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8-15-1997

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Recommended Citation

Hovav, Anat and Gray, Paul, "Academic Electronic Publishing: Scenarios for 2007" (1997). *AMCIS 1997 Proceedings*. 35.
<http://aisel.aisnet.org/amcis1997/35>

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Academic Electronic Publishing: Scenarios for 2007

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Introduction

Traditional academic publishing in refereed journals, such as those used in promotion decisions, faces major obstacles such as time lags from submission to publication and distribution costs. Although electronic publishing can reduce cost and time to print, it presents new issues and problems, such as:

- How to control the quality of the publication?
- What is the best medium for electronic publishing?
- How should copyrights be protected?

This paper presents four scenarios for 2007 to explore these issues.

Social Forces In Academic Publishing

Technology is not always sufficient to cause change. For example, the first academic journal was published in 1665, 215 years after the invention of the printing press. These initial journals resulted from the formation of academic societies and the change in the nature of academic work from large philosophical undertakings to smaller, empirical, and incremental projects (Schaffner 1994). To understand the future of academic publishing it is important to understand its functions. We will describe the extent to which these functions are satisfied currently, the social factors that influence academic publishing, and the driving forces behind the changes.

Journal publishing is a communication mechanism among academician (Schaffner 1994, Kling and Covi 1995). Although, much of the communication among researchers is informal and within small circles of colleagues, the published article is still an important communication medium. Schaffner (1994), lists five functions of an academic journal:

- Building collective knowledge
- Communicating information
- Validating quality
- Distributing rewards
- Building scientific communities

To fulfill these roles, publishing should be sustainable, accessible, timely, reputable (accurate and of high quality), and refereed.

Any attempt at alternative publishing methods should strive to achieve some of the following objectives:

- Reduce publishing cycle time
- Reduce publishing and distribution cost and at the same time ease space restrictions
- Increase the acceptance rate for new scholars and unconventional work
- Increase the variety of admissible formats such as color graphics, simulation programs, video, and images

- Increase accessibility to publications by eliminating geographic and temporal limitations

New Formats: CD-ROM, DVD, and the Internet

The introduction of CD-ROM and DVD (Digital Video Disk) as well as the Internet, present two potential new avenues for distributing books, journals, and other material. Each medium has its advantages and disadvantages. (For simplicity, we use the term CD-ROM to describe both CD-ROM and DVD). The main difference between these media for academic publication is the maximum amount of information they hold. Electronic publishing using CD-ROM, requires the same distribution mechanism used for paper publishing. Issues must be produced, copied, packaged, and shipped. For Internet based e-journals, the cost to create one copy is the same as the cost to create hundreds or thousands of copies since distribution is demand-pull rather than supply-push. CD-ROM publishing can take advantages of desktop publishing software capabilities, to produce the same look and feel of a paper article. Journals published on CD-ROM are perceived to have higher quality and can be incorporated into the on-line search mechanism in libraries. Because Internet-based software is in its infancy, creating high quality output is difficult; in particular for viewing mathematical equations, tabular data and special characters (Weibel et. al. 1995) without special viewers that permit matching the original representation. A comprehensive list of differences is presented in Table 1.

Issue	CD-ROM	Internet
<i>Distribution</i>	Managed, less costly than paper, same procedure	Ubiquitous, cheaper than CD-ROM
<i>Copyrights</i>	Possible to track original as in paper; still copyable	No way to track and monitor copying
<i>Format</i>	Can take advantage of multimedia capabilities	Can take advantage of multimedia capabilities; difficult for equations
<i>Looks and Feel</i>	Possible to create similar looks and feel to current printed papers	Somewhat difficult to create the look and feel of print. Tables and formats depend on viewer used.
<i>Citation and references</i>	Still possible to keep track of publications and citation	Harder to keep track of references and citations
<i>Accessibility</i>	Limited geographically and temporally	Any time any place
<i>Storage cost</i>	Lower than paper	Lower than paper. Not clear if lower than CD-ROM
<i>Ability to publish</i>	Some increased ability to publish due to less restricted space, lower copy and distribution costs	Increased ability to publish. Not limited by journal or library standards on organizing by issue and volume or by distribution limits
<i>Indexing and search</i>	Same mechanisms	Currently not being done in libraries. By 2007, search agents and hyperlink will improve search capabilities
<i>Quality of contents- perceptions and reputation</i>	Perceived quality the same as paper journals	Perceived as lower quality.
<i>Space</i>	Currently up to 4.7GB, enough to include raw data, algorithms etc.	Unlimited
<i>Timing</i>	Cannot publish one article at a time, lags will still exist	Can publish each article as it accepted
<i>Stability of medium</i>	Stable, can keep track of previous copies, a copy can be kept in Library of Congress	Currently, not very stable. Down time. Sites disappear. May not be available for future generations without central repository
<i>Version control</i>	Modifications have to be approved. Reprinting is controlled by the publishers	Currently, difficult to control changes. Can open the door for fraud
<i>Collaborations</i>	Does not improve collaboration	Improve collaboration. Scholars can access the same papers anywhere
<i>Customization</i>	Cannot customize journals to subscribers' needs	Subscribers can down-load only articles of interest to them
<i>Economics</i>	Lower cost to publish Can still charge per unit	Requires enforceable structure of fees and

Table 1. CD-ROM VS. INTERNET SOLUTIONS

Issues

Electronic publishing can solve many of today's problems . Time lags will decrease, accessibility can increase. However, electronic publishing is not without its problems. The following are some issues that need to be resolved before e-journals will be accepted universally:

- *Priority claims* - One of the functions of journals is to establish priority claims. Will computer time and date stamps be sufficient to establish priorities in electronically published articles?
- *International access*. We cannot assume that the electronic publishing revolution is global (Jacobson 1994). Many countries do not have the infrastructure to allow full Internet access or the technology to support production of CD-ROMs.
- *Tools* - Currently, Internet tools are not sophisticated enough to create papers with print quality. Extended character sets, navigational tools, better typography and a better markup tools are needed (Weibel et. al. 1995).
- *Highly published scholars and motivation* - Highly publicized and well established scholars have no immediate incentive to support electronic publishing. Maintaining the current status quo increases their standing as gatekeepers.
- *Tenure Committees*- Currently, it is difficult to keep track of electronic publishing. Tenure committees perceive electronic journals as inferior and will not grant the same credit to an article in an e-journal as they would to one in a printed journal even though many e-journals are refereed and follow the same acceptance procedures and quality requirements as printed journals. The reasons are not clear and need to be studied further if solutions are to be found.
- *Publishers* - Journals published by academic societies can be supported by membership fees and access can be given using member codes and passwords (Kling and Covi 1995).

Professional publishers face a dilemma.

- E-journals are cheaper to produce. At the same time publishers will lose some of the individual subscribers who can access articles electronically.
- Libraries may not buy more than one electronic copy of journals or books. Copies can be made and distributed freely.
- Publishers can charge per-usage fee. The per-usage fee may cause major objections among scholars who are used to free access to library material. Per-usage fee may cause drops in access to such material by students.

The Year 2007: Four Scenarios

Several social forces will determine the future of academic electronic publishing (AEP). We concentrate on two factors:

- the publishing community.
- tenure committees.

The publishing community may resist electronic publishing in the near future and try to preserve existing methods of copyrights charges, payments and distribution. At the other end of the spectrum the publishing community may be a leading force in electronic publishing. Tenure committees, consisting of established scholars, may delay the acceptance of AEP by rejecting or simply ignoring the phenomenon. At the other end of the spectrum, it is possible that tenure committee members will establish guidelines, procedures and ranking schemes for e-journals and in doing so will speed the acceptance of AEP in the academic

community. As shown in Table 2, four possible scenarios ensue: In scenario (1) AEP is ubiquitous. Electronic articles reside at their origin, connected through hyperlinks. Intelligent agents support access and search, changing the ways scholars read articles. A central repository provides copies for future generations and for resolving cases of disputes and fraud. In scenario (2) tenure committees delay the full development of AEP. Published journals are distributed on a CD-ROM like medium. The structure, format, and feel of e-journals does not differ from paper journals. In scenario (3) academic associations initiate their own e-journals. E-journals are backed up by paper journals much as paper money was once backed by gold. No centralized repository is needed for academic electronic articles. In scenario (4) academic publishing remains unchanged from 1997. Few attempts are made to create e-journals and those typically fail. Electronic publication does not succeed in replacing current journals but is used as a supplement.

Publishers High Acceptance

Tenure Committee	(1) Ubiquitous electronic publishing	(2) The era of CD-ROM . Internal structure maintained	Tenure Committee
High Acceptance	(3) Academic associations initiate their own e-journals	(4) Status quo: no major changes	Low Acceptance

Publishers Low Acceptance

Table 2. FOUR SCENARIOS FOR 2007

References available upon request from first author