

# CURRENT SCIENCE

Volume 78 Number 2

25 January 2000

## GUEST EDITORIAL

### Internet publishing

Knowledge grows when shared – so says Ancient Wisdom. The really dramatic evidence in support of this principle came in along with the Internet Era. One of the most attractive aspects of the Internet is that it allows knowledge (and more importantly, enthusiasm) to be shared across the globe, instantly and inexpensively. The spectacular accomplishment of the open source movement in general, and of the Linux operating system in particular, is a case in point. In 1991, Linus Torvalds, then a student in Finland, started developing (from scratch) a free unix-like operating system. Today, Linux has become the best, most robust and most cost-effective operating system – only a few years away from Total World Domination. That Linux could successfully compete against the billion-dollar-funded alternative operating systems is entirely because the source code of Linux was freely shared across the world. The loosely-knit, enthusiastic and dedicated team of brilliant hackers did the rest.

Though the Linux story is a classic example of using the Internet for sharing knowledge, it was mainly about sharing specialized knowledge amongst specialists. However, the Internet also offers a far more powerful tool – the World Wide Web. Though originally developed by Tim Berners-Lee to help out the community of particle physicists for coordinating their highly esoteric research, the Web has emerged as an excellent (most user-friendly, most versatile, most powerful, most cost-effective) medium for presenting all kinds of information to the world. Since the stated purpose of most scientific journals is to inform and educate their readers about scientific developments, what can be more appropriate than these journals making their appearance on the Web?

It would be interesting and instructive to trace the history and the growth of web-accessible scientific journals – but there can be no doubt that their number is increasing very rapidly, and so is their versatility. For example, the web pages of the library of the Indian Institute of Science and the National Center for Science Information (both accessible via <http://www.iisc.ernet.in>)

have provided a list of over 200 web-accessible journals covering the disciplines of physical sciences, life sciences, medicine and technology. Journals from many countries across the world (USA, Sweden, the Netherlands, Australia, Brazil, Korea, etc.) have taken to the Web.

The advantages of making journals available on the web are almost self-evident. Journals can be accessed from almost anywhere (from Institutes of higher learning, as well as from the rapidly mushrooming cyber-cafes!), and at any time: the interested reader is freed from the constraints imposed by space, geographical location and time. This by itself will ensure that more journals and more articles are read. The second, not so readily obvious advantage is that the article being read can be easily saved for reading it at leisure in future, this probably ensures that articles are read more carefully (and hence are more likely to be cited!). However, the most crucial advantage of web-based journals is that articles contained in them can be 'discovered' by interested readers, using the various search engines available on the Web. The days of actually browsing printed copies of journals to discover relevant articles (literature-search!) were over long ago, to be superseded by the era of using only the secondary sources like the abstracting journals, initially the printed versions and subsequently the compact discs (CDs). Today, the only source of information recognized by the graduate students (probably in all countries) is the Internet; what is not available on the Internet is deemed to be nonexistent! So almost the only way in which a published article would be noticed is when a search engine (e.g. Google or Yahoo), in response to a query from a researcher, scans tens of millions of documents spread all over the internet and picks it up along with other relevant documents which match the query. In other words, if a journal is on the net, there is a good chance that sometime or the other, an article published in it will be picked up and cited by researchers. On the other hand, articles published in those unfortunate journals not hosted on the Web may just continue to lie in some forgotten corner, never ever to be noticed.

It is for this reason, if nothing else that Indian journals have to go on the Internet as soon as possible. Taking to the web is the fastest, surest and the most cost-effective way of improving the visibility of Indian science.

Given that India has the third largest scientific manpower pool in the world, an abundant supply of skilled software professionals, and a profusion of organizations and companies providing inexpensive internet access, one would have logically (though naively) expected to see many Indian scientific journals on the web. Unfortunately, the ground realities are somewhat different. The pace of adaptation to these new technologies in India has been rather slow. However, one can take heart from the fact that things have indeed started moving. There are indications that a joint initiative from the academies of science will very soon (in less than a few months) ensure that all their journals are freely available on the web. The spirit-of-sharing whipped up by the Internet seems to be powerful enough even to make the two academies cooperate with each other.

Using the World-Wide-Web for communicating science means much more than simply hosting the existing journals on the web. The time is ripe for starting electronic journals that will complement the role of existing print journals. Even a conservative journal like *Acta Crystallographica* seems to be at it (yes, *Acta Cryst E* is not just next in series after A, B, C, and D – the E stands for Electronic!). For a truly exciting account of what a purely electronic journal can do, a visit to the website of the electronic journal *Conservation Ecology* ([www.consecol.org/vol3/iss2/art16](http://www.consecol.org/vol3/iss2/art16)) for a look at the editorial by C.S. Holling is strongly recommended. Once freed from the constraints of the print medium, the possibilities are enormous. Gone are the rigid limits on the number of words, figures or coloured illustrations. The authors can include even animations and videos if they so choose – and which theoretical chemist can resist the invitation to upload files that show the graceful transitions of a molecule from one symmetric conformation to another! For more mundane and number-and-statistics oriented researchers, large sets of primary data can now be included along with the article and made available to the interested readers – or skeptical referees. Talking of referees, electronic submission and refereeing of manuscripts is now easily possible; this means that it is inexpensive and operationally quite convenient to have a larger number of referees. The peer-review process can also be speeded up considerably, since postal delays can be drastically reduced. With just a little cooperation and just a little patience from the

interested parties (authors, referees, editors and readers), a purely internet-based journal is likely to prove to be a most cost-effective and attractive option in the days to come.

All these advantages notwithstanding, a rather serious issue, currently being constantly debated all over the world, is about the authenticity and reliability of web-based information. This will be all the more important for scientific journals. Setting up and publicizing a web-based journal takes hardly any resources. An old 486-based machine (powered by Linux, of course), a connection to the internet (the rates are coming down all the time!), and a desire to set up the journal is all that is needed – the required expertise can be picked up in a few hours by anyone who has used a computer even for just a couple of weeks. It is just a matter of chance that we do not as yet have an *Indian Journal of Herbal Petrol* (may be it is there somewhere!). A knee-jerk response towards solving this problem would be to request the Government or the Academies in collaboration with the government, to start some kind of certification system. Such an initiative, unfortunately would be a virtually worthless (and probably counterproductive) exercise. The community of Internet users is deeply suspicious (and probably rightly so) and vocally hostile to any kind of such authoritarian mechanisms. A better, though more time-consuming solution is to set up special websites for monitoring all journals. Anyone would be welcome to comment on the journals, but the comments would be moderated before hosting on the page. The great success of moderated newsgroups argues in favour of such a solution, though this is by no means a panacea. In the long run, the inexorable Darwinian selection will ensure that the better journals survive and flourish at the expense of the not-so-fit ones.

To sum up, the Internet and the World Wide Web are all set to revolutionize science communication and scientific publishing. India, in particular, can benefit greatly from this development. Unfortunately, not much has been done so far; in fact, it is a pity that so many, with so much, have done so little. On the other hand, there are very encouraging signs that the situation will change for the better, sooner rather than later. The internet technology is such that so much can be done with so little by just a few – and a few are indeed trying to do it. Just a little bit of encouragement and insistence from the discriminating readers, and Indian science journals will start flourishing on the web very soon.

N. V. Joshi