STATE-OF-THE-ART OF BRAZILIAN EJOURNALS IN SCIENCE AND TECHNOLOGY

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This paper reports partial results of a research project, sponsored by CNPq – the Brazilian Council for the Development of Science and Technology -, grant number 550693/2002-5, for the period of 2003/2006. It aims to develop a comprehensive framework of the Brazilian electronic journals in Science and Technology situation. With the facilities for web publishing electronic journals, the first difficulty faced by the research was to identify the majority of the Brazilian ejournals in Science and Technology, due to the lack of a centralized bibliographic control information resource. An extensive research on the Web had to be done in order to map Web sites of ejournals. Besides the use of bibliographic control devices like the SciELO portal (http://www.scielo.br), which holds a collection of more than 100 ejournals, and LatinIndex portal (http://www.latinindex.org), with more than 300 ejournals - including those held by SciELO -, Google and AltaVista search engines were used to identify the sites of Brazilian ejournals. Queries were submitted to those search engines like “Brazilian Journal of”, “Brazilian Archives of” etc. to identify additional ejournal sites. In each site, information about each ejournal was gathered, and stored in a database, according to its knowledge field, the kind editor, publication currency, technological aspects such as electronic text formats used, availability of a site search engine, if the ejournal belongs to a portal. The universe of Brazilian ejournal seems segmented. It varies from high quality and consolidated ejournals — which are originated from printed journals and are published by high-tech portals like SciELO —, to emerging ones — without printed version, recently set up ejournals-, produced by research groups which could take the benefits of the facilities of publishing in an university or research institute web servers; this universe also encompass different knowledge fields, with predominance of ejournals in health and biological sciences. After this initial phase, a qualitative research had to be carried out, based in questionnaires sent to the ejournals editors by email. Questionnaires were sent to each specific segment of the Brazilian ejournals universe. Questionnaires asked for information relative to ejournal business model, difficulties to maintain the currency of the ejournal, existence of long term preservation policies, use of metadata standards, troubles faced at the set up of an ejournal. All this information is being compared with the Brazilian public policies relative to information in Science and Technology.

Keywords: science and technology information, scientific communication, electronic publishing, electronic journals, Brazil

INTRODUCTION

Scientific journals have had a central role in the scientific communication process since the 17th century, with the raise of the scientific journal, the Journal des Sçavans, and the Philosophical Transactions of the Royal Society, in 1665[1,2]. Since then, for more then tree centuries, the
main actors of scientific communication cycle – authors, editors, publishers, libraries, users - had their roles established and institutionalized, until the present configuration.

With the rise of electronic publishing, scientific communication is now facing a radical transition. According to Harter[3] “the first peer-reviewed electronic, full-text e-journal including graphics was Online Journal of Current Clinical Trials (OJCCT)”, in the nineties. The old paradigm has been changing with the emergence of electronic publishing of academic documents directly in Internet[4]. Scientific community worldwide asks for more visibility of their research results, to faster publication cycle and freely access other publication[5]. Scientific community has developed an all new alternative for publishing, exchanging and accessing the results of scientific research, that is turning to be a new paradigm to scientific communication: direct publishing of full-text scientific papers in electronic web free accessed archives[6]. Throughout this transition, these all new forms of publishing seems to coexist with the old one, based on traditional scientific peer-review journals.

Science and technology in developing countries face several barriers to effectively play a strong role to the development of these societies[7]. Developing countries science frequently is concerned with specific problems, which that do not exist in developed countries; it uses native idioms to communicate their research results; its communication channels are generally local and not regular. The need of regular, consistent and high quality scientific journals is recognized by Brazilian scientific development agencies and policy makers, which have developed in recent years, different public policies concerning this subject.

The scenario of Brazilian ejournals began with the project SciELO[8] – Scientific Electronic Library Online —, in 1998. SciELO is a Web gateway to electronic journals holding the most important of Brazilian journals. SciELO is product of a partnership among FAPESP (http://www.fapesp.br) – the State of São Paulo Science Foundation, BIREME (http://www.bireme.br) – the Latin America and Caribbean Center on Health Sciences Information – an organization belonging to PAHO – Pan-American Health Organization – and to WHO – World Health Organization –, as well as national and international institutions related to scientific communication and editors. Today SciELO is an important component of Brazilian public policies concerning the development of Science, disseminating worldwide the technical and scientific literature published in developing countries, increasing its visibility that, otherwise, would be limited within their own borders.

Public policies related to centralized acquisition of international academic journals by Brazilian university libraries, since the 1980s have evolved to the acquisition/subscription of electronic resources and the use of these resources through a web gateway at present, The Brazilian research community has now free access to international journals through CAPES – Brazilian Ministry of Education’s agency for the development of post-graduation – electronic journals gateway (http://www.periodicos.capes.gov.br).

The facilities brought by the Web for the direct publishing of research results[9,10] have been used by Brazilian scientific community too. Many electronic published academic journals have been set up in recent years, using the facilities provided by availability of universities and research institutes web servers. This reality is perceived by isolated communications[11], and somehow restricted to the ejournals published by SciELO[12], but still not well known in totality.

The aim of this research is to develop a comprehensive framework of the situation of the Brazilian electronic journals in Science and Technology. The research also aims to analyze the Brazilian public policies related to scientific publications, mainly journals, and their adequacy to the raise of ejournals. This work is structured as follows: after this introduction, section 2 exposes
the methodology we propose to map and to collect data about the universe of Brazilian ejournals; section 3 shows the results obtained and discusses them; finally, section 4 draws some conclusions and indicates new directions of research.

METHODOLOGY

With the facilities for publishing an electronic journal via Web, the first difficulty faced by the research is to identify the majority of the Brazilian ejournals in Science and Technology, due to the lack of a centralized bibliographic control information resource. There are at present two of this information resources: LatinIndex (http://www.latindex.org) and SciELO.

IBICT – the Brazilian Institute for Information in Science and technology (http://www.ibict.br) -, is the Brazilian agency which assigns the ISSN to an journal. As a byproduct of this activity, IBICT feeds LatinIndex, an international database of Latin American, Caribbean and Iberian scientific journals.

SciELO and LatinIndex lists of Brazilian ejournals constitute the basis and the begin of the survey to identify the universe of Brazilian ejournals. While SciELO and LatinIndex constitutes controlled devices, maintaining controlled lists of ejournals, we suppose there are many emerging ejournals that are not hold in SciELO nor controlled by IBICT and feed in LatinIndex. To identify these ejournals we developed search strategies, using Google and AltaVista search engines, and submitting queries as “revista brasileira” and “Brazilian journal”, “arquivos brasileiros” and “Brazilian archives” (both in Portuguese and in English), etc. These search strategies permitted us to identify the majority of Brazilian ejournals. After this phase, new strategies to find other ejournals sites, whose titles do not fit in the search strategies described before, are being used, as an intensive navigation through web sites of the most important Brazilian universities.

Data to update the database was taken directly from the ejournals site. The information of the ejournals sites identified was collected and stored in a database composed of the following fields:

- IdPer
- Name of ejournal
- URL
- Previous URLs
- Editorial group?
- Affiliated to ABEC?
- Kind of Editor (universities or research institutions, commercial editors, scientific associations, commercial editors, non-profit organizations)
- Email of Editor
- Idioms
- Included in SciELO?
- Included in LatinIndex?
- Scope (as defined by. Editor)
- CAPES/CNPq knowledge area
- ISSN
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- Frequency of publication
- Has a printed version?
- Start date of printed version
- Start date of electronic version
- Has an editorial board?
- Peer-reviewed?
- Secondary sources which index ejournal
- Free access?
- Which institution is the Internet access provider?
- Which institution funds the ejournals
- Digital format
- Full text?
- Observations
- Date of data collection

Each ejournal identified was also classified, according to CAPES/CNPq* Knowledge Area Schema (http://www.cnpq.br/areas/tabconhecimento/index.htm), largely used in Brazilian scientific research and post-graduate scenario.

After this phase of mapping the Brazilian ejournals universe, a second phase, qualitative, is being carried out, based in questionnaires sent to the ejournals editors by email. Questionnaires were send to each specific segment of the Brazilian ejournals universe. Questionnaires asked for information relative to ejournal business model, difficulties to maintain the currency of the ejournal, existence of long term preservation policies, use of metadata standards, difficulties faced to set up an ejournal.

The research considered as ejournal those published in the Web, even if an ejournal are an electronic version of a printed journal or has its origin as a printed journal. It is an interesting fact that some editors of ejournals hold in SciELO, at first, did not answer the questionnaire because they considered their ejournals, besides the fact that they are available through a web gateway, are paper journals so the questionnaire do not apply to them.

The research has applied abroad criteria to identify an ejournal in science and technology: those which the contributions area submitted to an editorial board and somehow evaluated, according to stated in the ejournal’s site. This broad criteria was useful for a first identification the whole universe of Brazilian ejournals. Further it must be substituted by a more rigorous criteria, as suggested by Harter[3].

RESULTS AND DISCUSSION

The scientific journal is still the most important vehicle to communicate research results to the Brazilian scientific community, even under the form of an ejournal. Innovative mechanisms to direct publishing of full-text scientific papers in electronic web free accessed archives, innovative mechanisms alternative to peer-review are not disseminated by the Brazilian scientific
community[13], perhaps due to the complexity to setup an open archives server, as compared to web publish a journal.

Due to the existence of bibliographic control resources, constituted by the list of ejournals hold by SciELO and the list of Brazilian ejournals maintained by LatinIndex, this research has a priority in find out those ejournals that are not in these two lists. We found a whole universe that encompasses approximately 500 ejournals. Of this universe, 124 ejournals are hold in SciELO gateway, approximately 385 included in LatinIndex list (http://www.latinindex.org/busquedas/indicepais.html), including those 124 holden in SciELO but additional 176 ejournals, and approximately 89 are “emerging” ejournals, not hold in SciELO nor in LatinIndex; 29 of them do not have paper versions and are solely ejournals.

The identification and mapping of Brazilian ejournals began in June/2003 and is not considered completely finished. Until now questionnaires are sent to two groups: SciELO ejournals and the “emerging” ejournals. There is another important group of ejournals, those listed in LatinIndex but not held in SciELO, which are not totally identified by the research and are still being mapped. The questionnaires to the ejournals hold in SciELO gateway and the “emerging” ejournals, were sent by email in January/2004. We got 21 out of 124 answers to questionnaires sent to SciELO ejournals; we got 16 out of 89 answers to questionnaires sent to “emerging” ejournals. Some of the results are described bellow.

“Emerging” ejournals are distributed, according to CAPES/CNPq Knowledge Fields Schema, in the following areas:

**TABLE – NUMBER OF EJOURNALS PER KNOWLEDGE AREA**

<table>
<thead>
<tr>
<th>Knowledge Area</th>
<th>Inc. SciELO</th>
<th>tot. links</th>
<th>tot. repeat links</th>
<th>tot. links from SciELO</th>
<th>tot. links foreigners (X 2)</th>
<th>tot. links authorities (X 3)</th>
<th>tot. Simple links (X 1)</th>
<th>Gr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciência da Informação (Information Science)</td>
<td>yes</td>
<td>43</td>
<td>7</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>DatagramaZero &amp; Informação Sociedade (Information and Society)</td>
<td>no</td>
<td>37</td>
<td>8</td>
<td>5</td>
<td>7</td>
<td>1</td>
<td>18</td>
<td>0</td>
</tr>
</tbody>
</table>


“Emerging” ejournals are not up to date concerning their currency: out of 50 ejournals, 28 have last issue published in the same year of the research, 22 have last issue published with a delay of 1 year, 9 have last issue published with a delay of 2 years and 11 have last issue published with a delay of more than 2 years.

Out of 89 “emerging” ejournals, 56 proclaimed themselves as peer-reviewed, according to information taken from their sites, mainly in sections as “instructions to contributors”.

Of the segments mapped until now, SciELO ejournals and “emerging” ejournals (a total of 213 ejournals), 88 have as editor, universities or scientific research centers, 76 have as editor
scientific societies, 17 have as editor other institutions, 14 have as editor commercial editorial societies, 8 have as editor non-profit organizations, 5 have as editor government agencies and 2 have as editor companies (not commercial editors).

Questionnaires sent to these two groups asked for information relative to ejournal business model, difficulties to maintain the currency of the ejournal, existence of long term preservation policies, use of metadata standards, troubles faced to set up an ejournal. The answers to the questionnaires of the two groups, “emerging” ejournals and SciELO ejournals, are in Appendix 1.

Answers to Question 2 show that editors of the “emerging” ejournals seem aware of the visibility of ejournals when compared to paper journals, as stated by Lawrence⁵. Economic motivations, as the low costs of electronic publishing as compared to paper publication, the availability of web servers in the institutions and the easiness of electronic publishing are also considered.

ABEC – Brazilian Association of Scientific Editors (Question 3) – a traditional association, is unknown by editors of the new “emerging” ejournals. In the SciELO group of ejournals, the answers were the opposite: 73,68% of the ejournals are affiliated to ABEC. The results are similar to Question 4: besides the majority (75%) of “emerging” ejournals editors are aware of Support Program to Scientific Publications of Brazilian Science and Technology Ministry, few of them (6,25%) asked for support of the program; On the contrary, SciELO ejournals editors are aware and asked for support of the program. This facts may indicate a low level of professionalism of scientific editors activity of “emerging” ejournals editors.

Few of “emerging” ejournals editors are aware of the international initiatives concerning the provisions of permanent electronic addresses to ejournals, a important technological feature to permanently guarantee universal access scientific results (Question 7). Emerging technological standards to guarantee interoperability and universal access as Dublin Core Metadata Initiative (http://dublincore.org) (Question 8) and OAI-PMH - Open Archives Initiative Protocol for Metadata Harvesting (http://www.openarchives.org), (Question 9)- are also barely known by the editors. The situation is not different in the SciELO ejournals group.

Besides the fact that the majority of the ejournals have answered positively to Question 11, declaring to have mechanisms to measure their audience, the majority of this mechanism are simply visit counts to their sites. None of the ejournals which have answered to this question have more sophisticated mechanisms to measure their audience, as download statistics or citation statistics.

In the answers to Question 12, “emerging” ejournals have their own sites; besides, they know about the existence of gateways as SciELO and E-pub (http://www.epub.org).

The great priorities (Question 13) to the “emerging” group of ejournals are enhance visibility and regularity. They are few preoccupied with long term preservation, interactiveness, multimedia and hypertext and they are not preoccupied at all charge for subscriptions. In the SciELO ejournals group, visibility is the most important priority, followed by make available the backfile; long term preservation is slightly more important here than to the “emerging” ejournals group.

CONCLUSIONS

Ejournals are still not a reality in Brazilian scientific scenario. another strategy used to find other ejournals sites was to visit the sites of the. most important scientific associations in Brazil: ANPUH (History), ANPUR (Urban and Regional Planning), ANPOLL (Linguistic and Literature), ANPOF (Physics), ANPOCS (Social Sciences), ANPED (Education). Besides the fact that all this scientific association have high-tech sites, where subscriptions of their journals can be
purchased, out of two associations, all of the others have printed journals. This may indicate a
trend towards a conservative position relative to ejournals.

The mapping of the universe of Brazilian ejournals must be completed too, to provide a
comprehensive framework of this universe. We must finished to map the last group of Brazilian
ejournals identified, the ejournals include in LatiIndex database but not included is SciELO gateway;
a similar questionnaire must be send to the ejournals editors of this group. We hope also to maintain
updated the database developed as permanent bibliographic control device of Brazilian ejournals.

The research results indicates that the easiness to web publishing seems to result in a
proliferation of Brazilian academic and scientific ejournals. More then 80% of the “emerging”
Brazilian ejournals were setup after 2001. This situation may be more serious with ejournals than
with paper journals, due to the easiness/cheapness to setup an electronic publication in the web.
This proliferation must result in a short life to many publications (the same process identified in
Library and Information Science literature to paper journals) and in a trend to a decrease in
quality.

An ejournal is a technological device with far more cognitive potential than print ejournals.\textsuperscript{14, 15} The electronic technology can enhance ejournal interactiveness, multimedia and hypertext facilities\textsuperscript{16}. It can also provide a personalized information environment\textsuperscript{17}. The Brazilian ejournals, as many
international ejournals, are still designed based on paper journals model. They incorporate few of
those technological facilities.

If electronic publishing of a journal can be very easy and simple, deserving a minimal set of
abilities concerning site design and web languages programming, the intense use of technological
facilities to enhance ejournals interactiveness, multimedia and hypertext facilities are much more
difficult. The need to be aware of technological standards and initiatives concerning electronic
publishing, permanent access, long term digital preservation, as Dublin Core, Open Archives,
OASIS, etc constitutes, more and more, a strong demand upon scientific editors and publishers.
Today, the editors of Brazilian ejournals are not aware of these questions. This may be due to the
fact the majority of ejournals analyzed are included in SciELO gateway, were originally printed
journals and the SciELO managers are aware and take care of these questions\textsuperscript{18}.

This may indicates, the need for a more professionalism in the activity of ejournals web
publishers editors. Perhaps an alternative solution to this problem would be to stimulate the
association of various ejournals in a web gateway concentrating different technological facilities
Differently from international ejournals, generally available through a web gateway of international
publishers\textsuperscript{19} like ScienceDirect, Gale, OVID, Blackwell, etc, Brazilian ejournals, except for SciELO
and Epub gateways, area isolated, accomplishing a one site-per-ejournal model.

ACKNOWLEDGEMENTS

To Prof. Gilda Batista, for reviewing the text; to CNPq for funding this research

NOTE

\* CAPES (http://www.capes.gov.br) is the Brazilian Ministry of Education agency in charge of
promoting and evaluate the Brazilin Post-graduation programs; CNPq (http://www.cnpq.br) is
the Brazilian Council for the Development of Science and Technology, the Brazilian agency to
promote research
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ANNEX 1 – ANSWERS TO THE QUESTIONNAIRES

- Question 1 – date of first publication of the ejournal?

  **“emerging” ejournals group**
  - After 2003 31,25%
  - Between 2002 and 2001 50,00%
  - Before 2001 18,75%

  **SciELO ejournals group**
  - After 2003 05,26%
  - Between 2002 and 2001 15,78%
  - Before 2001 63,18%
  - Did not answer 15,78%

- Question 2 – the reason of the choice of an ejournals?

  **“emerging” ejournals group**
  - Availability of technology at the institution: 37,50%
  - Ejournals are more visible than paper journals: 87,50%
  - Ejournals are more cheap to publish than paper journals: 56,25%
  - Ejournals are easier to publish than paper journals: 12,50%
  - Neither of previous answers: 12,50%

  **SciELO ejournals group**
  - Availability of technology at the institution: 00,00%
  - Ejournals are more visible than paper journals: 68,42%
  - Ejournals are more cheap to publish than paper journals: 15,79%
  - Ejournals are easy to publish than paper journals: 15,79%
  - Neither of previous answers: 26,32%

- Question 3 – Affiliation to ABEC – Brazilian Association of Scientific Editors (http://www.abec-editores.com.br/)

  **“emerging” ejournals group**
  - Yes 00,00%
  - No 100,00%
  - Not aware about ABEC 31,25%

  **SciELO ejournals group**
  - Yes 73,68%
  - No 21,05%
  - Not aware about ABEC 15,79%
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- Question 4 – Aware of Support Program to Scientific Publications of Brazilian Science and Technology Ministry (http://www.cnpq.br/areas/humanas_sociasaplicadas/programa.htm)?

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<th>“emerging” ejournals group</th>
<th>SciELO ejournals group</th>
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<tr>
<td></td>
<td>o No</td>
<td>12,50%</td>
</tr>
<tr>
<td></td>
<td>o Yes, but has never asked for support</td>
<td>75,00%</td>
</tr>
<tr>
<td></td>
<td>o Yes, we even have asked for support</td>
<td>6,25%</td>
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</table>

- Question 5 – Ejournal has ISSN?

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<th>“emerging” ejournals group</th>
<th>SciELO ejournals group</th>
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<tbody>
<tr>
<td></td>
<td>o Do not know what is ISSN</td>
<td>0,00%</td>
</tr>
<tr>
<td></td>
<td>o Aware of what is ISSN, but does not have</td>
<td>6,25%</td>
</tr>
<tr>
<td></td>
<td>o Ejournal has ISSN</td>
<td>87,50%</td>
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- Question 6 – Have the ejournal ever changed its URL?

<table>
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<tr>
<th></th>
<th>“emerging” ejournals group</th>
<th>SciELO ejournals group</th>
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<tr>
<td></td>
<td>o No, never</td>
<td>75,00%</td>
</tr>
<tr>
<td></td>
<td>o Yes, just one time</td>
<td>25,00%</td>
</tr>
<tr>
<td></td>
<td>o Yes, more then one time</td>
<td>00,00%</td>
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- Question 7 – Aware of international initiatives to provide a permanent electronic addresses to an ejournal articles?

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<th>“emerging” ejournals group</th>
<th>SciELO ejournals group</th>
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<tbody>
<tr>
<td></td>
<td>o PURL</td>
<td>6,25%</td>
</tr>
<tr>
<td></td>
<td>o DOI</td>
<td>6,25%</td>
</tr>
<tr>
<td></td>
<td>o CrossRef</td>
<td>12,50%</td>
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- Question 8 – Aware of Dublin Core Metadata Set?

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<th></th>
<th>“emerging” ejournals group</th>
<th>SciELO ejournals group</th>
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<tr>
<td></td>
<td>o No</td>
<td>62,50%</td>
</tr>
<tr>
<td></td>
<td>o Yes, but do not use</td>
<td>31,25%</td>
</tr>
<tr>
<td></td>
<td>o Yes, and use</td>
<td>00,00%</td>
</tr>
<tr>
<td></td>
<td>o Did not answer</td>
<td>06,25%</td>
</tr>
<tr>
<td></td>
<td>o SciELO ejournals group</td>
<td></td>
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- Question 9 – Aware of Open Archives Initiative Protocol for Metadata Harvesting?

“emerging” ejournals group
- o No 81,25%
- o Yes, but do not use 12,50%
- o Yes, and use 00,00%
- o Did not answer 06,25%

SciELO ejournals group
- o No 57,895%
- o Yes, but do not use 21,06%
- o Yes, use 00,00%
- o Did not answer 21,06%

- Question 10 - Would you like to have the technology to charge for subscriptions?

“emerging” ejournals group
- o No, this is a free ejournal 06,25%
- o Yes, but do not have technology 00,00%
- o Yes, we are developing the technology 12,50%
- o Charge for subscriptions only in print version 12,50%
- o Neither of previous answers 12,50%

SciELO ejournals group
- o No, this is a free ejournal 42,11%
- o Yes, but do not have technology 00,00%
- o Yes, we are developing the technology 05,26%
- o Charge for subscriptions only in print version 42,11%
- o Neither of previous answers 15,79%

- Question 11 – Ejournal has mechanism to measure its audience?

“emerging” ejournals group
- o No 18,75%
- o Yes 75,00%
- o Did not answer 06,25%

SciELO ejournals group
- o No 21,05%
- o Yes 57,89%
- o Did not answer 21,06%

- Question 12 – Aware of the existence of the SciELO and the Epub gateways?

“emerging” ejournals group
- o Not aware of SciELO 12,50%
- o Not aware of Epub 12,50%
- o Intend to join SciELO 62,50%
- o Intend to join Epub 31,25%
- o Intend to have an own site 50,00%

SciELO ejournals group
- o Not applicable to SciELO ejournals

- Question 13 – What are the priorities?

“emerging” ejournals group
- o Keep ejournal more regular 47,75%
- o To promote the ejournal and make it more visible 50,00%
- o Make the backfile available electronically 12,50%
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- To assure long term preservation to ejournals’s contents: 18.75%
- To publish a paper version of ejournals too: 06.25%
- To develop technology to charge for subscriptions: 00.00%
- To enhance interactiveness, multimedia and hypertext: 12.50%
- Another priority: 25.00%

SciELO ejournals group

- Keep ejournal more regular: 10.53%
- To promote the ejournal and make it more visible: 63.16%
- Make the backfile available electronically: 36.84%
- To assure long term preservation to ejournals’s contents: 26.32%
- To publish a paper version of ejournals too: 15.79%
- To develop technology to charge for subscriptions: 10.53%
- To enhance interactiveness, multimedia and hypertext: 05.26%
- Another priority: 10.53%