

ELECTRONIC PUBLISHING. IMPACT ON DEVELOPING COUNTRIES

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Abstract. The developing countries at the low end of the scale face almost insurmountable problems in accessing electronic information. In Nigeria, only two of 40 universities have e-mail. Although electronic access to current information could revolutionize the educational situation at these places, the communication infrastructure does not exist, nor does the necessary funding.

The technological development and telecommunications infrastructure of countries which may be considered to be in the developing world varies greatly, some countries being almost as well equipped as any country in the developed world, while others have almost no access to electronic media. Some of the more electronically advanced countries such as India, Mexico and Brazil have successfully developed their own software packages (Report of Unesco Expert Conference on Electronic Publishing in Science, 1996).

However, attention needs to be drawn to countries at the extreme end of the range since their situation is so different. Apart from the problem of lack of access to electronic publications of all types and no access to email, there is also often a problem of poor communications in general. The ease of communication which is taken for granted by scientists in the developed world is just an unimagineable dream with no prospect of being obtainable in the foreseeable future.

This is the situation at the University of Nigeria, and at many other universities in Nigeria and probably many other African countries. Nsukka is in a very rural area far from large cities and areas of commerce. There is therefore little pressure from private businesses for improvements in communications and the likelihood that the private sector may provide some of the necessary funding for internet facilities is remote.

The regional map of world wide internet connections (the Internet Society), available on the world wide web, shows that Africa in general puts a blight on the map with only a few countries having access to the internet, in contrast to the rest of the world. This situation probably reflects the unique economic and political problems of African countries. Even so the map tends to paint a rather rosier picture than reality. According to the map Nigeria appears to have email, but in fact only two of its over 40 universities have access. However, even for these two exceptions, connections are intermittent and unreliable. This point, that email may be available but not reliable or readily accessible, was highlighted at the Sixth UN/ESA Workshop on Basic Space Science held in Bonn in 1996 and probably applies also to some Asian countries. The basic problems in Nigeria are that the telecommunications system needs to be upgraded, and there is gross underfunding of universities. Satellite communications are used over long distances, but more locally connections are by overhead cables. These are easily damaged and often not repaired promptly. The problem is not really one of expertise. A level of competence in computing is already available in Nigeria which could easily be built on and developed through further training.

To put the situation in perspective, communications of any form are a major problem at Nsukka. The telephone rarely works and even ordinary mail is unreliable. Courier services, which are prohibitively expensive, are the only sure way of communicating. Individual staff have to pay personally for any form of communication because of the poor financial situation of the universities. Thus even if email became available, the cost would be a non trivial problem. Increasingly research papers have to be published in local journals because the cost of mailing them overseas cannot be borne. This is very detrimental for research in an area like astronomy as there are few people with sufficient interest or expertise in astronomy in the country to either referee the papers, or indeed read them.

Accessibility to computers is restricted to the elite, who can afford their own personal computers, or to the few research groups who have succeeded in obtaining an external grant. Naturally enough, astronomy is not seen as a priority area for Nigeria by the international agencies that award grants.

CD-ROM readers provided by the World Bank are available in the University Library but are not readily accessible to the large number of students and staff in the university. Books and journals are also scarce and are largely out of date. In astronomy most of the books available in the library are at least 20 years old. Preprints from observatories and donations (some arranged through the IAU) are relied on for research, as well as photocopies obtained by anyone who is able to travel out of Nigeria. Despite this, for the present printed material is still far more accessible than any electronically published material and this is likely to remain the situation at Nsukka for the foreseeable future. The only way that change could come about would be if the necessary infrastructure were put in place by the government, and if funding of universities were given a higher priority.

It is clear that being on-line would revolutionize the situation at a place like Nsukka which is currently so isolated. Reliable and readily available access to email and the world wide web would solve many of the problems of scientists in developing countries, and CD-ROMs would provide an invaluable resource for book-starved students. It would also reduce the need for observational facilities to carry out astronomical research because of the extensive data archives which are available in electronic form. The continuing trend in developed countries to rely more and more on electronic communication and publication is however at present worsening the situation for scientists in developing countries who are without access, and who are falling further and further behind and becoming increasingly cut off from current research. At the same time their colleagues in the developed world, who take for granted email, access on the web to research results months before they come out in print, access to data banks, etc., often do not comprehend their plight.

The developed world cannot be held back by developing countries, this is clear. It has rightly been said that the developing world must be encouraged to catch up. However, scientists in places like Nsukka do need the support and understanding of their more fortunate colleagues and need to be remembered when decisions are being taken about producing publications in "electronic only" form. Some of them have struggled long and hard to try to convince their governments of the needs of astronomy and science. Government backing and national policies are needed to bring about the necessary changes. The present piecemeal acquisition of technology by the elite alone will not solve the problems.

Comments

EICHHORN: Will the new satellite telephone communications technology change the situation?
ONUORA: Not right away, since the main problem is lack of funding.

GENOVA: An example is the cancellation of Internet access in a lab of FSU because of costs.

SMITS: Nigerians visiting South Africa have no background in computing because of the lack of facilities at their home institute (University of Nigeria). We teach them how to use UNIX, Web browsers and email but when they leave South Africa they have no contact with us once back in Nigeria.