

Faculty Use of Electronic Journals at Research Institutions

Deborah Lenares

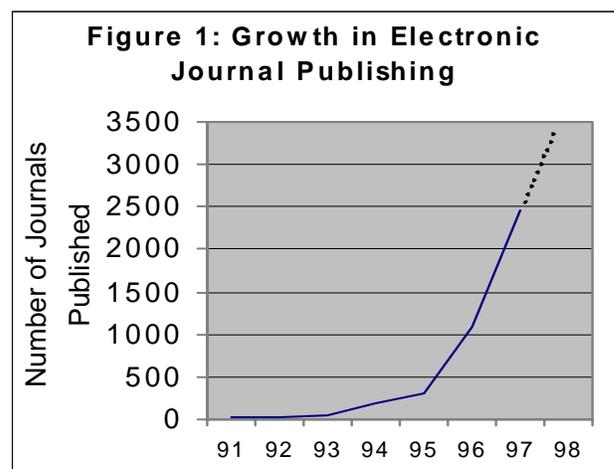
Introduction

The meteoric rise in the number of electronic journals published during the 1990s (see Figure 1) is documented in the *ARL Directory of Electronic Journals, Newsletters and Academic Discussion Lists*, published annually since 1991. The number of electronic journals listed in the 1991 directory was 27. The first significant increase in the number listed was a jump from 45 in 1993, to 181 in 1994. In 1995 the number rose to 306, in 1996 the number listed surged to 1093, and it surged again in 1997 to 2459 (ARL, 1997). Although the exact numbers of new journals published since 1997 cannot be reported until the release of the 8th edition of the *ARL Directory*, an extrapolation of the growth curve shows the expected increase (see figure 1).

The popularity of the World Wide Web helped to stimulate the growth of electronic journal publishing in the mid 1990s, but much of the growth since 1996 can be attributed to the electronic debut of many commercial publishers. The growth in parallel publishing, which may be defined as the publication of an electronic version of a traditionally print journal, has greatly increased the number of scholarly journals available electronically and may possibly have affected the attitudes of acceptance toward journals in this format. Together, these changes could have a dramatic affect on the use of electronic journals within the scholarly community.

If the introduction of parallel published journals greatly increases the acceptance of journals in electronic format, the transition to an electronic only environment that many predict could be hastened.

Robert Bovenschulte, Director of the American Chemical Society Publications Division, predicts that electronic journals will dominate the serials marketplace within ten years (Wilkinson, 13). Peter Boyce of the American Astronomical Society, predicted in 1998 that within three years electronic access to journals would replace print (Wilkinson, 13). Others, while not specify-



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ing a timeline, assume the complete transition to electronic (Varian, 1, Barnes, 404). If a complete transition to electronic does occur, there will be broad implications for the future of journal publishing.

Although many articles have been written in the past fifteen years examining the state of electronic publishing, there has been little empirical research published which examines the levels of use and acceptance of this new format within the scholarly community. One study of note is a 1995 project by Lisa Covi and Robert Kling. One hundred and twenty four faculty members at eight universities were interviewed to determine their use of "digital library services in the course of their routine work" (Kling, 1.0). The research focussed on "the social practices and organizational arrangements" of digital library use, and not on "static behaviors" such as the percent of faculty using electronic journals (Kling, 2.1). Conclusions drawn from these interviews were that, few informants had much knowledge of electronic journals, and few read them (Kling, 7.0), but that this low rate of acceptance was caused largely by the marginalization of electronic journals (Kling, 7.6).

With the phenomenal growth of electronic journal publishing since 1995, this research is necessary to examine the changes in attitude and acceptance that have occurred in these pivotal years. This study will provide librarians, and others interested in scholarly communication, with information about the current use of electronic journals. Using the 1995 Kling and Covi study as a baseline, changes in the acceptance of electronic journals within the scholarly community will be examined. Understanding the changes in acceptance and the current amount of use of electronic journals will help librarians to determine what resources are necessary to meet present and future patron needs.

Methodology

A survey was distributed in January of 1998 and, after slight revision, distributed again in January of 1999. The research design was a descriptive, fact finding survey, using multi-stage sampling of a stratified two-stage sample with systematic sampling at each stage. Descriptive surveys are useful for "collecting data around as well as directly on the subject of study, so that the problem is brought into focus and the points worth pursuing are suggested" (Moser, 4). Because there has been little research estimating faculty use of electronic journals since Covi and Kling's 1995 study, this type of survey

was chosen to collect basic data that can be used in the future for more complex research.

Instrumentation

A survey was designed to collect basic information about the level of use of electronic journals as well as other factors contributing to and associated with their use. The survey was self-administered and was delivered using electronic mail. The instrument collected nominal and likert scale data, as well as qualitative data through comments and lists of titles read.

Sample Population

The population sampled from was faculty at institutions whose libraries were members of the Association of Research Libraries. The primary sampling unit from this population was the list of member universities provided on the ARL website. The second stage sampling unit was departments within these universities or a directory list of faculty. A sample population was then chosen from this second stage. A total sample of 500 faculty members were chosen from 20 research universities, departments were chosen to equally represent the disciplines.

Distribution

Systematic random sampling of institutions from the list of ARL members was performed. Every third university on the list was selected. Non-university institutions were not included in the sample. From the university's homepage, faculty email addresses were located using one of two methods. The preferred method was to use the university's faculty directory to randomly select addresses. Searches were entered into directories in a number of different ways depending on the requirements of the directory. First priority was to include the word professor if a title field was available. If further fields were required, the letters "ca," "al" or "jo" were entered into the name field. From the list provided by the directory search every third faculty member was chosen until twenty-five were selected. If a directory search was not possible, academic department homepages were selected, and addresses were selected from departmental faculty lists. Five departments were selected from each university. Every third faculty member was chosen from the departmental list until five were chosen from each department, for a total of twenty-five from each university.

Distribution by email has limited the sample to faculty exhibiting some involvement in electronic services. This may create a bias in results, but a great majority of faculty members did have email links available, and I have sampled from this group. A survey has been distributed to faculty members by mail to study this bias. Results from this survey are not yet available.

Initial Results

Return Rate

Of the 500 surveys distributed in 1999 41 were returned as undeliverable, and a total of 120 responses were received, for a response rate of 26%. The response rate for the 1998 survey, with the same number of surveys distributed, was 22% with a total of 112 respondents. All results will be presented as comparisons of data collected in 1998 and 1999.

Percentage of Use

The 1999 survey revealed that 61% of faculty surveyed do use electronic journals (see figure 2). This is an increase from the 46% of respondents reporting electronic journal use in 1998. Examination of this use by discipline (see figure 3) shows that the number of faculty using electronic journals has increased in all disciplines. The physical sciences and arts and humanities exhibit the greatest growth. Ninety percent of respondents in the physical sciences reported that they use electronic journals. Across the disciplines a majority of faculty members report that they do use electronic journals.

Frequency of Use

Questions about frequency of use for both print and electronic journals help to further define this large percentage of electronic journal readers. Figure 4 displays the frequency of usage for those that do read electronic journals. Half of the respondents that read electronic journals report that they read journals in this format infrequently. The frequency of electronic journal usage has remained steady over the one year period. The frequency of use of print journals was also examined. Figure 5 charts the percentage of respondents reporting frequent use of electronic and print journals. Sixty five percent of respondents reported frequent use of print journals in 1999 a substantial decrease from 1998. It should be noted however, that when the percentage of respondents who reported frequent use of print journals are added to the percentage of respondents who

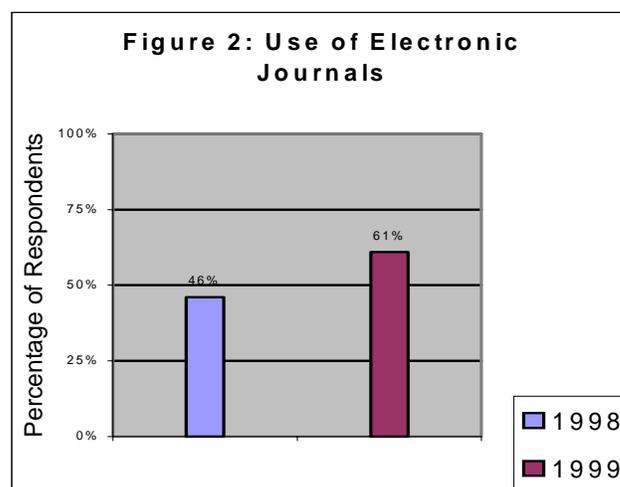
reported fairly frequent use, there is only a 2% decrease from last year.

Choice of Format

Respondents were asked to rate a number of characteristics of electronic journals that would affect their choice of the electronic format over print. Respondents in both 1998 and 1999 reported that the characteristics of convenience, timeliness and the ability to search text were the most important factors in their choice of electronic over print. The least important characteristics in this choice were interactivity, the ability to compute and the animation of graphics. It is possible that these characteristics are considered unimportant because they are not yet available in most electronic journals. When asked to rate characteristics that would affect their choice of the print format over electronic the most important characteristics were the ability to browse, portability, physical comfort and convenience. The least important characteristics were familiarity with format and the ability to underline.

Non Users

Respondents that reported that they do not use electronic journals were questioned to further to explain why they do not. Figure 6 shows that a majority of those that do not use electronic journals do not do so because they do not know of any well-respected electronic journals in their field. A comparison of results from 1999 and 1998 show a large increase in the percentage of respondents answering that the quality of electronic journals is not equal to the quality of print. There was also a slight decrease in the number of respondents that an-



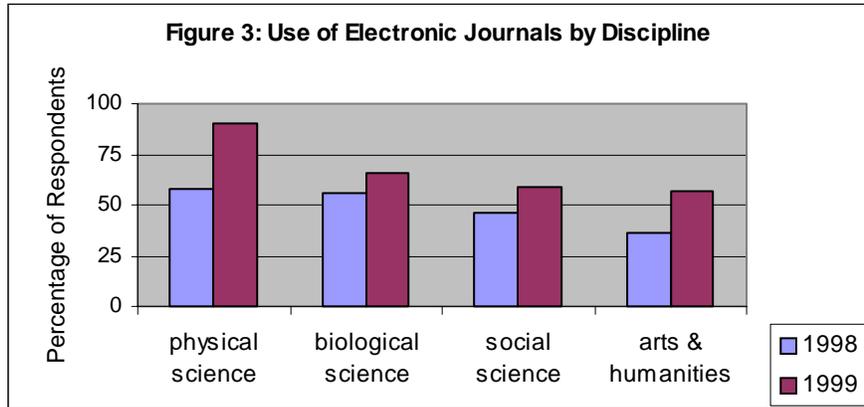
swered that they were not resistant to using electronic journals.

Initial Conclusions

The initial results of this research provide evidence of the rapidly growing acceptance of electronic journals within the scholarly community. Results from the mailed survey will be important to determine whether the distribution by e-mail has skewed these results. It is important to remember that these results report only faculty use of electronic journals at research level institutions, levels of use may be very different at others institutions with fewer resources. When compared to the Kling and Covi study, which showed that few faculty members knew of or used electronic journals in 1995, the rapid acceptance of this new format is remarkable. The increase in electronic journal usage is accompanied by a decrease in the frequent use of print journals. Print journal usage, however, continues to dominate electronic journal usage, with only 14% of respondents using electronic journals frequently as compared to the 65% using print journals frequently. It will be interesting to track changes in the use of print in the coming years.

When these results are viewed using the Diffusion of Innovation Theory (Rogers, 1971) interesting conclusions can be drawn about where we currently are in the adoption of the innovation of electronic journals, and conjectures can be made about when complete adoption may be attained. Rogers states that adoption of innovation has generally been found to follow a bell shaped curve over time, that adoption of innovation follows a normal distribution (Rogers, 179). Within this normal distribution, adopter categories, describing an individual's ability to adopt change, can be defined. Figure 7 shows the normal distribution for the rate of adoption and the adopter categories. The dotted line in Figure 7 represents the percentage of respondents that in January 1999 reported using electronic journals. When this is plotted on the normal curve, it is clear that we are in the late majority adopters stage.

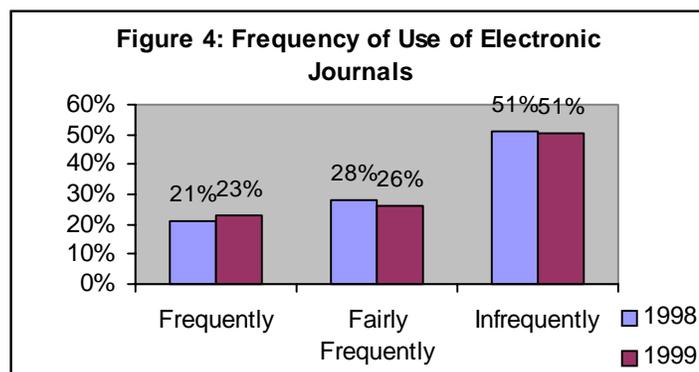
It is important when examining the current placement of the adoption of the electronic journal innovation on the normal distribution curve, to remember that those who do use electronic journals must be considered incomplete adopters at this point

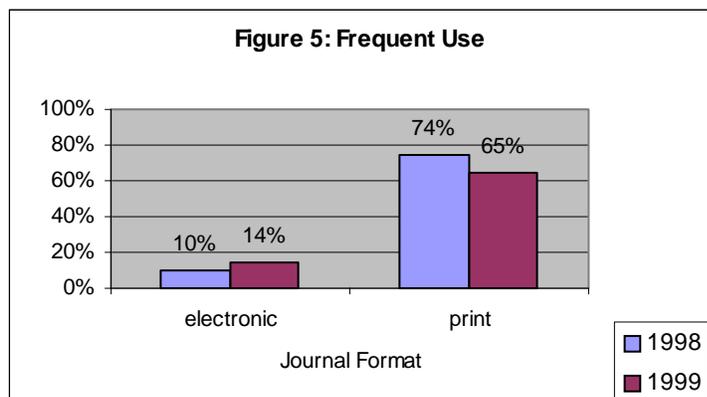


(Rogers, 182). The high level of infrequent use shows that complete adoption has not occurred in most electronic journal users. Incomplete adoption does effect the accuracy of this model, but for general representation of the adoption of innovation the model is useful.

The reasons given by faculty who are not using electronic journals as to why they do not, show increasing resistance to change. The percentage of responses to negative statements: "physically uncomfortable," and "quality not equal," have increased. The percentages of responses to neutral statements: "inadequate network resources," "the library does not subscribe," and "no knowledge of respected journals in their field," have all decreased since 1998. The percentage who responded to the only positive statement: "not resistant," has also decreased. The normal distribution shows that of the 39% of faculty surveyed that do not currently use electronic journals, a large percentage are of the most resistant adopter category, the Laggards. Individuals in this category are described by Rogers as traditionalists who are suspicious of innovation and who are "alienated from a too fast moving world" (Rogers, 185).

Another factor, which affects the rate of adoption,





is the diffusion effect. This is the effect of the cumulative pressure to adopt an innovation within a system, caused by the incorporation of the innovation into the culture of the system (Rogers, 161). Or, as described by one of the survey respondents, “Electronic articles of scholarship simply don’t fit into the manner of collegueship and discussion I have with fellow faculty members and graduate students. When it does, then I will read journals electronically.” Each innovation and each system has a unique threshold for the diffusion effect, and it seems clear that electronic journals have not yet reached the threshold of assimilation that would lead to their more rapid adoption throughout the academic community.

It would appear that electronic journals are clearly on their way to more complete adoption. The rate of adoption may still be undetermined, as the integration of electronic journals into the culture of the scholarly community is not yet complete. Once electronic journals become

integrated into the scholarly community the diffusion effect is likely to stimulate the rate of adoption, and we will begin to see complete adoption of the innovation. Librarians and others involved in scholarly publishing must be prepared for this complete adoption and continue to track its progress.

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