the next few years. The results also confirmed the importance of discipline and age as explanatory factors of the use of electronic journals. The preference for the electronic format was higher among academic staff in Biomedicine, Engineering and Exact and Natural Sciences.

A study by Kurata, et al. (2007) was carried out to show the position of electronic journals in scholarly communication based on Japanese researchers’ information behavior and estimation. The survey method was questionnaire. The results showed that Japanese researchers used electronic journals as a matter of course, and other electronic resources to some extent, for accessing information; but that shift to electronic resources seemed to be not a transformation but a modification of traditional patterns of use. Researchers relied on traditional scholarly journals for accessing information and publication, although their recognition had begun to change.

Questionnaire responses from academic atmospheric scientists on why and how they use electronic journals and article databases were examined by Kozak (2007). The results confirmed that many atmospheric scientists use article databases and electronic journals to find current as well as older literature. The results did not offer any startling discoveries but did help verify previous beliefs that atmospheric scientists use article databases and electronic journals regularly. Those results could ultimately be used for the design of both better interfaces and more effective instructional courses.

Using the “Science Direct” that was provided by Elsevier Science, Fukazawa, et al. (2008) at the Japan Atomic Energy Agency (JAEA) carried out the survey on the usage of electronic journals. Results showed that the number of users and articles read by users increased during the survey period. Moreover, JAEA users browsed a total of 1,028 titles for various fields such as chemistry, engineering, medicine, physics, and social sciences.

2.4 Use of Electronic Journals in Dissertations

Use of library and information science (LIS) journals in dissertations written by students undertaking the Master’s course in Information and Library Studies at the University of Wales Aberystwyth was studied by Tedd (2006). Analysis of the citations of 100 (post 2000) dissertations submitted gave an indication of the range of material used in dissertations. In addition, responses to questionnaires from students provided information about how relevant
papers were found from LIS journals. LISA was the most popular source for a literature search, followed by EMERALD with 15 students. Other sources mentioned included (in alphabetic order): EBSCO, Google, Google Scholar, Ingenta, JSTOR, LISTA, OCLC First Search, Web of knowledge (WoK) and ZETOC. Findings showed that journals with a practical bias were cited more than research-oriented journals.

2.5 A Comparison of use of Print and Electronic Journals

Siebenberg, Galbraith, and Brady (2004) concluded that most print journals at Washington State University’s Owen Science and Engineering Library in 2003 were actually used more than they were prior to the introduction of electronic journals. They argued that the availability of electronic formats had in fact greatly enhanced the total use of all titles.

Use of printed and electronic journals in a science library was surveyed by Bar-Ilan and Fink (2005). They showed that use of electronic journals increased with time; age and/or academic position was inversely related to the use of electronic media and journals; There was a gradual reduction in the use of printed journals as users preferred and used the electronic format more; With increased use, users accessed the electronic format more frequently; The use of a journal was not necessarily an indication of the preference of users. Accessibility and desktop access, home access, ease of retrieval, and hyperlinks to outside content were the advantages of electronic journals and the disadvantages of electronic journals mentioned were the lack of back issues and problems with reading a text from the computer screen.

2.6 Impact of Electronic Journals on the use of the Print Collection

Borrelli, Galbraith and Brady (2009) examined the use of geology journals at Washington State University (WSU), before and after electronic access was provided, to determine if the use of the print collection increased as in the previous studies at WSU of three other science disciplines. The number and source of articles cited by WSU geologists from 1998 to 2004 was also examined to determine the impact of electronic access on citation patterns. The study showed that the changes in the use of individual titles were research driven. By 2001, geology users were using print and e-formats equally. Geology print use in 2002 was virtually the same as that of 1998, but electronic usage had increased dramatically but in 2003 print use declined. As geology users became more familiar and comfortable with e-access, there was an increase in the total citations in the papers they authored. The method of library research changed, which led to an overall increase in the number of citations, individual articles, and titles appearing in their publications. The titles included in the geology collection for any given year are impacted by large or “big deal” package purchases. However, if providing an increased breadth of offerings was a deciding factor, those big deals, with increased title selection, might be a favorable option and more likely to be supported by subject specialists.

2.7 Citation Analysis of Research Articles from Scholarly Electronic Journals

De Groote, et al. (2005) studied online journals’ impact on the citation patterns of medical faculty at the University of Illinois at Chicago (UIC). That study looked at whether researchers
were more likely to limit the resources they consulted and cited to those journals available online rather than those only in print. Searches by author affiliation were performed in the Web of Science to find all articles written by faculty members. Searches were conducted for the following years: 1993, 1996, 1999, and 2002. The number of journals cited per year continued to increase from 1993 to 2002. The results did not indicate that researchers were more likely to cite online journals or were less likely to cite journals only in print. At the regional location where the number of print-only journals was minimal, use of the print-only journals did decrease in 2002, although not significantly. It was possible that electronic access to information (i.e., online databases) had had a positive impact on the number of articles faculty would cite.

Bhata and Kumarb (2008) stated the results of citation analysis of research articles from scholarly electronic journals in the field of library and information science published during the years 2000 to 2006. Results showed that 81.49% of articles published during the period had web references. Out of 25,730 references, 56.54% of references were print journal references and 43.52% of them were web references.

2.8 Access Problems and Issues Related to Electronic Journals

Watts and Ibegbulam (2006) presented results from a preliminary investigation into the situation regarding access to electronic healthcare information in developing countries, focusing on the circumstances in the Medical Library, College of Medicine, University of Nigeria. Information gathered from a series of interviews with the librarian at the Medical Library identified a number of issues, including the lack of an adequate ICT infrastructure and affordable online access, and a need for library staff and library users to gain ICT skills and information seeking skills.

2.9 Comparing Online Journal Usage Statistics

In their study, Botero, et al. (2008) analyzed the comparative findings of two studies undertaken at the University of Florida Libraries comparing online journal usage statistics derived from COUNTER-compliant publishers. The analyses conducted in 2005 and 2006 were not intended to be rigorous scientific studies. Instead, the statistical assessments were intended as tools for determining trends in the costs and use of online journals at the University of Florida. The studies also explored the relationship between the large publisher online journal packages (the so-called Big Deals often licensed through consortia arrangements) and online journal usage, and the effects of Big Deal packages on library budgets. Results showed that full-text downloads increased in all disciplines from 2004 to 2005 and the general disciplines exposed distinct differences in usage patterns. The usage variants led to more cost-effective expenditures in some disciplines over others and the increased purchase of electronic resources had had a definite effect on the entire library materials budget and on the process of collection development. Not only was there a demonstrated cost benefit for the UF Libraries through those Big Deals, the studies also showed a significant use of the titles not previously offered to library patrons and being received through the bundled packages. The two studies showed that, despite a growing percentage of the
materials budget being spent on online bundled packages, the Big Deal at the UF Libraries was a Good Deal if measured by overall use and by price per full-text downloads.

3 PATTERNS OF USE OF ELECTRONIC JOURNALS

Judith and Neal (2004) examined patterns of use of electronic versions of journals supplied by an academic health sciences library to determine whether they differed from patterns of use among corresponding print titles and to relate the applicability of print collection development practices to an electronic environment. Use data supplied by three major vendors of electronic journals were compared to reshelving data for corresponding print titles, impact factors, and presence on Brandon/Hill Lists*. In collections where one-click access from a database record to the full text of articles was possible, electronic use correlated with print use across journal pairs. In both versions, Brandon/Hill titles were used more frequently than non-Brandon/Hill titles, use had modest correlations with journals' impact factors, and clinical use appeared to be higher than research use. Titles that had not been selected for the library's print collections, but which were bundled into publishers' packages, received little use compared to electronic titles also selected in print. Collection development practices based on quality and user needs could be applied with confidence to the electronic environment. Facilitating direct connections between citation databases and the corresponding journal articles regardless of platform or publisher would support scholarship and quality health care.

In a related study Franklin and Pulm (2004) presented results from Web-based surveys of more than 15,000 networked electronic services users in the United States between at four academic health sciences libraries and two large main campus libraries serving a variety of disciplines. Results showed that at the four academic health sciences libraries, there were approximately four remote networked electronic services users for each in-house user. Sponsored research (grant funded research) accounted for approximately 32% of the networked electronic services activity at the health sciences libraries and 16% at the main campus libraries. Sponsored researchers at the health sciences libraries appeared to use networked electronic services most intensively from on-campus, but not from in the library. The purpose of use for networked electronic resources by patrons within the library was different from the purpose of use of those resources by patrons using the resources remotely.

The patterns of use of electronic journals in Spanish university libraries were studied by Rodríguez Bravo, et al. (2008). No stagnation observed in the number of articles downloaded during the period studied. Nonetheless, the overall figures for downloads were not particularly encouraging. The use of Science Direct was much greater than that made of the other suppliers in relation to the size of the package that distributor made available. The larger universities didn't always have greater numbers of downloads than institutions of smaller size. Although there was

* An indicator for utility commonly used in health sciences libraries is the "Brandon/Hill Selected List of Print Books and Journals for the Small Medical Library." This bibliography was first created by Alfred N. Brandon in 1965 to guide hospital libraries in collection building. The list includes a core collection of medical journals listed alphabetically and by subject area. It is supplemented by similar lists for nursing and allied health fields.
no clear pattern of usage, there were observable preferences on the part of different universities for given packages. All the universities had welcomed the Big Deal model. Although many of the titles under contract were not used by the academic communities, it was worth emphasizing that a considerable spread of use was noted and the most famous titles were not always those most frequently used. Users consulted numerous serials that their institutions had never held in printed format.

In a related study, Manhas (2008) analyzed the patterns of use of Internet and electronic resources, the Internet skills of the dentists, and problems faced by them while using the Internet and electronic resources in dental colleges and hospitals of Punjab, India. The results showed that the most popular method of acquiring the necessary skills to use Internet and electronic resources was via trial and error method. Most of the respondents accessed the Internet from the college or workplace, while 19.3% also access from home. 42.6% of the respondents used the Internet and electronic resources for finding health/dental sciences information, followed by patient care. Email had been chosen as the most popular Internet service and e-journals as the most popular electronic resource. 36.7% of the respondents found overload of redundant information on the Internet was the main difficulty in using the Internet. A majority of the respondents felt fully satisfied with Internet services and electronic resources and stated that the Internet and electronic resources could not replace the physical resources (print resources) that it only supplemented the print resources.

4 PATTERNS OF READING OF ELECTRONIC JOURNALS

Tenopir, et al. (2004) carried out a study to determine how medical faculty members use scholarly journals, whether there is a pattern among types of users. Results showed that medical faculty read a great deal, especially compared to scientists. The most frequently reported principal purpose of reading was to support their primary research (30% of reading). The majority of reading came from recently published articles, mostly from personal subscriptions. Medical faculty continued to rely on print journals (approximately 70% of readings) versus electronic journals. Age of faculty did not appear to influence the choice of print or electronic format. Medical faculty read more articles than others on average and need information digested and verified in a way to save them time. Convenience and currency were highly valued attributes.

In a study, Boyce, et al. (2004) found a very substantial shift over the past few years in favor of directed online searching and away from browsing behaviors. They suggested little change in reading patterns before and after the introduction of electronic access. They estimated the range of journals consulted by the typical academic researcher had grown from at least 1 article per year from 13 titles in the late 1970s, to 18 in the mid-1990s, to approximately 23 titles by 2001. Their analysis revealed the extent to which electronic formats had displaced print. However, using colleagues as information gatekeepers and “following up the literature” remained important despite technological advances.

Reading behavior in the digital environment was studied by Liu (2005). The study showed that a screen-based reading behavior was emerging for reading electronic documents. That
behavior was characterised by more time spent browsing and scanning, keyword spotting, onetime reading, non-linear reading, and reading more selectively, while less time was spent on indepth reading and concentrated reading. Annotating and highlighting while reading was a common activity in the printed environment. However, that “traditional” pattern had not yet migrated to the digital environment when people read electronic documents.

Surveys of the members of the American Astronomical Society by Tenopir, et al. (2005) identified how astronomers use journals and what features and formats they prefer. Astronomers, like other scientists, continued to invest a large amount of their time in reading articles and placed a high level of importance on journal articles. They used a wide variety of formats and means to get access to materials that were essential to their work in teaching, service, and research. They selected access means that were convenient—whether those means be print, electronic, or both. The availability of a mature electronic journals system from their primary professional society had surely influenced their early adoption of e-journals.

Tenopir, et al. (2007) carried out a study to describe the journal reading patterns of pediatricians members of the American Academy of Pediatrics (AAP). Results showed that pediatricians read journal articles primarily for current awareness and most often rely on quick reading from print journals for current awareness. Reading for research, writing, and presentations were more likely from library-provided electronic journals. Convenience and purpose of reading were key factors that explain reading patterns of pediatricians. Print personal subscriptions were convenient for current awareness reading, while electronic journals systems were convenient for reading for research because they provided access to a broader range of journals. Pediatricians read many current articles very quickly and from many different locations. Pediatricians under the age of thirty-five were more likely to use Personal Digital Assistants (PDAs).

In a related study, Tenopir, et al. (2009) examined how faculty members locate, obtain, read, and use scholarly articles. Data were gathered using questionnaire periodically since 1977. Many questions used the critical incident of the last article reading to allow analysis of the characteristics of readings in addition to characteristics of readers. They found that the average number of readings per year per science faculty member continued to increase, while the average time spent per reading was decreasing. Electronic articles accounted for the majority of readings, though most readings were still printed on paper for final reading. Scientists reported reading a higher proportion of older articles from a wider range of journal titles and more articles from library e-collections. Articles were read for many purposes and readings were valuable to those purposes.

5 CONCLUSION

The high number of studies in the area of electronic journals’ usage and users shows that electronic journals have been rapidly adopted in academic spheres and they have rapidly established themselves as a viable publication media in many fields. This review demonstrated
that there are four main research methodologies which are being used for profiling electronic journals usage and users including questionnaire, interview, citation analysis and transaction log analysis. Also, it is concluded that one of the aspects has been mostly analyzed in the studies of users carried out so far is that of the variables determining their behavior in the use of electronic resources. Clearly different behaviors can be identified according to variables such as discipline, age and academic position. Therefore policy makers and publishers should take into accounts these variables to design appropriate journals and services.

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