Emerging Digital Media Project

John Schoneboom
American Association for the Advancement of Science (AAAS) Africa Program

Introduction

This paper explains a project of the AAAS Africa Program intended to help address the problem of obtaining access to scientific and scholarly information for scientists in Africa. The Internet's promise in this regard has been only partially fulfilled. Even if localized access problems (e.g., low bandwidth, dodgy connection lines, inconvenient access points, high connection fees) can be overcome, there still remains the issue of high subscription costs to many scientific journals. Journal subscription costs vary widely, actually, from less than one hundred US dollars a year to several thousand dollars (see Appendix I for a table of costs of a selection of popular journals). It is therefore probably more accurate to say that, while the subscription fees of many popular journals are quite reasonable, taken together they can quickly add up to more than many African university libraries or individual scientists are able to pay. Thus, despite the growing availability of Internet access, many scientists in Africa feel that they remain outside the mainstream of their disciplines. The good news is that the Internet enables the innovation of creative alternative approaches to information-related challenges, and indeed several emerging digital media have become available in recent years as alternatives to traditional journals.

For example, tables of contents and abstracts of research articles are now routinely made available for free by most online journals, and can even be delivered regularly by email. For many purposes, the abstracts themselves may be sufficient information. In cases where the full article is needed, some journals now offer the option to purchase a single article at a time, rather than requiring a full subscription. Budgeting for single article purchases may prove to be a key part of a cost-effective information strategy, displacing at least some complete subscriptions. It may be desirable to maintain subscriptions to certain core journals as well, but actual usage and benefits should be evaluated against costs in light of these other kinds of options. There are also a variety of freely available news, university, research institution, and individual websites that may fill a substantial part of the information needs of researchers. Furthermore, discipline-specific mailing lists and online conferences provide opportunities to build and maintain "virtual communities" in which desired information can be shared formally or informally among colleagues.

The extent to which these kinds of free and low-cost options can satisfy the information needs of researchers (whether in Africa or elsewhere) is the question to which the AAAS Emerging Digital Media project is directed. The project represents an exploration into whether these information alternatives are viable, and offers a tentative model for organizing them into a coherent and useful form. To that end, a web-based information portal has been established at www.virtualscience.org, focusing on the disciplines of environmental chemistry and conservation biology and comprising the sorts of resources mentioned above.

The Portal

The information portal at www.virtualscience.org has four components:

- URL directories: These are "Yahoo style" directories of web-based resources, divided into various categories. New entries can be added to the URL database at any time by any user, although submissions must be approved by the site manager before they appear in the directory (to prevent "spam" attacks or other frivolous or malicious entries). There is one directory for conservation biology and one for environmental chemistry.
- Online conference areas: these are permanent, ongoing discussion areas (rather than time-limited conferences), using a web-based format, and there is one for conservation biology and one for environmental chemistry.
- Electronic mailing lists: the portal includes links to subscribe and unsubscribe to two mailing lists, one for conservation biology and one for environmental chemistry.
- News feeds: There is a general interest science news feed on the front page of the site, and then separate discipline-specific news feeds on the main pages for the two sub-sections, i.e., environmental chemistry and conservation biology.

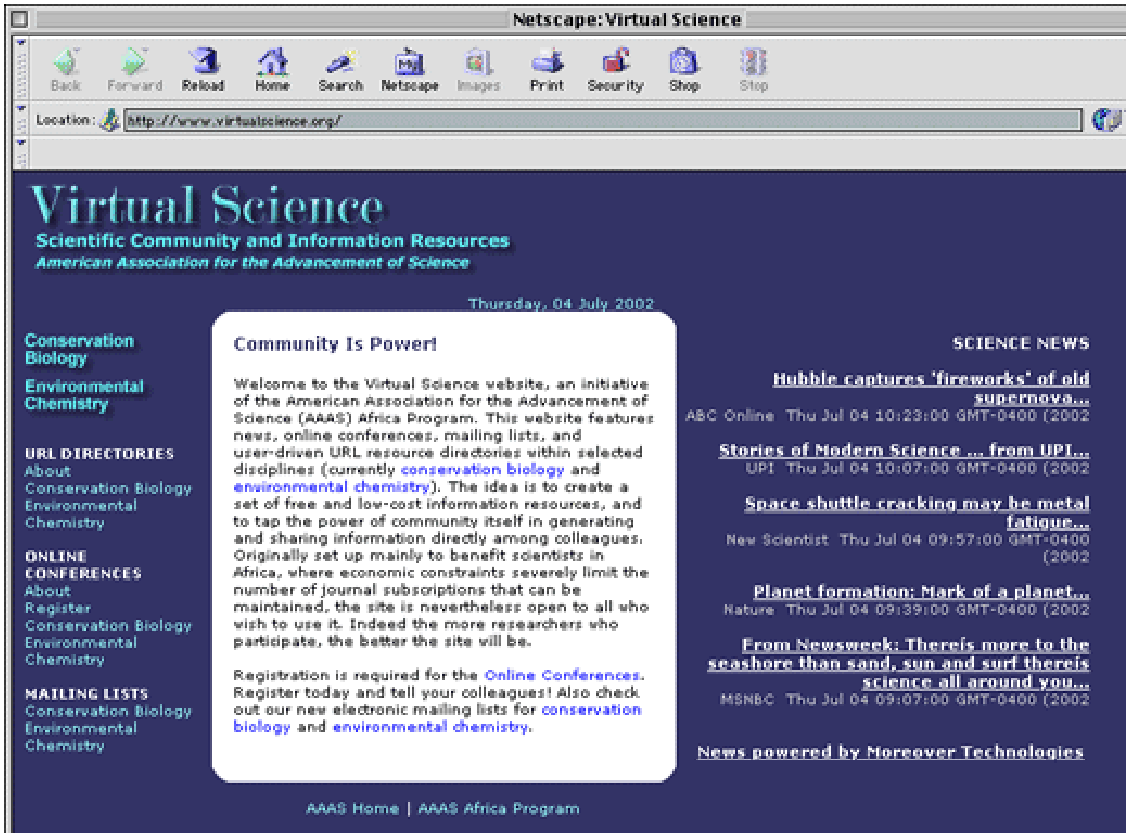

Fig 1. Screen shot of the front page of the Virtual Science website (www.virtualscience.org)

The most important thing to note about this information portal and its various features is that, apart from the news feeds (which come automatically from Moreover, a free news-

feed service, and are updated continuously throughout the day), each of the functions of the portal is completely dependent upon the active participation of a user community. Without active users, the portal is almost completely useless. Clearly, an online discussion area is a lonely place with nobody there to discuss anything; a mailing list with no active members may as well not exist. Similarly, it is highly unlikely that any one person could fill the URL directories with enough useful links to make it a highly desirable Internet destination. In order for the directories to grow and remain current, the active participation of an enthusiastic user community is essential. In short, this whole project will only be as good as its participants make it. Therefore the most important role for AAAS here is to try to establish such a community of interested users by promoting the portal to those people who might be interested in making use of it.

The User Community

Like any publicly available website on the Internet, the Virtual Science site is open to anybody who wishes to use it. No passwords are required to view the URL directories, and no passwords are required to submit new information to the database. (As noted above, new entries must be checked and approved by a site manager to prevent malicious or frivolous entries from "polluting" the database.) Similarly, anyone interested in environmental chemistry or conservation biology is welcome to join the electronic mailing lists or the online conferences (discussion areas). Registration is required for the online conference system, but there is no cost to do so.

Although the system is open to the world, there is at the same time a "target community" of users consisting of four African universities: University of Bamako in Mali, University of Ghana (Legon), University of Eduardo Mondlane in Mozambique, and University of Zambia. These universities were chosen to represent a geographic and linguistic diversity, and because in each case there was a pre-existing relationship between AAAS and people at the university.

There are two things that separate this African university target community from the rest of the wide open world of users. One is that the AAAS project offers these users a modest budget to purchase single articles from those online journals that offer the single-article option, and the other is that the project will solicit detailed feedback from these users as part of the effort to evaluate the project upon its completion at the end of 2002[1]. We will attempt to identify the strengths and weaknesses of these alternative information options, as well as the strengths and weaknesses of the way the project itself was organized. In addition, we will attempt to gather empirical data in order for the analysis of the relative cost-benefit ratios of journal subscriptions and pay-per-article strategies.

The user communities can also be described by discipline. The project needed to have a more narrow scope than just science in general if it could hope to provide a set of resources that would be useful to anybody. We chose to focus on environmental chemistry and conservation biology for three reasons. First, these are fields of science

[1] The formal project, i.e., the availability of the pay-per-article budget and the monitoring and evaluation process, will come to a close at the end of 2002, but the portal itself will remain in place and open for use indefinitely.

with strong relevance for Africa and active scientific communities within Africa. Second, there were existing scientific networks in these fields, with good contacts established between US and African scientists, so that we would not be starting from nothing when we tried to build our virtual communities. And finally, the AAAS Africa Program had completed previous projects focusing on these disciplines, allowing us to build on those earlier efforts, creating synergies and maximizing impacts.

The Challenges

AAAS embarked upon this effort in response to concerns from colleagues in Africa about the costs of online journals and the usefulness of the Internet in general to their scientific work. However, even though the concerns expressed are real enough, there is no certainty about the solutions. The project as described above is one attempt to offer something that may enable the creative use of the Internet to "get around" the problem of expensive subscriptions and to tap the power of community itself to address the various problems of isolation from the mainstream of science. Inasmuch as the project is so dependent upon an active user base for its own success, and it started from a base of zero users, there are many difficulties associated with reaching the "critical mass" of participants that allows any community to achieve the spark of life that sustains and nourishes it.

Is this project's approach a useful one in terms of responding appropriately to the perceived problem? Is the perceived problem really a problem at all, or is access to electronic information perhaps not in reality very high on the list of priorities for African scientists? Is there really any demand for this kind of portal, or for online discussion areas, or does this project represent a "top down" approach for which there is little receptivity among its presumed constituency? Or is there a latent demand, requiring only better marketing and promotion efforts to overcome the initial inertia? At this point we do not have the answers to these questions, but we eagerly seek the answers.

Whether this Virtual Science project becomes a thriving Virtual Community or simply sits neglected in cyberspace is very much an open question. Therefore the project is best considered an exploration of the possibilities, an experiment that may or may not produce the intended results, but that even in "failure" may offer important insights as to the limitations of these emerging digital media and/or the challenges of building functional communities among disparate strangers.

Appendix I. Some Typical Costs of Online Journals as of July 2002 (in US dollars)

Journal Name	PPA*	PS*	IS*
Lancet	$15/$30	$162	$728
Science	$5/$10	$205	$475
Nature	$25	$159	$845
Cell	$15	$242	$899
Annual Review of Biochemistry	$15	$82	$165
Genome Research	$8	$173	$906
Modern Physics Letters A	$19.90	$1,272	$2,103
Conservation Biology	$19	--	$385
Journal of the American Medical Association	$9/$30	$150	$325
Journal of the American Chemical Society	$25	$187	$594

PPA = Pay-Per-Article (where a second price is shown, it refers to the fee for a "24-hour pass" to the full journal)
PS = Personal subscription (outside of US rate)
IS = Institutional subscription (outside of US rate)