The Development of a Truly Electronic Scholarly Journal in a Developing Country
Challenges, Difficulties, and Accomplishments

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Abstract. This paper describes the methodology developed and the experience gained in the creation of a dynamic and interactive electronic scholarly journal in an environment with shortage of resources. The work described is based on the concept of extensive communication drew from the theoretical thought in both, communication and information sciences, as well as a hybrid model of the scholarly communication process and the so-called parallel publishing model. The main aim of the project is to provide a prototype, which could be used by existing print journals in humanities and social sciences in similar environments, for conversion into electronic versions. The methodology and strategies developed are an integral part of the prototype.

1 Introduction

The availability of digital content for the scholarly community in any discipline has become a primary issue over the last decade. Investments in information technology infrastructure – namely computers and electronic networks – have allowed both availability and access to these contents and have been in the agenda of universities, funding agencies, governments and private institutions, around the globe. Such endeavours are in line with, and confirm what Richardson [1] predicted in the

late 1980s – that computer-mediated communication would soon be commonplace in organisations that have significant numbers of knowledge workers as members, such as higher education institutions. In this regard, Borgman [2] observes that the creation of a global information infrastructure has allowed interconnect computer networks and other forms of information technology around the world.

Planning and settling down a robust infrastructure for production and availability of digital contents, from individual journals to complete libraries, is inherently multidisciplinary and involves a number of related fields which include database management, distributed systems, hypertext, human-computer interaction, information retrieval, information science, and multimedia services (Gonzalez, [3]). Such infrastructure, according to Borgman (op. cit.), includes people, technology and content, as well as the interaction between them.

The relation between the social and economic development of a country and its stage of scientific and technological development is undeniable. Thus, an initiative that stimulates the diffusion of scientific and technological information, and besides that, the knowledge construction, is worthwhile in any country in a process of development. In this regard, the proposal described here aims to create, as a pilot development for the creation of a digital library in the social sciences and humanities[4], the electronic version of a Brazilian print scholarly journal in information science, as well as to join IBICT's[5] open archives initiative. It is actually a joint initiative involving different institutions, having received technical support from people at the University of Brasilia, in Brazil, the University of Minho, in Portugal and the University of Toronto at Scarborough, in Canada. The collaboration between these institutions is being accomplished as a result of the joint work of researchers and experts who belong to each of them.

2   Statement of the Problem

The convergent and integrated use of information technology has offered digital contents in a new access environment, which makes the collective knowledge construction and co-operation favourable. Either publishing electronic journals or developing electronic versions of journals traditionally distributed in paper are important resources for the academic community, so that scientists, scholars and students can access the state-of-art on the area they are focusing more easily.

In fact, studies carried out by Tenopir & King [4] demonstrated that the use of e-journals by university scientists have increased, though it varies according to the knowledge field. Part of their data actually show that the use of e-journals have

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[4] Initially, at the University of Brasilia (around 15 journals that are available in print format), extending further to other universities or research institutes that could eventually be interested.

[5] The Brazilian Institute of Information in Science and Technology

testified a big jump over the second half of the 1990s, and the escalate goes on. Costa et al [5] point out the use of electronic media for publishing scientific and scholarly literature as an inexorable trend. It is however interesting to highlight that initiatives relating to the use of new information technology have been much more concentrated on the sciences, which, in turn, points to the need of initiatives regarding the social sciences and humanities.

As far as scholarly (formal) communication is concerned, the availability, access and use of electronic publications by academic researchers constitute one of the major current issues in information science. Incidentally, electronic communication has introduced significant changes both in the scholarly communication process and the interactions amongst researchers within their scholarly communities. Such changes, in its turn, have brought about a number of researches in the area, with important contributions to its body of knowledge (Costa, [6]). The work described in this paper aims to bridge some gaps by the creation, in an ultimate sense, of a digital library in the social sciences and humanities in Brazil, using advanced methodology and technology. Besides that, it will certainly result in greater and faster access to information by the community that it aims to serve, and this, in turn, will contribute to better interactions. In fact, it also aims to add to previous initiatives in the country via a greater insertion of researchers from the social sciences and humanities – still very much neglected regarding the use of advanced technologies – into the international scholarly community. In this regard, the STM[6] sector is assumed as reasonably well attended to.

3   Relevance of the Project

Borgman [2] observes that the creation of a global information infrastructure has permitted to interconnect computer networks and a number of other information technologies worldwide. Such an infrastructure comprises people, technology and content, as well as the interactions between them. Likewise, facilities such the use of metadata, which have enhanced retrieval of relevant information, among other benefits (Baptista & Machado, [7]), have contributed to increase the use of electronic publication through the Internet. That is what electronic (online) scholarly publications seem to do, whatever the area under concern.

Nevertheless, as stated before, accomplishments in terms of a high use of electronic facilities for communication purposes by academic researchers around the world, besides being concentrated on scientists, have also mostly happened in the developed world. For this reason, it seems that initiatives as the one described here, which benefit social scientists and humanists in a developing country, are looked-for. This, ultimately, could contribute to the advance of knowledge itself. As asserted by a number of authors (Crane, [8]; Pinch, [9], Meadows, [10]; Costa, [11] among

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[6]   Science, Technology and Medicine.

others), knowledge growth is a sort of diffusion process in which ideas are transmitted from person to person, alongside a social interaction process that underlies the development of knowledge.

4 Main Objective and Major Issues

The main objective of this project is to increase the visibility of both the journal itself and authors. In fact, developing an electronic version of the "Brasilia's Journal on Library Science", (*Revista de Biblioteconomia de Brasília*) was part of a deeper restructuring of the publication, which aimed to enhance the reach of the journal, not only by making it physically available on the Internet, but by establishing an international partnership with researchers. This includes inviting papers, and beginning a bilingual version, in Portuguese and English.

However, focusing on this objective brought to light some of the difficulties, which have hindered both access to the journal and visibility to authors. After identifying such difficulties, some strategies have been developed to overcome them, as well as others, which arose during the process.

Some of these difficulties include a number of issues. Firstly, there is the limitation in the interactions between authors and readers beyond institutions in Brasilia and in Brazil, which has been tackled by developing strategies that avoid inbreeding, such as having an English translation of every paper originally published in Portuguese, make the journal content available on the Internet, implementing an Open Archive initiative, and so forth. Secondly, lack of people with technical skills also concerns, and is to be overcome by promoting interactions with other people and institutions, as described below. Thirdly, there is the lack of standardisation and auxiliary tools, which may reduce the usability of published papers. Finally, there is a need for decision on document formatting, an issue that is to be studied during the whole implementation of the project.

5 Research Work

In order to achieve the stated objectives and have the project implemented, both formal and informal scholarly communication have been used as the base for the theoretical foundation and methodological procedures, according to the state-of-the-art identified in the (formal) literature, either printed or electronic, and the exchange of ideas through electronic discussion lists, conferences, round tables, e-mail exchange and informal meetings. It is interesting to point out differences in the use of electronic media in informal and formal communication. Those differences, alongside the remaining rejection of the electronic media by part of the scholarly community, have led to a parallel model of publishing, at least in terms of journals.

That is, the journal publication has been - and appears that will remain for some time to come - in both print and electronic format (Costa, [12]).

Although in a different context, Chartier [13] provides some contributions to this debate by analysing the relationship between formats and contents. In this sense, the author verifies the transition of an "intensive" to an "extensive" reading. In the intensive reading, traditionalism imposes rules to the reading and norms, thus people are confronted with a restricted number of possibilities that perpetuate the same texts and the same formats, always supplying identical references. Extensive communication, on the other side, is more superficial, as a result of the new format, less ornamental. It leads to the production of countless written versions, read individually, in a disposable way, with formats that facilitate the spread and popularisation of contents. The reading assumes a collective and extensive character, becoming, in fact, public knowledge. The distinction between Intensive and Extensive does not depend merely on the technical apparatus, but in the possible functions of a registration, which can either be limited in a conservation task and memory (storage), or serve the new reader-editor with multiple accesses and interactions (extensive communication). It is not only the support that imposes the two reception ways, but a series of intervening factors, including the reading protocols, edition, formats and printing.

These ideas relating to extensive communication, taken from Chartier, along with issues regarding formal communication in electronic format, taken from data gathered in previous research work in Brazil (Targino & Castro, [14]; Costa et al., [5]; Berto, [15]; Chan, [16]), were used as the base for some of the issues pointed out in the project. Soft System Methodology in an organisational changing programme carried out at the Department of Information Science, University of Braslia, gathered data, which supported changes that were necessary to the journal production system and its environment.

6 Development Work

The experience with the journal, in terms of both the theoretical and methodological approaches used (research), and the practical application of the procedures defined (development) shall be extended to allow the creation of a digital library in the social sciences and humanities. It shall be done first at the University of Brasilia (with other departments) and then, via consortia, with other Brazilian universities and research institutes which might show interest[7]. Incentives will be given to project team members, in order to participate in national and international events, as well as the publication of journal articles about the project experience, as an endeavour to firstly, contribute to other initiatives of this kind that may be

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[7] This may become international by being part of the A3Network, based in the Netherlands.

on the agenda later on in the country, and secondly to share the experience gained with this work. The development work comprises all the tasks needed in order to have the set up objectives accomplished. It also involves the strategies carried out to tackle the difficulties identified, and which are shortly described in the next paragraphs.

To decrease the problems caused by the lack of people with technical skills, which seems to be the norm in departments of humanities and social sciences, interaction with departments of computer science, linguistics and other technically oriented institutions have been promoted. Besides that, a core package, which could be easier to adopt by other institutions, which face similar problems, has been developed.

Promoting the development of a co-operative portal for this kind of journals and integrating this portal with updating data available on larger national or international sites will contribute to increase the visibility of many journals on humanities and social sciences. Also, a strategy to be used as a guideline for integrating academic publications with institutional portals, in University departments and research institutions will be developed.

Concerning the authors, negotiation with former authors that involves issues regarding copyright will be conducted, in order to get their consent for making their work available online on the Internet. Lack of standardisation and auxiliary tools reduces the usability of published papers, so, authors will be provided with standard templates to submit their papers, thus minimising the need of further editing. These standard templates will be submitted to tools that allow the processing of the structure, meaning and references of papers. This process adds value with very little impact on the effort demanded from authors.

Installing the technological infrastructure requires the acquisition of microcomputers (work stations as well as web & OAI compliant servers) and all peripheral equipment and software needed to digitise/capture/copy the journal content, define/extract metadata, execute XML, add search facilities and navigation tools and guarantee operability of the OAI at the international level[8]. Such equipment and the software needed serve a computer laboratory that has gradually been installed in the Department of Information Science, at the University of Brasilia.

To provide navigable and searchable versions of papers, a structured database will be created and maintained, containing the Dublin Core metadata and a search system for the metadata generation in XML, according to the DTD of the Open Archives protocol, will be implemented and maintained, as well. The implementation of a Z39.50 server for making that protocol available will be needed, too, as well as the development, implementation and maintenance of a search tool for the database and its availability in the Z39.50 protocol.

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[8] These resources might be expanded in order to permit the extension of the current project activities to the digital library aimed.

6.1   Initial Strategies

In order to produce results on the short term, thus gaining visibility, support and engagement of other people into the project, the work has begun with a quite simple presence on the Internet, based on the existing digital form of the journal issues published between 1995 and 2001. A web site for the journal has been created. Initially, as a static site, with a *pdf* version only of the journal articles published originally in print format. Then, the dynamic and interactive web site, with the navigable and searchable version of the journal will be implemented. The later is to be applied only to issues published from 1995 to date (16, so far, as the journal publication failed from 1991 to 1994). The former is to contain the totality of the issues, from 1973 to date (around 52). The translation of the journal content (originally in Portuguese) to English will only be done for new issues, from 2001 on[9].

To make all the previous issues available, gradual digitalisation, capture, copy and availability of the content (1973 to 2001), from the most recent to the oldest ones, will be done.

The first stage, planned for six months, has given us feedback on structuring the information architecture that will support the journal. It involves, firstly, putting into place existing papers, in the existing format, together with the supporting pages. Secondly, it requires gathering and testing auxiliary software, for example for format conversion, automatic input of references and search engines. Finally, there is the need for familiarising the project team with the computational environment supporting the initiative, namely the departmental server, the network, web servers, data base servers, operating systems, and their interaction.

After this initial step, researching and deciding on a language to support a standard formatting of papers, developing standards for the journal, developing a strategy for defining standards for similar journals, etc., are necessary and shall be gradually implemented over the next year or so.

7   Expected Results and Impacts

First results of the electronic online, bilingual, dynamic and interactive version of the journal proposed here are expected to be available by the end of 2002, with a pilot development with the issue number 1, volume 25, 2001. At the same time, the digitalisation of previous issues is being performed, and the whole collection of the journal shall be recorded in a static web site, in pdf format, in about two years. It is also expected that in two years or so, issues from 1995 to date will be available

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[9] This is to be implemented via negotiation with the faculty, from the 'Letters Institute' at the University of Brasilia, in order to use trainees from the English Translation undergraduate course. The project expert would, then, review their translations.

in an online and interactive environment. The bilingual version, as stated above, should include only issues from 2001 on. This development and implementation shall lead to a suitable environment that will allow the creation of a digital library within the University of Brasilia, comprising every scholarly (print) journal that has been published by departments from the social sciences and humanities. This might also permit the creation of electronic journals *ab initio* whenever desired.

It is interesting to note that these journals, or any other kind of publication made available, should reflect the academic research work that has been carried out by the university faculty. One of the major concerns is to create a sort of "authorship laboratory", which will let any academic to be a skilled author in an electronic environment. Moreover, the methodology developed, the infrastructure implemented and the model adopted, if needed, feasible and desirable, shall be extended to other university departments and research institutes from the public sector in Brazil. All this should lead to greater interaction and visibility of Brazilian scholarly journals and academic researchers from the social sciences and humanities within their scholarly communities at the local, national and international level.

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12. see [11]

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