The Web: Challenge and Opportunity for an Independent Journal

Klaus Kaiser
Houston Journal of Mathematics
University of Houston
Houston, TX 77204-3476
e-mail: kkaiser@uh.edu

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Abstract

To establish a comprehensive Website is for any journal a major task. Most independent journals face the additional obstacle of not having the financial resources for hiring information technology staff. I am going to describe the kind of decisions we had to make to set up a comprehensive Website for the Houston Journal of Mathematics (HJM). The result is a publishing format which may not have all the characteristics of a primarily electronic journal, but it offers more than a paper journal with free abstracts, and file access to its subscribers.

Like some other journals, HJM decided to make electronic editions freely available for registered subscribers of the print edition. Nevertheless, one still needs a "License Agreement Form". This is a legal document that defines the "Scope of the License" and which includes a "Copyright" clause. In its present form, our license excludes electronic files from Inter Library Loans. I will try to explain our opinion on this controversial topic.

All journals, whether commercial or independent, face the problem of "archival quality" of current file formats, primarily of the .pdf format. But there is also the related problem of shared legal responsibilities of possible file maintenance. The paper will present some thoughts on these most pressing issues.

1 What is an Independent Journal?

Mathematicians like precise definitions. So, how do we define independent journals versus journals that are not independent? Most people classify journals according to their owners, and independent scholarly journals are then more or less journals that are owned by universities. They are perceived as small and cheap. The *Notre Dame Journal of Formal Logic* is a prime example of a small and very inexpensive journal. On the other hand, *Duke Mathematical Journal* is very large and not inexpensive, even on a price per page basis. But both journals are members of *Project Euclid* which is meant to be "A partnership of independent publishers". I guess here the phrase "independent publishers" means publishers that are not part of one of the major publishing giants, for example Bertelsmann, while publishers like the Heldermann Verlag, or International Press, are considered as independent.

I feel that one should differentiate between independent journals and independent publishers. Certainly, all journals need an *Editorial Board* and a *Publisher. Independent journals are those in which the editors also function as publisher.* Such journals are usually run by university departments. Thus, with respect to fiscal and personnel related matters, they are units of the department and therefore under direct jurisdiction of the chair and the dean of the college. As I see it, the important characteristic of an independent journals is that no relevant decisions are made outside the board of editors and the publishing department.

Some independent journals work with independent publishers to facilitate their shipping and printing tasks. Doing so, these journals still maintain their independence because in such cases the publisher provides only a service. HJM is regularly considering this possibility.

For *commercial* journals, we see a strict separation of the Editorial Board and the Publisher. The editors are responsible for content and academic standards while the publisher takes care of all business related issues, in particular, the publisher determines the price structure of the journal in order to guarantee *profitability. Societal* journals are like the independents *non-profit* but because of their size and financial obligations they are run like commercial journals. Some larger publishing companies, like Cambridge University Press, are affiliated with academic institutions. Most people would consider such *Academic Publishers* as independent because they are different from the publication and media giants. But their journals are in general not independent according to my definition. For example, also here it is the publisher who finally determines the subscription rate. And the editors may have little or no say about the overall

design and features of electronic editions.

Electronic journals fall into an interesting category. Most of the new electronic journals can be considered independent. Here, publishing means "Web posting" of accepted articles. Unlike periodical journals, publication is continual. Of course, commercial publishers may also have electronic journals. Most of the independent electronic journals are freely accessible. This is possible because there are only small "real" expenses involved: Computing facilities, office space, technical and secretarial personnel etc. are provided by the publishing institutions. In some cases, libraries have been asked to *sponsor* such journals in order to guarantee free access and to provide funds for periodically published printed editions. Many people feel that independent electronic journals that are freely available, and which provide in regular intervals hard copies (meant primarily as an alternative form of archiving the contents of electronic files) are the wave of the future and may eventually replace traditional journals.

Because of the ongoing electronic revolution, all journals, whether independent or commercial, have to change. I am going to describe part of this process for a typical independent journal, namely the Houston Journal of Mathematics (HJM).

2 Print Editions

As editor of the HJM, I interact with many of our authors, and one thing I can definitely conclude is that mathematicians still want to see their work the old fashioned way: printed on paper. And they want reprints. While authors exchange ideas *via* e-mail and circulate their papers in an electric format, for most mathematicians, a publication isn't a publication unless it is available on paper in a respected journal. This is confirmed in the findings of [4].

Thus, the quality of typesetting and printing still matters. This is an area where independents have a decided advantage. Because most journals use the same LaTeX program for typesetting, journals now look more or less the same. Commercial and societal journals have lost their edge during the electronic revolution because independents can produce journals at a much lower price.

Most journals request that authors send their submissions in the form of a LaTeX file. Here, independent journals, like HJM, may be more persistent than commercial ones. Retypesetting articles is an expensive and time consuming process, besides being wasteful. In order to keep a low overhead, we insist authors to provide us with a useful LaTeX file. In exchange, we go beyond providing authors with the usual tips and helpful tools for accomplishing this. We made an arrangement with our TeX provider, VTeX, to give our authors a steep discount on the same commercial LaTeX implementation that the journal uses.

A major problem for independent journals is finding a reasonable printer. It used to be the case that universities maintained their own printing facilities. Unfortunately, this is no longer the case even for larger public schools, and the number of smaller printing facilities seems to be dwindling. Some major

subscription agencies are rushing to fill the gap by going into the "printing plus mailing" business. While this makes a lot of sense, it might create some conflict of interest. This development makes the survival of smaller academic presses even more difficult.

Printing and mailing are the largest expenditures for independent journals. While commercial journals have the advantage of bargaining power, for independents, these costs are nonnegotiable. Although we seem to be stuck with printing and mailing costs that are high and inflationary, I have found that these costs are recoverable through modest increases in subscription rates and through the authors' voluntary contributions. In addition, digital printing technologies already being adopted by printing companies have been reducing the cost of labor. Therefore, I feel that independent journals will be able to provide printed editions at a very reasonable cost for many years to come. In fact, if printed journals should disappear at some point in the future, it will not be because of the high cost of printing, but because the mathematical community has deemed printed journals to be obsolete. No one knows if this is ever going to happen, but right now it certainly doesn't look that way. The predictions of authors like [9, page 2] have not materialized, yet.

3 Electronic Editions

Most journals provide "Electronic Editions" in addition to the traditional print format. Naturally, commercial journals started this first and have to some extent set the pattern for the overall design of a Web presence for scientific journals. Of course, not all features of a conglomerate of dozens, and in some cases of hundreds of different journals apply to a "single journal" site. For example, the practice of providing links to different journals from the same publisher is not an issue if you only have ownership of one journal. As for appearance, there is no universally accepted standard of what a good Website should look like. Like furniture, the architecture of a Website is very much a matter of taste. For independent journals, a clean and simple design is very often a necessity because most independents don't have a Web-trained professional staff to take care of the frequent, regular updates. Our Website is strictly text based, easy to navigate, easy to edit, and it puts content over form.

As I see it, the single most important part of a journal Website are the *Titles and Abstracts*. Here, HJM is somewhat different from most other journal sites. For an author, the paper abstract is an integrated part of the paper. In particular, the paper abstract may refer to items in the literature, and to numbered theorems. And there may be mathematical symbols for which there is no HTML code. Even worse, authors may have used their own TEX macros for text and mathematics. Because of these problems, we ask authors to provide us with a specially prepared Web abstract, preferably in plain English or HTML, but with no TEX jargon, and with all references explicitly stated. Unfortunately, not too many authors are paying attention to our request. Thus we very often have to *detex* the paper abstracts, add the references etc. But the situation is

improving. Before we officially post a new issue, authors are now given a secrete URL and they can inspect everything before it becomes official. Of course, this is a luxury probably only independents can afford, namely to personally contact each and every author before posting the papers, send them the final .pdf files and allow for further corrections of the paper, abstract, addresses etc. When an author sees his abstract on the Web, he may realize that it does not express too well what the paper was about. But he has a second chance to e-mail us a rewrite, and if he wishes to do so, he can add a direct link to his homepage with related papers etc. To summarize, the HJM perceives Web abstracts to be more like self-contained author-reviews than as abstracts in the traditional sense.

Now, why is it the case that Web abstracts are important? Before the appearance of the Web, mathematicians had to rely very much on the major reviewing organs in order to learn about the current literature. Nowadays, search engines and pre-print servers can find difficult to get, or still unpublished material. Search engines are timely and stupendously reliable. While an author's abstract cannot replace a carefully written evaluative review, most papers don't get an evaluative review and certainly not what the Reviews call a "featured" review. But through his Web abstract, an author is given the opportunity to describe in plain English and to an open forum, what the merits of his paper are and emphasize what he thinks is new and interesting.

In order to assure a more timely coverage, the major reviewing organs have started to accept electronic files. However, this yields the very important *integrity problem*: Printouts from downloaded files must be identical with the print editions. To ensure this for Print Journals has become a new and major responsibility of the publisher. HJM has addressed this problem by using for print editions exclusively printouts from .pdf files, the same files that have been posted on the Web. Hard copies are not produced from .dvi anymore. This policy can be time consuming. Articles may contain non-standard graphics commands, or obsolete (e.g., old UNIX) usepackages which conversion programs have difficulties to implement in .pdf format. But unless the .pdf file provides exactly the same output as the .dvi file, we do not proceed with posting and publishing an article. Needless to say, we occasionally have to consult professional help from our LaTeX provider.

So, as I'm describing it, the HJM's preparation of Web abstracts goes beyond "copy and paste"-ing abstracts from their source documents as given. Each abstract is individually checked for "Web suitability" and then edited and approved by the author before final posting. A more automated procedure would be to extract abstracts from the .pdf files, and post them together with the list of references. This is what some commercial journals do which offer besides the paper abstracts, also *enhanced* versions for a fee. But this still does not guarantee that the abstracts are self-contained and meaningful. There might be references to numbered theorems, for example.

Another special feature available on our journal's free web version is the index. We have divided the index into five year increments, which are easy to scroll because each page has not more than 250-300 entries, reflecting the

50-60 published papers per year. Freely available, complete Web indexes are one of the nicest and most useful features of journal Websites. Besides helping mathematicians with their research, scrollable indexes make the development of a journal evident and indicate its scope and strengths.

While we considered adding a search facility to the journal's website, we decided it would be redundant because all browsers allow for page search. Actually, now even site search is possible, because of the generosity of Google which provides this service to universities for free. Newer papers in the index are linked to the corresponding Web editions.

Abstracts, Index and Author Information are the basic ingredients of journal Web sites. A comprehensive Website allows also for full length paper access. Before offering paper access, a few decisions have to be made. Most importantly, one has to decide on a file format. HJM decided to use exclusively the .pdf format because it has become the *de facto* standard for electronic postings of more complex and longer documents. Other possible choices are the TEX source file and the .dvi and .ps format. Posting documents in their source form as .tex file is, generally speaking, not very realistic because of the possibility of having to include graphics and other files. Moreover, .tex files can be easily abused by plagiarists who are roaming the Web which is, unfortunately, no longer a hypothetical threat. Like .tex source files, .dvi files need the full TEX program for reading and printing. Of course, TEX is in general not installed on public computers and many mathematicians have access to TEX only on their office machines. If there had been a reader available for TEX , .dvi would have been a viable, *albeit* basic, choice for posting scientific documents on the Web. The .pdf file format has been specifically created for the Web, and TEX files can be compiled quite easily in .pdf, and then be read and printed from a variety of freely available readers. Thus, the .pdf file format has become the most obvious choice for the Web. There is, however, a serious caveat on which I will comment later on.

Before HJM added access to paper files, we offered a complete volume on a CD. We decided to offer the CD because at that time, everybody was asking for it. It came to me as a bad surprise that only a handful of institutions showed interest of buying the CD for the nominal price of $20. We certainly lost money on this experience! Libraries explained their disinterest by saying that patrons were lukewarm about checking out CDs. However, my thinking behind offering a CD had less to do with library patrons. I was interested in giving libraries an alternative means of storing documents, or for archiving their holdings in digitized form. By now, we know that this kind of electronic library never materialized, probably because of copyright concerns. The electronic "holdings" of a library are now typically rights of access to the remote sites of publishers, not the physical ownership of digitized files. It is the publishers who ultimately keep control and ownership of "their" files. So, what we now offer are the electronic editions and we have dropped the CD option.

4 Legal and Business Decisions

4.1 Pricing Electronic Editions

The difficulty with offering Electronic Editions is that nobody knows what kind of overall impact it will have on the subscription base. Electronic access certainly diminishes the need for multiple copies, e.g., one for the main library, and another copy for the department. On the other hand, a comprehensive Website increases visibility and status of the journal which may lead to more, and also to higher quality submissions from prestigious places. For HJM this process has certainly taken place. Since HJM entered the Web, we publish about 15% more pages per annum, and our backlog increased from about two issues to six issues. While we experienced some cancellations, mainly for multiple copies, and from places where several other universities were in the immediate vicinity, our overall subscription base has been stable. We also have more authors who take our plea for voluntary support more seriously and whose contributions have offset to some extent inflationary pressures.

HJM decided to provide electronic access free of charge, but only for subscribers of the print edition. The main advantage of this policy is its simplicity, which minimizes the amount of additional bookkeeping of the subscriber list. Moreover, this way we have made access to electronic files a privilege and not part of the paid subscription. This has some legal ramifications when it comes to assessing responsibilities for file maintenance.

Some independent journals offer electronic access for free. Outside academia, free access has become the norm for daily newspapers but not for magazines. I took a clue from this development and decided that free access would pose too much of a risk of eroding our subscription base. It also looks to me that libraries base their decisions to subscribe to a particular journal not solely on affordability, and on input from faculty, but also whether there is a need to subscribe. Free electronic access is in general no incentive to subscribe to the print edition of a journal. In contrast, I have been told that some libraries are now storing printed copies in book repositories, if electronic access has become available.

Print and electronic editions share the same upfront editorial work which is needed for the preparation of a new issue, but electronic editions require extra labor. Thus, electronic editions are not free *per se*, though there are no costs for mailing and printing involved. Indeed, the additional time and work needed for posting an electronic issue can be quite substantial. Thus, separate pricing of print and electronic editions makes a lot of sense, but in order to avoid additional administrative costs, we decided for one combined price.

Once a library has registered for electronic access, it has access to all electronic issues, even to those for which it didn't have a paid subscription. This is an incentive to subscribe. Especially when (eventually) we will have created an archive of all published articles. On the other hand, if a library cancels a subscription, it has lost a privilege, namely electronic access, even to those issues for which it had a subscription for the hard copies. This serves as a deterrent

to the cancellation of subscriptions. Such a policy is justifiable because a subscriber never had to pay for electronic access in the first place. Through many e-mail exchanges, I have the impression that librarians encourage this kind of access policy.

4.2 The Licence Agreement Form and Interlibrary Loans

If a publisher does not provide free electronic access, then in order to obtain electronic access, the university of the subscribing library and the publisher have to agree on a legal document, called the *Licence Agreement Form.* At the minimum, such a document specifies the *Scope of the License*, it contains a *Copyright* clause that limits the usage of files, a clause that relates cancellation of subscription to *Termination of Access* and, finally, it has an *Indemnity and Warranty* clause that protects the publisher from liability claims and, for the benefit of libraries, guarantees the integrity of files. Because we are dealing with regulating the use of new technology, all of these issues enter virgin territory, and, consequently, there is no uniform agreement on any of these clauses. The copyright clause is the most critical of these clauses, and publishers and libraries are changing, or modifying, their positions continually.

When the HJM established full internet access in 1998, we adopted more or less the same positions the AMS held at that time toward copyrights. They have changed their position, but ours continues to read, *"Printing and Downloading of the Electronic Version of HJM articles is permitted solely for Individual use by Authorized Users and only at Permitted Sites."*

This has been correctly interpreted as having the following ramification: Electronic Editions, in any form, are excluded from being accessible through *Inter Library Loans (ILL's).* My explanation for excluding files from ILL's is quite simple: There are no actual loans involved. The "lending" library is not giving up the use of anything (such as a copy of a periodical or a book) because it is on loan. The "borrowing" library, in attempting to exchange files, is in effect using IP numbers outside the scope of the license. Superficial paperwork involving these purported loans does not in and of itself validate them as comparable to traditional loans.

Some publishers do allow limited use of electronic files for the purpose of ILL's, namely for printouts of electronic files, *in lieu* of using photo copies from print editions. This sounds like a good idea. Libraries don't have to search for print editions, which might not even be available at the time of the request, or issues have been misplaced, missing, or mutilated etc.

However, there is another important argument against allowing printouts of electronic files - the possibility of contaminated content. While a publisher has the legal power to restrict or allow printouts of electronic files as ILL's, he has no control over how a library transmits those printouts (the same way he can't tell a library how to do its mail when traditional ILL's are involved).

The mode of transmission is what should concern us. It is possible that a library decides to digitally transmit documents by scanning a printout, using sophisticated character recognition software. As a possibility, a .pdf file could

be created which would then be e-mailed to the "borrowing" library. However, a .pdf file that has been produced this way is almost always of inferior print and display quality compared to the original; but much worse, if the document contains mathematics, the character recognition software may have altered or compromised the content. A publisher cannot permit these compromised files to then get into circulation and be mistaken for originals. It should be clear, then, that if a publisher has made .pdf files available, then only those sanctioned files can be used for (legally limited) e-mail exchanges. I am not sure whether international copyright laws have addressed this point or not.

Some subscribing libraries have provided the HJM only with the IP numbers of their mathematics department members, thus bypassing conflicts they may have honoring ILL requests.

New products and technologies do not always fit seamlessly into old business practices. Liberal distribution of electronic files is not covered by current ILL copyright laws and therefore, unless specifically arranged otherwise with publishers, must be, by default, excluded. Like many other publishers, HJM considers electronic access a bonus for subscribing libraries, one which cannot be shared through ILL's.

Only very few libraries have questioned our journal's ILL policy. My general response to them has been that unlike commercial journals, HJM is so inexpensive that every library with some budget can afford our subscription. In all but one case, every library agreed with me, and then explained their initial opposition to our ILL policy stemmed from the fact that they were not aware that our journal, unlike commercial journals which are highly profitable cash cows for their publishers (see the New York Times [5] on that subject), was not trying to make more money from this ILL policy. In contrast, as a University journal, we only seek to recover our own production costs through modest subscription fees.

It may be the case that eventually State Agencies will negotiate with publishers licences for their whole system of public libraries, thus making electronic exchanges of files between such libraries unnecessary. In the UK, the *British Library* is considering a form of licensing that would allow for controlled access, that is, questioning the idea of unrestricted public access at a public library (cf. Sally Morris [7]. Another possibility would be that a consortium of libraries makes long term subscription committment to selected groups of journals, in exchange for making internet access free or a more liberal policy of ILL's. But before anything like this is going to happen, cheap access for everybody maybe the best solution.

4.3 Implementation and Administration of Restricted Internet Access

Independent journals which are affiliated with major universities generally have access to departmental servers, and this allows them to establish an Internet presence. HJM is very fortunate in that our mathematics department has superb computing facilities and a knowledgable IT staff. Thus we did not have to

look outside (e.g. to Project Euclid [3]) for launching a Web presence. The development of the Web has been fast and to some extent pleasantly unpredictable. We only have to think about free global search engines and site searches provided by Google. Because of this, Websites of independent journals can match many features of expensive commercial ones.

While libraries can register directly with us for Internet Access it seems that they prefer to go through their subscription agencies. These agencies now keep a record of subscriptions with internet access and therefore can notify us about changes. Because of this co-operation, the transition from print to *Print plus Electronic Access* has been straightforward and smooth. Our experience very much sustains the claims made in Andrew Knibbe's article [6] on the increasing role of subscription agencies in electronic publishing.

5 Caveat the Adobe Reader

The .pdf format is intimately connected with the Adobe Software Company and two of its products, the *Acrobat* and its free *Acrobat Reader.* However the file format .pdf is open source and there are various products that convert LaTeX files into .pdf. Some are even free, and convert, for example, .ps files into .pdf. The paper by Ockerbloom [8] discusses in more detail the legal relationship between the .pdf file format and Adobe.

The quality of .pdf files is not always high and there are often problems with fonts and graphics; also, screen display and printing can be less than perfect. Unfortunately, no matter by what means LaTeX files have been generated into .pdf files, every new version of AR seems to cause new and unexpected problems for existing .pdf files which originated as LaTeX files. This is an unacceptable situation; the .pdf file format is well understood by a number of professionals who are also familiar with the TeX typesetting language and know about the needs of scientific publishers.

I feel that publishers and libraries should start thinking about the creation of an academic version of something like the Acrobat which would address these issues. According to the information I got from specialists (e.g., from Micropress), the initial development of a high quality reader of .pdf files would be in the neighborhood of $500,000 to $1,000,000, but probably lower. This would include further improvements of the .pdf format, reliable, high quality conversion to .pdf from LaTeX and other essentials. Upgrades of such a product would be much cheaper to produce, but upgrades are necessary to accommodate changing, or new operating systems. Because the .pdf format is open source, any number of developers could be "certified". For paper, government agencies have defined criteria for what constitutes "archival quality." For electronic files, *certification* poses a much more complex problem. It would involve, for example, a certification process for software packages that convert TeX into .pdf files, and another certification process for readers that are supposed to handle (display, print, search etc) such certified files.

While a certification process might be far away, it would be very helpful if

the AMS, or other professional organizations, would on a regular basis evaluate and test the various software packages which are currently needed for scientific publishing. It is interesting that about 15 years ago, the AMS did something like that for scientific wordprocessors and printers. I wonder why the AMS is no longer providing this kind of badly needed service to the mathematical community.

I am afraid that the current situation of various well known (free or very inexpensive) patchwork solutions for electronic publishing will not work forever and that finding permanent solutions may need a stronger financial committment from all parties involved.

Nobody knows the future of the .pdf format, and the need for .pdf readers outside the journal publishing community. For the Web, the HTML format is continually improving and various application programs (e.g., for wordprocessing, spreadsheets, data bases etc) may converge to uniformly accepted, but diverse, file formats. Readers for such file formats may become part of Operating Systems, thus making plugins, like the AR, redundant. Thus, even if Adobe survives the current .com shakeup, there is no guarantee that it won't drop the Acrobat at one point in time. However, the .pdf format is a language and as such it will be understood as long as people are willing to learn it. Because publishers depend on the .ps and .pdf format they should make sure that this language stays alive, regardless whether other parties will have interest in it or not.

It has been suggested (e.g. [11, p. 924]) that one should safe-keep electronic documents in their most primitive format. However, it is even now not feasible to recompile periodically LaTeX source files into .pdf in order to make them compatible with the latest version of the AR. This is because LaTeX and some essential components, e.g., enhancements provided by the AMS, are not upward compatible, and older files have to be manually edited in order to compile under such upgrades. A quick calculation shows that this approach is cost prohibitive, even for smaller publishers like HJM. On the other hand, to collect $1,000,000 from publishers on the basis of published pages per year, would amount only to a fraction of their combined printing costs. HJM certainly would support an initiative to establish a monetary pool to be used for the further development and maintenance of the .pdf format, and to create standards that meet the specific needs of scientific publishers. As I see it, the only question is whether publishers and libraries can afford **not** to do so.

Traditionally, librarians have been the custodians of published material. This is still the case for printed matter but does not apply to documents in electronic format. The reason is simple: Libraries do not own files. Libraries may have access to individual files but in most cases, libraries are not allowed to download whole volumes. Thus, their ability to archive electronic material has been curtailed. On the other hand, whether publishers are willing, able, or even legally responsible, to archive and maintain files is untested territory. Publishers and libraries have to come together and find a common ground. Independent publishers may be ready to form partnerships with certain libraries to share the price and burden of file maintenance and archiving. However, it should be clear

that the fate of electronic publications should not depend on the good will of a business oriented company, like Adobe, that has no vested interest in academic matters. I feel, more is needed than committees making recommendations. As I see it, the presence is already too worrisome to lose much thought about the future.

Conclusion

The electronic revolution has certainly changed the landscape of the publishing business. It is remarkable that every stage of this still ongoing process seems to have fostered the development of independent journals.

In order to stay competitive, every new technology forces a publisher to rethink its operating procedures. Because of their smaller size, better educated staff, and in many cases the ability to access state of the art computing facilities, many independent journals are well equipped to implement new and more efficient production methods. This explains, at least in part, their much lower journal prices.

For these reasons, I am quite optimistic about the future of independent journals. It will be interesting to see whether some editorial boards of commercial journals decide to go independent, or at least change to an academic publisher, as it has already happened in the well publicized case (cf. [2]) of a prominent journal in computer science.

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