Online publishing: how, why and other related issues

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The Internet allows the creation of a peer reviewed online journal, such as *Images in Paediatric Cardiology*, at a fraction of the cost of a conventional journal. Furthermore, an online journal can display a multitude of images and other multimedia material (such as audio and video files) – a feature not available in a conventional journal. The issues of creating such a journal are explored, along with the issues of online publishing, including copyright and peer review. Current proposals that may affect copyright and peer review in all journals are also outlined.

Introduction

In medicine, information is presented in fragmented form in thousands of different journals which, in general, charge readers substantially for subscription. Technology has rapidly progressed over the last decade and now provides a global network – the Internet. Journals such as the *British Medical Journal* publish their material as conventional hard copies and via the Internet. Others such as *Pediatrics* publish different articles in hard copy form and online, and some journals such as *Images in Paediatric Cardiology* have started exclusively, and therefore very recently, online. The success of the Internet will almost certainly lead to this medium supplanting the traditional paper journals for three main reasons.

- First, because the distribution of a printed journal is inherently restricted, and may unintentionally exclude potential readers who are unaware of the publication or unable to obtain it within a reasonable time frame.
- Secondly, subscriptions for a conventional journal are expensive because articles must be edited, reviewed, copy-edited, printed, mailed – and yet remain profitable. An exclusively online journal is much cheaper to produce. This is especially so if the journal relies heavily on graphics; the Internet constitutes an ideal medium for disseminating graphical information because of the ease and low cost of producing images online.
- Thirdly, the Internet allows journals to be more versatile in presentation, with the ability to publish multimedia presentations, including audio and video clips.

The launch of an online journal is an arduous task so key issues must be addressed at the outset, especially usefulness (would such a journal be useful to a discipline?) and appropriateness (is there any point in the exercise?).

Journal name and location

When a suitable journal name has been decided upon, a domain name that is easy to remember and associate with the journal should be chosen. However, the hosting website may not be able to allocate a specific domain name for technical or other reasons. A medical journal should ideally be hosted by a respected institution, but a variety of sites offer free web space. Having the journal hosted on more than one site – mirror sites – should also be considered. Ideally, these should be in different countries, or even continents, so users may choose which site to access for reasons of download speed. A journal contact email address is also essential.

Financing

This may come from a national or institutional level, or may be sought from advertising on the journal website. Funding may also be acquired by making the journal available to interested readers or institutions on CD-ROM. Furthermore, the editors may choose to finance the journal by password-protecting the website, allowing access only in return for a regular subscription fee.

Advertising the journal

The launch of a journal should be advertised conventionally, for example, in journals of a similar type. An online journal should also be submitted to the major search engines, and a list of submission pages is given in Table 1. It is crucial to include a list of keywords in the web page header which can then be used by the search engines to index the journal. In addition, websites with content related to the journal should be asked to include the journal among their own list of links. The launch of a journal should also be announced on existing related list-servers. Indexing of the journal in
Table 1. Web page submission links

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<tr>
<th>General information</th>
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<tr>
<td>Multiple submission</td>
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<td>Excite</td>
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<td>Webcrawler</td>
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<td>Yahoo</td>
<td><a href="http://docs.yahoo.com/info/suggest/">http://docs.yahoo.com/info/suggest/</a></td>
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<tr>
<td>Lycos</td>
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Medline or Index Medicus is by application – a process that generally takes years after the initial launch.

Hardware

Any current, entry-level personal computer is capable of producing an online journal. A flatbed scanner and a slide scanner are necessary in order to convert pictures submitted as drawings, photographs or slides to digital format. For on-screen viewing, a resolution of 72 dots per inch is sufficient. A fax is also useful for communication if an email link is unavailable. This may be a fax machine or fax software on a computer.

A backup device to allow the daily backup of the journal files is mandatory. An ordinary floppy drive is insufficient if graphics are employed in the journal. Zip drives and tape drives may be used, but CD writers and rewritables are the most practical backup devices available. Drag-and-drop software for CD-R (read only) disks such as Nero Burning ROM is easy to use. Similarly, rewriteable discs (CD-RW) can be viewed and treated as 500 Mb hard disks by means of packet writing software such as Prassi ABCD.

A black-and-white laser printer is necessary for the internal circulation of documents and for general mailing purposes. A colour printer is useful for image proofing purposes.6,7

Submission and publication of articles

Submissions should be on floppy disks, CDs or other electronic media. Email submission should be discouraged due to the inherently large file sizes that would need to be downloaded at the journal end. The length of an article is not an issue in an online journal. A word processing program is used to view and edit submissions.8 The final HTML document is created by importing the text into a web editor, and then adding the necessary links to images. Some word processing programs allow a document to be saved directly as a web page complete with links – any embedded images will be automatically saved with the links. Prior to publication, the journal articles should be printed to ascertain the page lengths for each article. This will allow each article to have a specific citation, with journal name; year, issue and month of publication; and page numbers. The chief editor should also inform the article authors of the exact address of their respective articles, and the exact citation. Articles should be cited in text and appear as references in the conventional Vancouver format.9

Peer review

Although the system of peer review is often questioned, it remains fundamental,10 and is especially important on the Internet where thousands of websites supply information, none of which is necessarily accurate. The review process for an online journal is identical to that carried out by any conventional journal. Review is undertaken primarily by the journal editors who may: reject articles; review articles themselves; or forward them for review by an international advisory board.11

The Internet is also used as a forum for manuscripts, and web postings may be categorized as follows:12

1. An electronic draft posted at an individual or institutional website that is used for collaborative purposes by predetermined members of the medical community, but is inaccessible to others.
2. An electronic preprint of a paper posted on the Internet for general informal review and comment prior to eventual conventional submission to a journal.13,14 The principle is similar to that whereby papers are presented as abstracts at conferences and eventually published formally.
3. An electronic letter or email that can be automatically posted by a server, allowing rapid exchange of ideas and information.
4. An electronic preprint of a completed journal article that has undergone the peer review process and awaits formal publication.
5. An electronic copy of the printed article, including volume and page numbers. This may be made available as a web page or as a downloadable PDF file.

However, some journals refuse to publish material that has appeared on the web, arguing that the posting of such material constitutes prior publication and incidentally avoids the peer review process.15 It has been suggested that the process of ‘open’ peer review should be encouraged, whereby manuscript authors are supplied with the identities of reviewers and vice versa.16 Furthermore, it has been suggested that the identities of reviewers should also be disclosed for each published paper.17

Copyright

A recurrent and progressively more important theme in web publishing is the importance of the protection of intellectual
property rights. Copyright gives the creator of an original work the right to protect such work from unauthorized use. Hence, copyrighted work may not be duplicated or distributed without the owner’s consent. It is current practice for authors to be asked by publishers to sign over copyright to the journal publishing house prior to printing. However, copyright is subject to the proviso of ‘fair use’, which allows use of copyrighted work for the purposes of criticism, news reporting, teaching or research.

Copyright protection also applies to online material. However, the use of a picture or a video file without the copyright owner’s permission is especially prevalent when the image is distributed electronically, because a digital copy does not suffer degradation like a photographic copy. Standard protection schemes, such as locked files, data encryption, distributing only low-resolution previews, and marking images to make them unusable, inconvenience both the authors and the readers. The most sophisticated option is to use an invisible electronic watermark that embeds marks into images in order to identify both the source and recipient of such images. Although this will not prevent copying of images from a website, third parties will be alerted to the fact that such images have been copied.

Website structure

The following pages are suggested as part of a journal’s core structure. By default, the home page of a website is usually called index.htm, which can be used to list the editorial board and website host. Additional pages linked to the home page should include: a page detailing the scope of the journal; a set of instructions to authors, including a consent form for images which show recognizable individuals; a page detailing journal copyright and a disclaimer; and a page with links to related websites. Net etiquette requires that permission is asked for the creation of links to other websites.

Care should be taken so that graphics are only loaded once at any time during navigation in the website. For example, the journal banner/logo and commonly used web page buttons such as ‘home’, ‘top’ and ‘back’ should be the same graphic loaded by different pages. This speeds up journal page download. Folders and subfolders should be used copiously in order to minimize the number of files in each folder, thus making individual file location and website integration a less arduous task.

Journal and website layout

Since the Internet is inherently graphical, the help of a professional graphic artist should be sought in order to design a journal logo that is suitable not only for a web page but also for printed letterheads. A graphic artist can also help to determine the overall style of the journal website. The actual layout may be hired out to professional web writers, or be produced by the journal staff themselves. Web page design has been simplified by WYSIWYG (what you see is what you get) web editors – one need never actually program in HTML. The obvious disadvantage of hiring out is the recurrent cost incurred for production.

A web browser and web editor

The core of the World Wide Web is its ability to link related pages by means of hyperlinks. The most commonly used browsers are Internet Explorer and Netscape Navigator. Different browsers interpret hypertext differently, so pages should be viewed with both browsers prior to publication. Furthermore, different video display settings at the user end may result in very different screen displays, so it is also advisable to create web pages at the most common display resolution setting of 800×600 pixels, and then to test the page at settings of 640×480 and 1024×768 pixels.

The most commonly used web page editors are Microsoft Frontpage and Netscape Composer. The latter is free, and is an integral part of the Netscape browser. Some word processing programs have the ability to save documents as web pages, but this is a cruder approach. Third parties have also produced dedicated web page editors, some of which also act as website managers, e.g., Macromedia’s Dreamweaver.

Unusual fonts should be avoided at all costs. If the user does not have the font installed, the browser will use its default font, thus the formatting within the original page may be lost. It is therefore advisable to use Times New Roman or Arial.

Tables with invisible gridlines are crucial in web pages because they are used to space text and graphics. For example, if a background with a margin on the left is employed, the page contents should be placed in the right-hand column of a table with two columns. The left-hand column may then be used to hold the contents away from the margin. Tables can be created (nested) within tables, and the background of each table can be different.

The degree of sophistication that the journal will employ must be decided at the outset. Users with older and slower computers may well be using older browsers that are not compatible with frames, javascript, or dynamic HTML. Elegance must therefore be tempered with caution so as not to exclude users with older computers and browsers.

Graphics

The use of graphics should be encouraged. They may be supplied as photographs which can then be scanned, or as electronic files. Both black-and-white and full-colour images can be published online at no cost to the journal. This is one of the great advantages of online publishing, and this aspect particularly applies to multimedia submissions, which may include animations and audio.

Programs such as PaintShop or Adobe Photoshop allow images to be edited (e.g., cropping, resizing, adjustment of contrast and brightness). Two basic graphic file types are most commonly employed on the Internet: JPEG and GIF. Both formats employ compression algorithms in order to reduce file size and thereby speed up downloading from the Internet. The JPEG (Joint Photographic Experts Group) standard in the public domain supports 16 million colours (24 or 32 bits per pixel), and uses lossy compression. The level of compression is under the operator’s control, but care must be taken not to compress graphics excessively or
details will be lost and artifacts will occur. GIF (Graphics Interchange Format) is a standard defined by CompuServe for images compressed by the LZW (Lempel-Ziv Welch) non-lossy algorithm. This format supports a maximum of 256 colours (8 bits per pixel) and also supports ‘transparency’, i.e., the background of the web page can be viewed through the transparent part of a graphic image.

In practice, individual graphic file sizes should not exceed 400×320 pixels in dimension, as many individuals browse the net at a 640×480-pixel video screen resolution. Moreover, graphic files should not exceed 20 kilobytes in physical size: a single 20-kilobyte file will download from the Internet in 19 s over a 14.4K modem, 9.3 s over a 28.8K modem and 4.8 s over a 56K modem.

Both JPEG and GIF support progressive coding (interlacing), which is an algorithm that stores graphic data non-sequentially so that downloaded data add progressively greater resolution to the whole image image, whereas sequential coding builds an image gradually from top to bottom. Progressively coded images are more likely to hold the attention of a browser.

Logos, page backgrounds, buttons with text, page dividers, etc., may be created using any graphics packages. However, they can also be downloaded without charge from the Internet. Alternatively, dedicated commercially available packages, such as Xara Webstyler, allow the easy creation of such graphics specifically for use on the Internet. Moreover, modern web editors also incorporate themes with matching sets of backgrounds, buttons, banners and dividers for automatic application to a website. Logos and buttons may also be animated. Once again, such animations can be created by means of dedicated software, or may be created free, online, from sites such as www.MediaBuilder.com.

Page backgrounds may consist of a single colour which is preset when the web page is created, or may consist of a graphic. A graphical background may consist of a small picture rectangle that browsers automatically tile across the entire page, or of a wide and narrow graphic that extends across the width of the page which is automatically tiled down the entire page by the browser. The latter option allows a margin to be created, usually on the left-hand side of the screen.

Multimedia submissions

A video capture card is essential if animated clips submitted on videotape are to be displayed. A videotape player connected to a computer allows the content of the tape to be captured digitally onto the computer’s hard disk. Such files are saved in AVI (Audio Video Interleave) format, a standard designed by Microsoft that is specific to Microsoft Windows, or in QuickTime format, which is Apple Computer’s standard. QuickTime’s advantage over AVI lies in its compatibility with both Windows and Macintosh environments. Video compression software and hardware codecs are used to compress files of video clips to allow faster download times. Users of video compression software must consider the compression quality of various codecs. The underlying principle is to reduce the video file into the smallest possible size without sacrificing playback quality. Several compression techniques exist, though MPEG (Moving Picture Experts Group) is currently the most popular compression algorithm used in Windows.

An animation editor, such as Adobe Premiere, can be used to edit both video and audio submissions. The final output should ideally be to both MPEG and QuickTime formats to allow users of IBM clone computers and Apple-Mac computers respectively to view the animations easily. MPEG conversion can be achieved from AVI format by a stand-alone program such as the Xing MPEG converter, or via an animation software add-in, such as the Xing add-in to Adobe Premiere.

Upload

The journal goes online by being uploaded in toto, structure and all, onto the hosting server. This applies to each and every edition of the journal. Links within the website are preserved because hypertext linking is relative to pages and not absolute. Upload is usually performed by the web editing software, or may be performed by an FTP (file transfer protocol) program.

The future of publishing

The United States National Institutes of Health (NIH) propose to set up a single electronic database and full text repository for peer reviewed biomedical research papers, as a natural extension of the National Library of Medicine’s PubMed service. Both would be funded by the US Government, as is the current financing in Medline. This would be the most revolutionary change in scientific publishing since the appearance of the first peer reviewed publications. A similar service has served the physics community since 1991. Such a proposal would not only be of tremendous benefit to researchers, but would also free up the budgets of libraries worldwide. Such a repository would force most journals to move exclusively online in order to exist on budgets diminished by subscription losses. It would also mean that authors would retain copyright rather than relinquishing it to publishers. However, others have argued that the publishing industry is inextricably linked with the research establishment and that the publishing lobby is too powerful to fall prey to the NIH proposal.

Conclusion

The launch and maintenance of an online journal is an intricate task, and the author speaks from personal experience as the creator of Images in Paediatric Cardiology. But such a journal is much cheaper to create and maintain than a printed journal, and has proven to be equally rewarding.

References

17. Scott PV, Smith TC. Definition of authorship may be changed. Peer reviewers should be identified at end of each published paper. Br Med J 1996; 313: 821.