

Sharing the Know-how of a Latin American Open Access only e-journal: The Case of the Electronic Journal of Biotechnology

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Abstract

Scientific communication is essential for the advancement of science and in generating benefits for the general society. Also it is fundamental in strengthening the knowledge society with a positive effect on innovation and economic growth. The Open Access journals have demonstrated to be important in providing a reliable and a more accessible mean in communicating science. An example as such, is that they are evaluated by the ISI Thomson Scientific –recognized as an authority for evaluating journals- following the same rigorous selection process as journals in print media. The measurement of the impact factors in the electronic publications demonstrates that these receive a smaller citation level than print journals, ranking in general in the lower half of journals in their subject category. Moreover, the low usage of the electronic media demonstrates a lack of confidence of authors in this new mean of communication. In this sense, editors have to provide answers to some unsolved issues regarding e-publications in order to make these journals more reliable and confident to the scholarly community. The journals edited in Latin America with international visibility represent 0.63% of the total number of publications covered by the ISI Web of Science. In the year 2005, there were 44 Latin American journals covered by the Science Citation Index, of which 89% of these are considered Open Access publications. In that same year, these publications reached an impact factor average of 0.447 in comparison with the impact factor average of 1.588 for all the journals of Open Access at world-wide level. The Electronic Journal of Biotechnology is the only Open Access Latin American journal edited exclusively in the electronic format which is covered by the ISI Science Citation Index. The experience of this journal shows that with commitment to international diversity, quality, academic rigor of the peer review process, transparency, responsibility to scientists, innovation and international cooperation, a high level of visibility and accessibility can be obtained, as demonstrated by an average of more than 83,000 readers during year 2006 and an impact factor of 0.725, which is over the mean value of Latin American journals, offering an unique opportunity to fulfill the ever increasing public demand for science information.

Keywords: ISI Web of Science; electronic journal; scientific communication; impact factor; open access

1 Introduction

Science and its communication are essential in science advancement and in building the knowledge society with a positive effect on innovation and economic growth. Its dissemination, accessibility and understanding play key roles in its impact on research funding policies and in the benefits for a knowledge-based economy. The success of modern science depends on social acceptance of new scientific results and requires a permanent dialogue with an informed civil society where an open communication system, accessible and visible, is of primary importance for the benefit of society [1].

Although the introduction of the web based technology has raised a continuous debate on science communication, the journal system has remained stable and scientists value journal articles as a recognized mean of communicating original, peer-reviewed and edited information. The key problems regarding the use of this journal system continue to be the high costs of subscriptions, technical barriers, and the specialized language used in the scientific articles which leads to non-equity and discrimination across the international science community [2, 3].

The increasingly pervasive impact of science and technology is reaching every aspect of human welfare and is therefore urgent to make information more accessible and more usable by offering electronic journals a unique

opportunity to reach these goals through the instant access to and dissemination of scientific information [4]. An important recent trend has been the development of the Open Access movement, which promotes free online access to full text research articles in every academic field [5, 6].

2 Are Scientists and Society Living in the Plato's "Myth of the Cave"?

The changes in information technology and communication that made possible the rise of the knowledge society generated a new type of illiterates. They are citizens and scientists, as authors and publishers, have not sufficiently incorporated the new expertise and possibilities of communication that are based on the use of information technology. This technology not only changed the form of communicating, but also reinvented the strategies used to recover, to analyze, and to diffuse scientific information. In recent years, societal changes have rapidly progressed and caused the previous guidelines of scientific communication to be insufficient for today's society.

An important decision made by the members of the international scientific community was to adopt new guidelines of communication for their results. Also, as evidenced in this article, a large part of the world's researchers continue to resist the new forms of communicating science based in web technology. The consolidation of new communication channels as they are: exclusively electronic journals, the repositories of preprints and postprints, and the institutional repositories. The enhancement of procedures of quality control of science, such as public and open peer review. Furthermore, the opportunities created by multimedia and hypertext that can exist exclusively in an electronic format. New alerting services and new indicators of scientific production, such as the index of Hirsh or the citation tracker, constitute sufficiently forceful changes that have moved for always the guidelines of scientific communication.

All these changes that characterize the knowledge society can lead one to recall Plato's "myth of the cave". It is possible to imagine a parallel link between the scientists who do not incorporate these new guidelines of scientific communication and the inhabitants of the mythical Greek cave. The cave dwellers were convinced that the shadow projected inside the cave was the reality. They were wrong. The reality is that of scientists that live outside of the cave and dominate the useful tools of communication that the world of today offers them. However, the one that remains inside the cave sees a only piece of the present reality and thus runs the serious risk of thinking that what he or she sees is the whole truth. Also, publishers who maintain printed journals and those that impose high subscription costs, have the most part of society living within the cave, thus making difficult the equitable access to high quality scientific data and the possibilities for science to benefit all of society.

3 The Traditional System of Academic Journals and the Challenges of the Digital Environment

Key changes must occur in order to make scientific knowledge more accessible, visible, and usable. More editors and publishers should commit themselves to the requirements of the overall society, which claims for innovations that depend in the scientific information.

Moreover, governments should assume a more proactive and strategic role in addressing key international issues regarding the importance of science for society, supporting an efficient communication system. Although the digital era offers a unique opportunity to cope with these goals, the number of Open Access journals indexed in the ISI Web of Science is still low, representing less than 3% of the total number of journals published by this database.

In spite of the well known and unique advantages provided by the electronic journal format in comparison with the print version, such as increased visibility, accessibility to all issues, lower costs of edition, use of hypermedia, the adoption of only electronic journals still poses a challenge to the editor [7, 8].

Some unsolved issues regarding e-publications, for example electronic archiving and uncertainty about future access, generate significant concerns, skepticism, and distrust in the scholarly community. It has taken some time for only e-journals to become integrated into scientific information systems, indexed by major services, appear in library catalogs, and cited by other researchers in main stream journals.

As a result only e-journals covered by the ISI Thomson Scientific database have low impact factors affecting the prestige of these journals. Also it is worth noting that authors tend to stick to traditional formats and do not make

use of the advantages offered by electronic media when writing manuscripts for e-journals. The publication of videos, audio, and three-dimensional images between others are all examples of such advantages. In summary, the distrust of the scientific community in this new media directly affects not only the prestige of these journals but also the possibility to have an accessible communication system that satisfies the needs of the scientific community.

4 The ISI Thomson Scientific and Impact Factors

The Institute for Scientific Information, ISI, was founded by Eugene Garfield in 1960. Then, in 1992, it was acquired by the Thomson Scientific & Healthcare, thus changing the name to Thomson ISI. It is now a sector of the Thomson Corporation referred to as Thomson Scientific [9].

Recognized by the widespread scientific community as an authority for evaluating journals, it covers the world's leading journals of science and technology. Thomson Scientific, or ISI, offers bibliographic database services, covering thousands of academic journals in all scientific disciplines, social sciences, and arts and humanities that consistently achieve and maintain high quality standards in their editorial processes. The ISI Web of Science includes the Science Citation Index (SCI) with 6,623 journals [10], the Social Sciences Citation Index (SSCI) with 1,962 journals [11], and the Arts and Humanities Citation Index (AHCI) with 1,158 journals [12], all of which are available online through the Web of Science database, a part of the Web of Knowledge database collection.

While the evaluation process is independent of the journal's business model, it depends exclusively on quality standards that are independent of the journal's format, whether it be print or electronic [13].

The ISI Thomson Scientific writes: "E-Journals undergo the same rigorous selection as journals in print media. Publishing Standards, Editorial Content, International Diversity, and Citation Analysis are all considered". This gives clear evidence that both paper and electronic formats are equally reliable and genuinely able to communicate science.

Thomson Scientific also publishes an annual Journal Citation Reports, which lists an impact factor for each of the journals of the SCI and SSCI. This is a quantitative tool, which measures the frequency of citation of an "average article" from a journal in other publications covered by a citation index within a two year period previous to its publication. The impact factor is calculated based on a three-year period, and can be considered to be the average number of times published papers are cited up to two years after publication [14]. For example, the 2007 impact factor for a journal A, which is known in the following year, is calculated as follows:

X: 2007 cites in ISI journals to articles published in 2006-2005 by journal A

Y: total number of articles published in 2006-2005 by journal A

$$\text{Impact Factor 2007} = \frac{X}{Y}$$

Although traditional journals have attained high impact factors, 49.794 being the highest record in 2006, electronic journals in general rank in the lower half of journals in their subject category. Table 1 shows the highest impact factors of e-only journals ranking among the top 12%.

Journal	Impact factor	Open Access	ISI subject category	Highest IF of the category	Lowest IF of the category	No. journals of the category
PLos Biology	14.672	yes	- Biochemistry & Molecular Biology	33.456	0.097	261
PLos Medicine	8.389	yes	- Medicine General & Nternal	44.106	0.067	105
Genome Biology	9.712	no	- Biotechnology & Applied Microbiology	22.738	0.024	139
BMC Developmental Biology	5.41	yes	- Developmental Biology	23.69	0.66	33
BMC Structural Biology	5.00	yes	- Biophysics	16.175	0.169	65

BMC Bioinformatics	4.96	yes	- Biochemical Research Methods - Biotechnology & Applied Microbiology	9.876 22.738	0.404 0.024	53 139
Physiological Genomics	4.636	no	- Biochemistry & Molecular Biology - Cell Biology - Physiology	33.456 29.852 28.721	0.097 0.207 0.082	261 153 75
BMC Molecular Biology	4.49	yes	- Biochemistry & Molecular Biology	33.456	0.097	261
BMC Evolutionary Biology	4.45	yes	- Evolutionary Biology - Genetics & Heredity	14.864 25.797	0.675 0.08	33 124
Pediatrics2	4.272	no	- Pediatrics	4.272	0.208	73

Table 1: Ranking of impact factors of the top 12% only e-journals [15, 16]

The information provided in the table is self explanatory. An effort must be done by editors and publishers of only e-journals in order to make this media more reliable and useful to communicate science and therefore to achieve higher impact factors and to locate journals in the upper half of their subject category.

5 The Latin American Context

The journals of Latin America have a low representation in the international databases as in the ISI Web of Science, where 44 journals are covered by the Science Citation Index. These represent a 0.43% of the total of journals on a worldwide basis included in this database. The ranking the impact factors of the Latin American journals is between 0.078 and 3.234, with an average value of 0.442.

It is worth to mention as Table 2 shows, that a high percentage of these publications are Open Access.

	Number	Percentage %
Open Access	39	89
Non Open Access	5	11
Total	44	100

Table 2: Comparison between Open Access and non Open Access Latin American journals covered by the Science Citation Index

The ISI criterion to identify Open Access journals is that they are available in full text for the data bases DOAJ , J-Stage and SciELO.

The SciELO (Scientific Electronic Library Online) project is an initiative by FASESP (Foundation of Support to the Research in the State of Sao Paulo) and by BIREME (Latin American and Caribbean Centre with Information in Health Sciences) who is headquartered in Brazil. It includes a selected collection of scientific articles in full-text from Latin American scientific publications. Thanks to this project, the selected Latin-American journals are publishing their articles in the electronic format, remaining freely available in the SciELO website and thus acquiring the character of Open Access.

6 The Case of the Electronic Journal of Biotechnology

The Electronic Journal of Biotechnology is an Open Access, scientific international peer-reviewed journal which has gained a position in the international scene as the only Latin American journal edited exclusively in the electronic format that belongs to the 1% core of only e-journals covered by the ISI Web of Science. It has an impact factor of 0.725, over the average of the impact factors of journals in Latin America and is positioned number 6 in ranking of impact factors in the 44 Latin American journals covered by the ISI Science Citation Index.

It was created in 1998 by the Pontificia Universidad Católica de Valparaíso, Chile with the declared purpose of servicing the international scientific community to make information more accessible, searchable, relevant, and usable. It supports the principles of equal opportunities and freedom of access to scientific information, making the full contents of all articles permanently accessible and searchable for anyone. Therefore, it satisfies the demands of Open Access initiatives. Also, no charge is required for publication and articles are published under the Creative Commons Public License, where no restrictions apply on subsequent redistribution, allowing

unlimited use, distribution, and reproduction in any medium, provided the original work is properly cited. Moreover, the provision of CD-ROMs with the Electronic Journal of Biotechnology website to UNESCO and the subsequent distribution to least developing countries allows for a shortening of the digital divide between countries with and without internet facilities, as the CDs also contains the browser internet explorer.

We have an outstanding international academic editorial board, composed of 72 members from 21 countries with Dr James D. Watson (Nobel Prize Laureate) as the Honorary Member of the board.

The journal covers a broad scope of topics in biotechnology, from molecular biology and the chemistry of biological processes, to policy, educational, and ethical issues related directly to this topic. It publishes review and research original articles, short communications and technical notes after submission to full and strict peer review, engaging a geographically broad group of well-recognized scientists as evaluators. Manuscripts are handled electronically, which drastically reduces the time of publication and accepted articles are published in HTML and PDF formats.

In order to maximize its visibility, the journal is located on two servers, one in the Northern hemisphere (<http://www.ejbiotechnology.info>) and the other in the Southern hemisphere (<http://www.ejbiotechnology.cl>) receiving in March 2007 more than 110,000 visits and over 1 million hits per month. Also, the use of CrossRef, a citation-linking network, allows the connection of cited references with full text papers while enhancing visibility and accessibility. The knowledge and skills developed during our 10 years of publication can be summarized in seven commitments:

6.1 Commitment to Internationality

The editorial board is international, conformed by 72 members, 34% from North America, 33% from Latin America, 28% from Western Europe, 3% from Near East, 1% from Pacific, and 1% from Asia [17] (see Fig. 1).

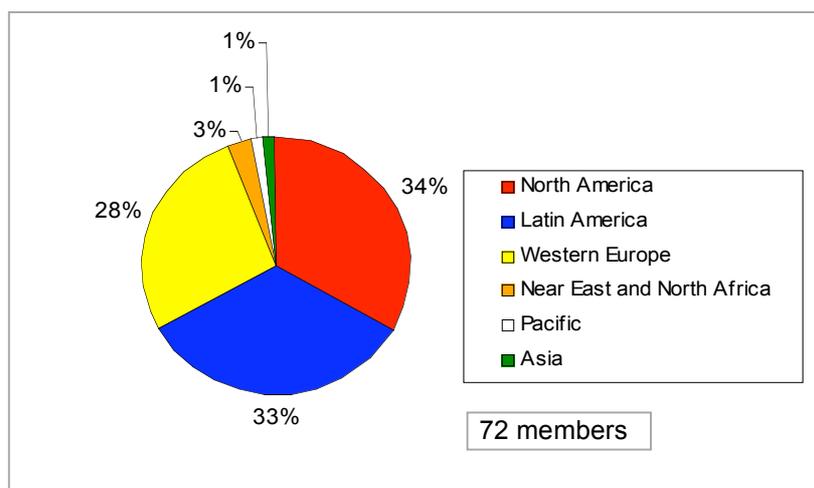


Figure 1: Editorial board internationality

Also, the internationality applies to authors (see Fig. 2) and reviewers, as they come from nearly each region in the world.

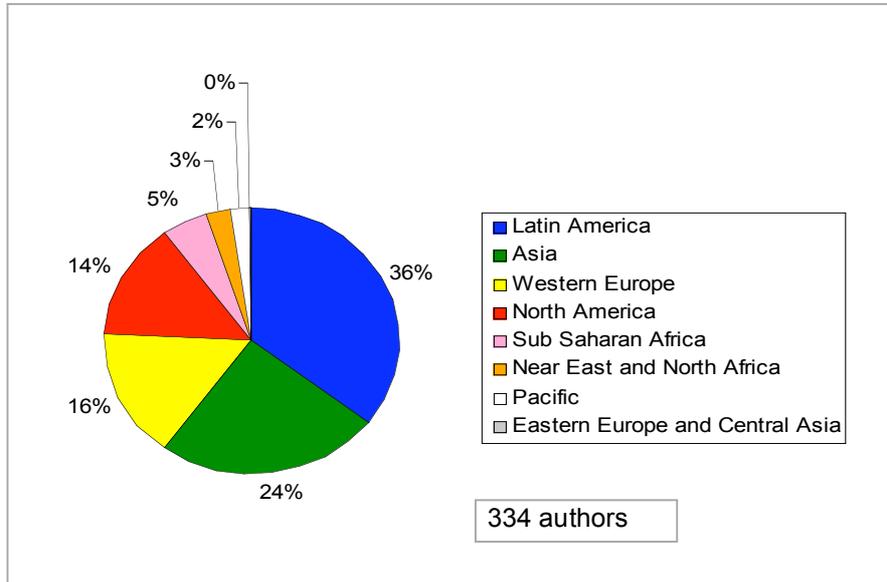


Figure 2: Corresponding authors internationality

A statistics software included in the server shows that readers also hail from different regions, with the USA ranking first as the most active country with visitors on both servers. India, UK, Malaysia, Singapore, Canada, Italy, Germany, Australia and Chile follow for the server located in the Northern hemisphere. The activity of the website located in the Southern hemisphere shows that visitors are mainly from Mexico, Chile, Colombia, Spain, Argentina, Brazil, Peru, Germany and India.

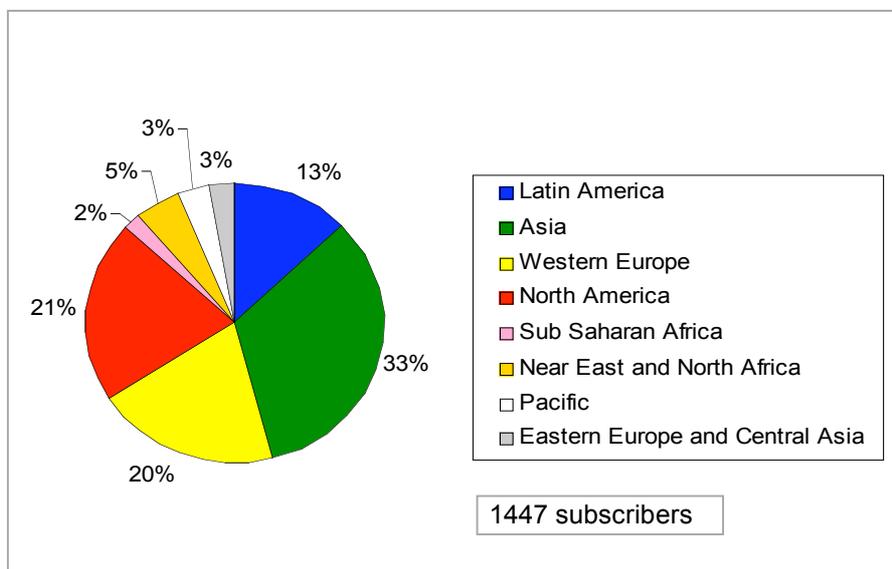


Figure 3: Subscribers internationality

Figure 3 shows the international diversity of the subscribers to an email alerting service of the Electronic Journal of Biotechnology.

6.2 Commitment to Quality

The journal follows the high standards of scientific publications recommended by the ISI Thomson Scientific. Editorial board members are selected by their publishing records taking into account where their articles have been published and if the manuscripts have been cited. A prominent Honorary Member and a well-recognized editorial board are among the best guarantees for the scientific quality of published articles and are indicative of a reliable media of communication.

The Electronic Journal of Biotechnology follows international editorial conventions, for example, the informative journal title, abstracts, full address information for every author and keywords between others. Also the journal is strictly published according to its stated frequency, 4 times a year, in order to comply with guidelines of publication, which is an important standard criteria for quality.

Complete bibliographic information for all cited references is essential and authors are required that at least 75% of the cited bibliography must be from the last decade while at the same time from ISI indexed journals.

6.3 Commitment to Academic Rigor in the Peer Review Process

We follow an independent, international and blind peer review process. Evaluators are selected by their expertise from international bibliographical databases and the success of this system is demonstrated not only by the high quality of revision performed on each manuscript, but also because several reviewers have subsequently submitted their manuscripts to the Electronic Journal of Biotechnology in order to be considered for publication. It is worth mentioning, that the refusal of manuscripts has been increasing with time, reaching at present over 70% of rejection (see Table 3).

Published articles	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	TOTAL	Percentage %
Research	3	7	3	13	18	13	21	26	69	23	196	59
Review	17	7	11	3	2	5	5	2	3	1	56	17
Short communications			5	3	5	6	2	4	7	5	37	11
Educational Resources	0	0	0	0	0	0	0	0	0	1	1	0
Biotechnology issues Developing Countries				8	8	5	4		3	1	29	9
Issues in Biotechnology Teaching					5	1	2	3	0		11	3
Letter to editor					1		2		1		4	1
Total published	20	14	19	27	39	30	36	35	83	31	334	100
Rejected articles												
Research	4	2	3	9	9	15	53	74	79	80	328	72
Review		1	4	1	1	12	4	7	7	1	38	8
Short communications			2	1	9	9	3	6	16	33	79	17
Educational Resources									1	1	2	
Biotechnology issues Developing Countries						1	3	3	1	1	9	2
Issues in Biotechnology Teaching										0		0
Minireview								1	0	0	1	0
Total rejected	4	3	9	11	19	37	63	91	104	116	457	100

Table 3: Comparison of received, published and rejected articles

6.4 Commitment to Transparency

Instructions to authors, the composition of the editorial board and the statistics of the website are all easily visible and accessible from the homepage of the journal. The items considered in the evaluation process are also transparent to the authors, the originality of the work being of utmost importance. Furthermore, a code of ethics is also visible to the visitors (see Fig. 4).

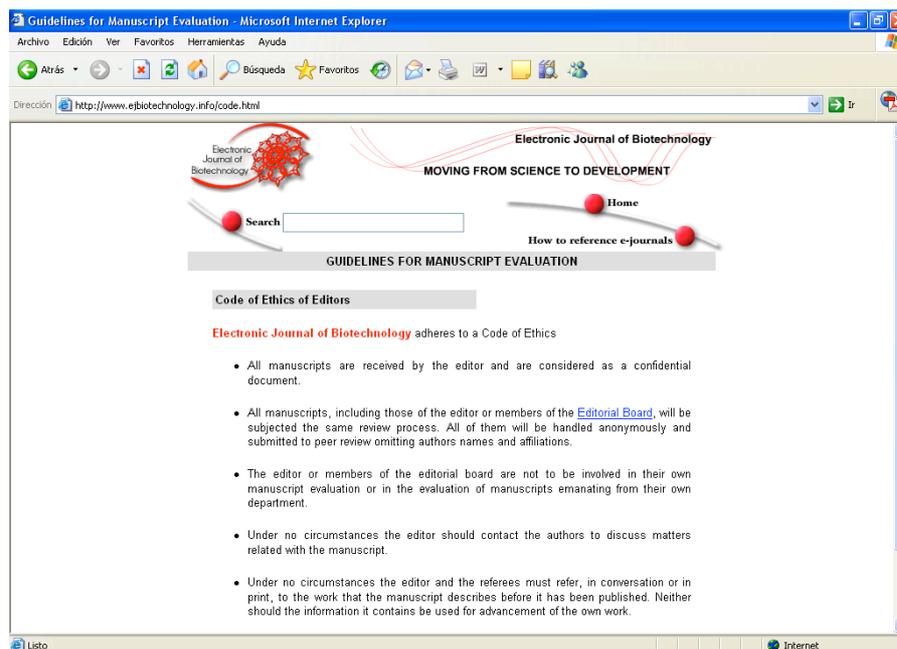


Figure 4: Code of ethics of Electronic Journal of Biotechnology

6.5 Commitment to Scientists

The editor is obliged to scientists, and must acknowledge within three working days the reception of a manuscript. Also, the editor has to respond to the requirements of every author and reader, independent of their academic position and geographic location. The commitment to the scientific community is also demonstrated by the support for an Open Access journal with Open Access licenses that clearly facilitate the retrieval of manuscripts.

6.6 Commitment to Innovation

Electronic Journal of Biotechnology provides a good graphical user interface which enhances the usability of the website. This is based on the scientists' requirements of speed and efficiency which are necessary for the identification and retrieval of articles and documents of interest. Also, the use of searchable descriptive metadata greatly increases the accessibility of the journal to search engines. As for example, if the term "journal biotechnology" is searched in Google, one the first documents to be retrieved is the Electronic Journal of Biotechnology.

Also we have adopted the DOI system [18], which provides a persistent and unequivocal identification of each article. It allows the use of CrossRef, a citation linking system that permits a researcher to click on a cited reference and link directly to that reference on the publisher's platform, subject to the publisher's requirements regarding the access to information [19].

6.7 Commitment to Cooperation

Electronic Journal of Biotechnology welcomes cooperation with any group interested in communicating scientific results in the area of biotechnology. In this way, we have interacted with UNESCO, Bioline International, REDBIO/FAO Co-operation Network on Plant Biotechnology for Latin America and the Caribbean.

In summary, Open Access electronic journals offers a unique opportunity to fulfil the increasingly public demand for making scientific information more accessible, visible and usable. Scientific knowledge must be made public, as it is a right of education and essential to human development. The problem of the distrust in electronic communication must be overcome by the inclusion of more e-journals in international scientific information systems. The ISI Thomson Scientific database publishing company has ensured that both paper and electronic formats are equally trustworthy and legitimate to communicate science.

Acknowledgements

The authors wish to acknowledge the contribution of the team of Electronic Journal of Biotechnology. Also the authors are grateful to Mrs. Marcela Aguirre, Departamento de Información, Comisión Nacional de Investigación Científica y Tecnológica (CONICYT) Chile.

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