The Future of Electronic Journals: Unpuzzling researchers' attitudes about electronic journals

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When writing about the future of scholarly electronic journals, forecasters often focus on fine-tuning electronic delivery mechanisms (Okerson, 1991) or revolutionizing scholarly communication (Harnad, 1995). If instead they anchor their predictions in real-life experience, they focus on their personal (usually positive) experiences or successes of electronic publishing in a particular domain such as Mathematics (Odlyzko, 1995). Success stories can be helpful to support decisions promoting access to electronic journals. However, mixed attitudes of other readers, editors and contributors reveal some important challenges facing the future of electronic journals. Attitudes about publishing and reading electronic journals both shape and are shaped by the technology of electronic journals. For instance, the long-term viability of particular electronic journals depends upon acceptance by readers, editors and contributors who help the journal gain a sustainable readership, respected contributors and a desirable reputation as a useful forum. At the same time, the technology of networked electronic communication provides the means for distributing and exchanging materials in new formats.

This paper examines attitudes of current and potential readers, editors and contributors. These people currently depend on paper journals to provide legitimate materials which they integrate and transform into their own work through analysis, citation or discourse. Journals also provide outlets for their own contributions. University researchers from eight U.S. research universities in four disciplines: sociology, computer science, molecular biology and literary theory discussed their use of electronic materials and attitudes about electronic journals during the first six months of 1995 (Covi, 1996). Although informants' attitudes and behavior changes over time, the uncertainty they expressed in 1995 persists today. Unpuzzling researchers' attitudes about electronic journals will help us anticipate current challenges to acceptance of electronic journals such as this one, and help us better predict how the technology of electronic journals shape their use. An earlier analysis of this data is also available (Kling and Covi, 1995).

1 Confusion about Electronic journals: What are they?

Inventors of new technologies frequently have trouble explaining their artifacts or predicting how they will be used by future consumers. Consumers learned about new information technologies such as the Internet and the World Wide Web from popular discourse about metaphors like "the information superhighway" or "online shopping" which created minimal shared understandings. These metaphors conveyed some functional aspects of the technology, but masked or ignored others. Most consumers only gain a working understanding of technology through direct exposure and use. Attitudes about electronic journals reveal similar challenges to understanding and working knowledge. For instance, although university researchers most commonly associate the word "journal" with the peer-reviewed scholarly publications they read, contribute to and edit, there are other serials that use the title journal. The Ladies' Home Journal, and the Wall Street Journal have very different formats, content and editorial policies. This creates confusion when searchers try to evaluate the relevance of materials published in journals with which they are unfamiliar.

Even within the realm of scholarly electronic publication, there are ambiguities. It is not always clear whether an electronic journal is an electronic distribution format for a print journal, an electronic archive of a print journal or an electronic-only journal. For example, one researcher was fairly precise in explaining what she examined, yet she still expressed some confusion. "[I've looked at a couple of electronic journals] I'm not sure that they're actually electronic journals. It's not electronic to start with, it's just that they keep a copy of all their journals electronically. My husband has them on CD." She assumed that electronic journals are journals that are created and distributed originally in electronic format. The "electronic journals" she examined were archives of print journals.

Adding to this confusion, the publications themselves may call themselves "journals" without regard to their formats or publication arrangements. Some journals like the Journal of Artificial Intelligence Research (Kling and Covi, 1995) are affiliated with publishers who produce print archives, manage subscriptions and arrange for abstracts and indexes to carry them. Other journals like Postmodern Culture, may sell archives or alternate electronic formats, but are basically run by the editors themselves who bypass traditional publishers and some traditional publication processes. In this confusion, it is not therefore surprising that researchers develop attitudes about electronic journals based on diverse assumptions about publication formats, policies and processes.

2 Social Dimensions of Electronic Journal Use

We asked 124 U.S. university researchers if they used electronic journals in their research. In 1995, the predominant answer was no. A typical response was, "I've heard of electronic journals, but I've never used them." In a few cases, researchers were serving on editorial boards of electronic journals, but had never read an issue. The only exception was Artificial Intelligence researchers who regularly read and contributed to the Journal of AI Research (Kling and Covi, 1995). However, analysis of their responses revealed several key social dimensions of their reported behavior. Here are a few characteristic examples.

Some informants based their opinion about electronic journals on the status of available publications. One researcher explained why he doesn't read or submit work to electronic journals. "I've got some lists of some electronic journals [in his specialty] but I've never looked at them. They are sixth-tier. Not many of the key players are putting any of their work in them....[However,] you'd be damn sure I'd be sending off 'electronic manuscripts' [if a top-tier journal became an electronic journal]." This example shows several key factors in acceptance of electronic journals. First, the evaluation of a journal within a specialty as being "top tier" or "low tier" was independent of format. The status of the journal served as an implicit social cue for researchers to decide whether the material published in it is worthy of reading. Second, the participation of high status colleagues influenced who read and submitted work to the journal. In other reports, the nature of key players' participation emerged as another factor. If high status colleagues served on the editorial board but did not submit work to the journal, informants were likely to consider the journal a write-only journal rather than one to routinely read. The last statement of this quote demonstrated another ambiguity about electronic journals. Although electronic journals usually required electronic submission of research articles, many print journals have also shifted to offering or requiring electronic submission of research articles. The amount of preprocessing influences the researchers' work load, but not the desire to contribute to print versus electronic journals.

Some researchers based their attitudes upon the added benefit of searching and retrieving electronic formats rather than on the dearth of existing relevant journals. One researcher assumed that electronic journals in his specialty would primarily emerge from the existing publication organization. "I think that being able to get journals electronically will be a major step forward. If I could not only search for a keyword and get the title, if I could then get the actual text on the screen, maybe even make little printouts of them for convenience, but just the idea of being able to get that - I think that will be really quite fantastic." This researcher made assumptions about the social arrangements of publishing that many of the forecasters implicitly share. They assume that journal status and participation by key colleagues are ensured by the continuing participation of established publishers and publishing practices.

However, relationships between contributors, editors and publishers are changing due to the emergence of electronic-only publication. Many publishers are still coming to grips with how to organize and control paper publication in relation to electronic publication. One editor expressed her need to be concerned about her publisher's source of revenue when organizing a new journal, "The publisher [of a new journal the researcher is starting] is not interested in electronic journals until they work out the costing scheme." When organizing new forums for scholarly communication, format plays an integral role in how to organize distribution. Although there is pressure from some readers to provide benefits from electronic access to publications, electronic distribution offers the disincentives of easy replication without added revenue to publishers. The relations between publishers and contributors become strained when researchers do not receive direct financial compensation for their contributions or in fact have to pay to have their findings published [1]. The social dimensions of electronic journals found in this study include politics of participation, social pressure for added benefit, and the economics of access to publishable material.

3 Building social dimensions into the technology of electronic journals

How, then can we utilize insights about social dimensions of electronic journals when starting new electronic journals or initiating an electronic version associated with an existing paper journal? Here are some insights on each of the three dimensions: politics of participation, social pressure for added benefit and economics of access to publishable material.

The politics of participation is important for editors starting any kind of new journal. Key participants in the field can help provide input for the editorial focus and intended audience for the journal. The focus should establish the journal's relationship to existing paper and electronic publishing outlets. If the focus is too broad and overlaps or subsumes several existing paper or electronic journals, it may result in a write-only outlet for contributors even if it provides a viable subscription base of readers who don't contribute. For example one editor expressed some ambiguous feelings about serving on the editorial board of one of these broad journals, "I'm also on the [editorial board of the electronic] Universal Journal of Computer Science or whatever it is. I was asked to join the board and I did. And this is really supposed to cover all of computer science which seems to me a pretty wild idea.... Heck, you know, why not?." This editor was skeptical about the focus of the journal and it was unlikely that he will read or submit work to this despite his editorial participation.

Depending on what contributors a new journal intents to attract, editors must take into account the status and legitimacy of their journal to influence incentives for participation. The Journal of AI Research has succeeded in providing a legitimate electronic outlet for publication of research. The editor and publisher made it indistinguishable in key ways from print journals such as providing print archives to institutions, Postscript distribution that resembles a photocopy of a print article when displayed, indexing in bibliographic services (Kling and Covi, 1995). Because research university tenure and promotion committees tend to evaluate journals by reports of influence and quality, less established electronic journals may be too risky for some contributors. One junior researcher even stated, "I'll be happy to submit when I get tenure" indicating his unwillingness to risk publication in a forum with uncertain reward or penalty.

New electronic journals may seek participation of contributors and readers through the potential for easy replication and wide dissemination of materials over the Internet. To the extent that electronic distribution will allow authors to be read by new valued audiences, electronic journals will attract contribution and readership around its defined focus. The sustainability of the electronic journal will depend, in part, upon the importance and durability of their added benefits over print journals.

The added benefits that electronic journals provide not only attract attention to the novelty of new formats, but also influence incentives and disincentives for reading and publishing in them. For example, many researchers find sustained reading of electronic text on the screen to be difficult or impossible. Even if they receive articles in electronic format, they prefer to print them in order to read or annotate it. For this mode of use, paper journals save time and paper on the part of the reader. However, if time, searchability or personal electronic indexing is important to the reader, faculty prefer electronic copies even if they have to print them out themselves. On the other hand, electronic articles are inferior when they use formats (postscript versions, compression, encryption) that are not shared between source and readers . Also in some fields, notably molecular biology, journal articles often include photographs, diagrams, tables or charts which may not be easily reproducible or comparably printable in electronic format.

Another way to build added benefit into electronic journals is to examine some of the diverse ways other print journals are providing adjunct electronic services. For instance, Protein Science, provides readers with an online version of published data which they can use to examine different modeling techniques or approaches for their own work directly. Researchers who wish to share modeling techniques in molecular biology, social network analysis or computer science simulations have also begun incorporating some data-sharing into electronic publication. Although researchers in these fields have shared data via older technologies such as ftp, there is great interest in incorporating data sets, algorithms or overflowing DNA sequences into electronic and print publications polymorphously. It is not clear, however, how publishers will integrate these new into the existing economic system for access to publishable material.

With the proliferation of specialization in many research areas, the number and price of print journals have increased. Institutional libraries have had to cut subscriptions in many cases, often of the most expensive, most specialized print journals that researchers would like to have. In addition, some readers perceive electronic journals to be an easier, faster means of distribution for researchers who do not usually receive direct remuneration for scholarly publishing and have a stake in reducing publication lag time. However, the editorial work necessary to support publication activity, especially of an electronic-only publication can be substantial. Activities such as building an audience of interested readers, attracting relevant authors to contribute their work (and lobby for commensurate reward in professional or personal social structures), finding a group of participants to help collect materials, referee articles, process materials, produce the journal issue and disseminate the journal issue are time-consuming if not expensive. If there is no revenue stream to support this work, and many electronic journals are freely distributed, the disincentives of editing free journals will restrict their quality.

Publishers and editors are using a variety of formats for electronic communication besides electronic journals in conjunction with scholarly publishing. Editors often make use of mailing lists to publicize calls for papers, tables of contents and sometimes abstracts of forthcoming issues of paper and electronic journals. These activities stimulate awareness and direct communication between scholars about the newest work in the field. Social mechanisms within research subspecialties tend to moderate how quickly research becomes public in part due to issues of who receives credit for work (Covi, 1996), but electronic dissemination of a subset of what is published in print journals can be critical to researchers in competitive areas.

Some researchers expected that working with electronic journals would radically alter their research practices making them more productive and their research more thorough. Although working with data electronically had opened new research arenas, most researchers continued to work in the same way they had been trained and in some found using electronic materials slowed them down due to having to relearn skills or work with more materials. Access to electronic materials can be liberating for some but burdensome or superfluous to others who can continue to be successful enough using their paper-based materials and work-practices.

4 Conclusions

This analysis of researchers' attitudes towards electronic journals highlight some current challenges to acceptance and use of scholarly electronic journals: politics of participation, added benefits of electronic journals the economics of access to publishable material. I have also tried to provide a starting point for thinking about how to organize the technology of electronic journals taking into account these social dimensions. At its core, electronic publishing in scholarly communication is a profoundly social process and therefore social dimensions which both comprise the technological design of the electronic journal and provide context for its use will continue to shape its future.

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6 Footnotes

[1] In fact some journals, for instance in molecular biology charge a fee to the author for submission and/or after acceptance to publish an article. References

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