SciELO

Scientific Electronic Library Online

SciELO: 15 Years of Open Access

(An analytic study of Open Access and scholarly communication)

UNESCO
United Nations
Educational, Scientific and
Cultural Organization

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Preface

UNESCO's Open Access (OA) Strategy was approved by the 187th session of the Executive Board (EXB) and was unanimously adopted by the 36th General Conference in November 2011. Inspired by the same, detailed short, medium and long-term action plans have been prepared. In the short term, the proposed activities would prepare a basis for the realization of the strategy as approved by the EXB and by the General Conference. As per the decision, UNESCO's work in the next four biennia (2012-2019) should focus on: (i) Provision of upstream policy advice and building partnerships; (ii) Strengthening capacities to adopt OA; (iii) Serve as a clearing-house and informing the global OA debate. Open Access has been recognized as an implicit agenda to deal with the knowledge challenge in the future. We understand that soon a new policy on the rights will be jointly agreed by the UN system and many other UN organizations will adopt Open Access policy in their publication.

The unique stakeholder composition of UNESCO gives it a privileged position to act as a go-between the existing knowledge-divide between countries. Similarly, it also allows for a broad-based participation of stakeholders such as policy makers, particularly parliamentarians, government officials, the productive sector, scientists, women, students, youth, indigenous people and the public at large. The same position of UNESCO also provides it with an opportunity to identify and inform good practices on issues to other stakeholders.

This book on SciELO has been prepared with the same sentiment – to document wa best practice of Open Access Publication. It is the first case study of this kind, which appreciates and documents the positive contribution of SciELO.

SciELO Network websites hits of over 1.0 million per day to explore sciences, and a similar number of downloads of scientific research

are not mere numbers! It's a testimony that SciELO has been a beacon to spread and expand knowledge contained in pages of journals and books. From the launching of 10 journals at a public workshop in São Paulo in 1998 to the current level of over 950 journals and near 500,000 freely downloadable articles is a remarkable feat and an example of Open Access approach par-excellence!

We hope that the SciELO book will provide others with an excellent example to follow.

I would like to express my recognition to the São Paulo Research Foundation (FAPESP) and the other national research agencies that lead and support the SciELO regular operation and development since 1998 and present in 16 countries in 2014. I would like also to express my appreciation for the very hard work of Mr. Abel Packer, the Director of SciELO, Mr. Ernesto Spinak, Mr. Nicholas Cop, Ms. Adriana Luccisano and Ms. Amanda Ramalho for editing the book and for their chapter contributions. I would also like to thank Messrs. Rogerio Meneghini, Rodrigo Duarte Guedes, Solange Santos, Fabiana Montanari, Fabio Batalha, Atilio Bustos–González, Patricia Muñoz Palma, and Isidro F. Aguillo for contributing chapters. I also note with thanks the financial contribution by the Government of Japan to prepare this publication. Finally, I would like to thank Mr. Bhanu R. Neupane for coordinating this project on behalf of UNESCO.

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Chapter 1 – SciELO at 15 Years: *raison d'être*, advances, challenges and the future

Abel L. Packer and Rogério Meneghini

Introduction

In 2013 the Scientific Electronic Library Online (SciELO) program achieved 15 years of regular operation with a sound record of achievements related to its raison d'être with functions that cover the indexing, aggregating, publishing and interoperating of open access collections of peer reviewed academic journals, published by institutions from Ibero-American countries and South Africa. The collections are multidisciplinary and multilingual. Most of the journals are independently managed either by scientific societies or academic institutions, with the rare presence of commercial publishers.

The creation of SciELO 15 years ago and its further development were driven by two innovative and pioneering approaches: first, the indexing of national quality journals to complement international indexes and the publication of the full texts with free access on the Web in the modality known today as the "Golden Road", which took place about four years before the launch of the Budapest Declaration that is internationally agreed to as the beginning of the Open Access movement; and, second, the cooperative convergence of independent publishers, editors and national research agencies around a common objective to increase the visibility and quality of journals (Packer 1998; Meneghini, 2003; Packer 2009). During this development, SciELO became a standard of quality for the journals it indexes. As of June 2013, the SciELO network covers 15 Ibero-American countries plus South Africa, with each country publishing a national collection of journals in the network. There are also two multinational thematic

collections in the network. Together these countries index about one thousand journal titles that publish more than 40 thousand articles per year. To date, the network has published a total of more than 400 thousand open access articles that receive a daily average of over 1.5 million article downloads, 65% as PDF files and 35% as HTML files.

The wide presence of SciELO on the Web is evidenced by different metrics systems, such as the Ranking Web of Repositories whose July 2013 edition positions the SciELO Brazil collection portal in first place, and the SciELO collections of Chile, Argentina, Colombia and Spain in the top 20 portals (Aguillo 2014).

The SciELO network is the major provider of journals indexed by the Directory of Open Access Journals (DOAJ). The majority of Latin American journals indexed by the Web of Science and Scopus are open access and most of them are SciELO journals. No other region in the world has this level of adoption of open access journals indexed internationally (Miguel, Chinchilla-Rodríguez and Moya-Anegón 2011).

SciELO is a special program of the Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) that provides political and financial support to the development of the SciELO Brazil collection that interoperates with the other SciELO national and thematic collections, and provides the on-going maintenance of the methodological and technological platform. SciELO Brazil also acts as the network technical secretariat. Each of the SciELO national collections is managed and funded by its corresponding national research institution. All collections follow the same operating methodology and technology.

The origins and main drivers of the SciELO Program and Network

Origins

SciELO's regular operation was launched in Brazil in 1998 after a one--year pilot project partnered by FAPESP and the Latin American and Caribbean Center in Health Sciences Information (BIREME/PAHO/WHO). SciELO aimed at addressing two concurrent objectives. The first one was to develop capacities and infrastructures to index and publish, on the Web, a collection of selected Brazilian peer-reviewed journals from the different disciplines capable of dealing with multilingual texts. The second one was to increase the visibility, use and impact of the indexed journals and of the research they publish.

SciELO was conceived as a project and strategy to overcome the phenomenon known as "lost science" which was due to the very weak presence of developing country journals in the international indexes. In addition to the lack of visibility, this phenomenon also manifested itself in the lack of communication in many areas between scientists from developing and developed worlds, and also between developing countries. (Gibbs 1995)

The pilot project involving 10 Brazilian journals, most of them indexed in Science *Citation Index* (SCI), of the former Institute for Scientific Information (ISI), played an important role in finding a way to publish online in a time of scarce technological options. The successful implementation of the pilot project with the proactive contributions of the participating journals produced the SciELO model of indexing and publishing that was soon adopted by Chile, which stimulated the development of the SciELO network of national journal collections. (Prat 1998) The network coverage evolved continuously in the following 15 years both in terms of the number of countries and journals. (Packer et al 2006)

SciELO's main drivers

The SciELO indexing function, driven by quality criteria, was conceived to complement international indexing, especially the *Science Citation Index*, with the vision to broaden the coverage of journals with an online system capable of measuring journal performance in terms of number of downloads and citation based bibliometric indicators as those provided by the *Journal Citation Reports*.

The SciELO publishing function operates on the Web to provide an open access platform for the journals, and facilities for the navigation and searching of contents at the level of collections, journals, issues and articles. The publishing function is accompanied by the interoperability of the contents on the Web through a broad distribution of metadata to the main Web bibliographic indexes and services that provide efficient universal access to the full texts. These functions were improved systematically with the adoption of state-of-the-art methodologies and technologies in scholarly communication. There also has been a progressive expansion of publishing functions, including the provision of online submission management services, XML full text formatting as a source for HTML, PDF and ePUB publishing formats, editorial assistance to journal publishers, and dissemination.

Over the years, SciELO became an integral component of the research infrastructure of most of the countries where it operates. The governance, management and funding of the SciELO national collections are led by research agencies in most of the countries. SciELO is also used by many countries as a reference to evaluate research as a complement to evaluations based on international indexes. As such, SciELO became a standard of quality. This recognition and status achieved by SciELO reflects, on the one hand, its successful approach to raising the profile of the journals and, on the other hand, the increasing recognition by research related authorities and scholarly communities of the importance of research communicated by nationally published journals to complement what is published in high impact international journals. Overall, SciELO responds to the idea that the progress of research includes the progress of communicating research, which includes the capacity to produce quality journals.

SciELO was launched in March 1998, about four years before the Budapest Declaration. Thus it pioneered the adoption of open access and became an important force in the international Open Access movement, particularly in the so-called Golden Road. In fact, Latin America is the region leading in the proportion of internationally indexed open access journals in the Web of Science and Scopus. As stated earlier, SciELO is the major provider of open access journals to the DOAJ. The massive adoption of open access by Latin American journals is largely due to SciELO's pioneering work. The remarkable impact of SciELO open access has been evidenced by the increasing number of accesses and downloads of articles, which is exemplified by the statistics of the Brazilian collection: from an archive of 190 thousand articles in 2011 with an average daily download of 1.10 million articles to 210 thousand articles in the archive in 2012 with an average daily download of 1.29 million articles, representing an increase of 17%. The average downloads per article remained around 2,200 per year. About 65% of the downloads were of PDF files. In July, the Brazilian mid-year university vacation, there is a drop in the number of downloads of about 10 million from the previous month, evidencing the high use of SciELO by students.

However, the average performance of SciELO journals falls short when measured by citations received particularly in the international indexes. Due to many reasons already known, most of the SciELO indexed journals have low international impact when compared to developed countries' journals as measured by the number of citations received by their articles within international journal indexes such as the Web of Science and Scopus. In fact, most of the SciELO journals rank below the median of the impact factor distribution for their thematic areas in the *Journal Citation Reports* and in the *Scimago Journal Rankings*. A critical determinant and consequence of this situation is the role played by the journal impact factor indicator that, notwithstanding its inherent restrictions (Jerome 2012), has been used almost indiscriminately by most countries as a standard to evaluate research programs, institutions, projects and even the output of scientists. The general belief or perception that the impact factor is correlated to the quality of research a journal publishes and, therefore, a proxy of

the quality of the journal itself, severely influences and restrains the development of nationally published journals and, in particular, the actions carried out by the SciELO program to increase the impact of the journals. In other words, in spite of the significant contributions brought by SciELO, the problem of low impact of nationally published journals remains its Achilles' heel.

The characteristics and role of nationally published journals and how SciELO contributes to their development

The characteristics of nationally published journals

Nationally published journals are broadly identified here as those that predominantly publish research from the country where they are edited and published under the responsibility, in general, of scientific societies, and academic and national institutions related to research. The characteristics of nationally published journals presented in this chapter refer mainly to Latin American journals and more particularly to those indexed by SciELO, although many of the characteristics are valid worldwide.

The idea of SciELO was conceived in 1996. At that time, most Latin American journals lacked international indexing and therefore lacked the related perceived distinction and recognition of being quality journals. So, this was the main characteristic and the main limitation of the nationally published journals. Notwithstanding the advances on increasing the visibility of the nationally published journals that has been occurring since the emergence of the Web and more specifically of SciELO, visibility remains a critical characteristic and problem.

Only 14 Brazilian journals from different disciplines were indexed internationally in 1997 in the ISI database (today's Thomson Reuters Web of Science) while dozens of other journals were published with small circulation, usually restricted to libraries and members of scientific societies. Few succeeded in having enough subscriptions

to cover a significant part of their costs. This lack of being indexed and the subsequent lack of visibility were once described using the iceberg as metaphor with the small part visible representing the few internationally indexed journals. There were also a few Latin American journals indexed in the MEDLINE database, which today is the Web based PubMed. Meanwhile, several national and regional indexes contributed to identifying and establishing bibliographic control of journals, mainly within thematic areas, such as the Latin American and Caribbean Health Sciences Literature database (LILACS). However, they did not achieve the status of the developed countries' indexes and did not solve the problem of the indexing of multidisciplinary journals and the follow-up of journal performance by means of citation based bibliometric indicators.

Even the few Latin American journals indexed in the ISI database lacked visibility as they were positioned below the median, mostly in the lower quartile of the impact factor distribution of their respective thematic categories. These journals were publishing predominantly national authors, with at least half of the articles in Portuguese or Spanish. In the terminology in vogue at that time and still used today, developing country ISI indexed journals were identified and stigmatized as "regional" in contrast to the so called "main-stream" journals from developed countries, mostly published by private publishers. Their evolution in the *Journal Citation Reports* ranking was virtually impeded by the well-known "Matthew effect" (the rich get richer and the poor get poorer), a vicious circle that expresses the phenomenon whereby low impact journals do not attract the submission of better manuscripts and therefore do not receive many citations (Prat 1998). In fact, as the international journal publishing ecosystem progressed, driven in many ways by impact factor based evaluations, it established a universe dominated by commercial publishers and important scientific societies of developed countries. Developing countries were not able to follow this trend and remained as peripheral players in the international flow of scholarly communication. (Packer, Meneghini 2007)

The characteristic and problem of visibility were and continue to be surrounded by other damaging aspects related to the lack of profes-

sionalism and internationalization of the journals which weakened their profile and raised negative perceptions of the journals in many segments of the research community.

The role of nationally published journals

In Latin America, most journals are managed and produced independently. The presence of publishers is rare, although recently international commercial publishers have begun to pursue the acquisition of local journals or of co-publishing agreements. Therefore, editorial management of journals in Latin America is dispersed since journals are responsible for the management of all the editorial and publishing operating processes. This, on the one hand, contributes positively to the dissemination of knowledge on how to publish journals but, on the other hand, impedes the creation of economies of scale that is important to streamlining the editorial and publishing processes, lowering costs and promoting the adoption or generation of innovations. Given this situation, SciELO represented an innovative and unique solution to bringing together publishers and aggregating journals for online publication and dissemination following a common approach and operating platform.

Within their disciplines or thematic areas, the scope of Latin American journals is more generic when compared to the universe of international journals. This is mainly due to the lack of a critical mass of scientists in specific areas to sustain highly specialized journals. For example, all Brazilian journals indexed by SciELO and Web of Science are present in only about 35% of the Web of Science 230 thematic categories (Packer 2009).

In terms of audience, most of the Latin American journals are centered on national and regional research communities. This is evidenced by the following facts: (a) the use of Portuguese and Spanish to communicate research limits international reading; (b) the research

published is carried out mainly by national authors, few of which have international collaboration; (c) citations received are predominantly domestic, or from other national or regional scientists; (d) the editorial boards and process are led by national scientists. It can therefore be concluded that these journals communicate research of local interest or based on methodologies and idiosyncrasies linked to local national research communities. Despite this, there is a small percentage of nationally published journals that are oriented to the international research community in their respective areas. These journals, for example, receive a significant number of citations from foreign authors and journals (Meneghini, Mugnaini and Packer 2006).

Nationally published journals are also known to serve as an option to publish manuscripts that have not been approved by foreign journals.

Finally, a key role played by nationally published journals in many disciplines is to serve as a reference for the learning of writing, editing and publishing.

How SciELO contributes

Overall, nationally published journals from developing and emerging countries communicate a significant percentage of their research, whether indexed or not internationally, in English and/or a national language other than English. Considering these journals as a whole but also as specific groupings of journals, SciELO has been contributing to their development in many ways by:

- Providing online indexing, publication and interoperability on the Web to maximize their visibility and use. All articles metadata have a link to the full text;
- Providing efficient indexing of all journals in Google Scholar, CrossRef and DOAJ, which do not have selective criteria;
- Increasing the indexing and interoperability with multidisciplinary international indexes that do have selective criteria, in par-

ticular Web of Science and Scopus. This function applies to the journals that are indexed in these indexes;

- Increasing the indexing and interoperability with thematic and regional indexes such as PubMed operated by the US National Library of Medicine, AGRIS (International System for Agricultural Science and Technology) operated by FAO, and LILACS operated by BIREME/PAHO/WHO. This function applies to the journals indexed in these indexes;
- Following-up on journal performance by using bibliometric indicators within the SciELO collections that permits assessing the journal trends in terms of citations as well as in the download of articles. The metrics based on citations, even though limited as a performance measure because of the limited national and regional universe of journals, do contribute to following up on the domestic impact;
- Providing multilingual publication involving mainly English, Portuguese and Spanish. This has been crucial to empowering Latin American journals with the capability of addressing different audiences, since articles are published simultaneously in two or three languages.
- Anticipating individual article publication, which has contributed to accelerating the availability of the articles once approved and prior to their corresponding journal issues being completed;
- Providing editing and publishing services such as online manuscript submission, evaluation and processing; formatting of texts in XML, PDF, HTML and ePUB formats to allow the reading of the articles on any device; marketing, and other related services. This has widened the functions of SciELO to be somewhat that of a metapublisher;
- Providing assistance to improve a journal's editorial management.

During the last few years, as several countries were creating their core SciELO collections with minor movements of journals, the SciELO program started to prioritize three lines of action to promote a significant improvement in journal performance for the near future: professio-

nalization, internationalization and sustainability. Professionalization applies, on the one hand, to the adoption of state-of-the-art editorial and publishing service and, on the other hand, to the performance of editors and editorial teams. Internationalization applies, on the one hand, to the expansion of the audience of the journals and, on the other hand, to the internal management and operation of the journals in terms of the composition of the editorial team and the editorial processes. Sustainability applies, on the one hand, to the increasing presence of the journals within their research communities which is demonstrated by a flow of submissions allowing an adequate level of manuscript approval and, on the other hand, to stable financing based on a mix of revenue and funding sources.

Conclusions

SciELO reached its 15th anniversary in 2013 with plenty of achievements to celebrate. Several reasons contributed to the success of SciELO. First, its pioneering conception and implementation in the early days of online journal publishing gave SciELO the conditions to move through a progressive technological learning curve with the development of a critical mass of open access journals and articles that were receiving an ever increasing number of accesses on the Web. Second, the commitment to quality as the central driver of the collection development resulted in the adoption of SciELO by national research agencies in Brazil and Chile as the national indexing standard to rank the published research. Third, the FAPESP and BIREME partnership in the development of the pilot project and its further consolidation gave the project a high degree of credibility in the research and academic information communities. The selection of recognized quality journals to start the pilot project collection also distinguished the project. Fourth, the political support and funding received from FAPESP, CNPq (National Council for Scientific and Technological Development) and CONICYT Chile (National Commission for Scientific and Technological Research) positioned SciELO as part of the national research infrastructure in the respective countries.

However, the success of SciELO in contributing to the improvement of the quality of the journals is pending on achieving better international performance in terms of impact based on citations received, which requires additional improvements in the professionalization and internationalization of the editorial management of the journals. This is the main challenge faced by the SciELO Program, the national collections and the individual journals in the coming years.

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Chapter 2 – The Pioneering Vision of the SciELO Founders

Rodrigo Duarte Guedes

Introduction

Just imagine if someone were to offer you today the chance to be part of a pilot project, where your very thoughts would be passed directly to a text file on a computer. Would you accept? Or, would you think this was such an absurd innovation, and as a consequence, would not revolutionize how you work, being nothing but a waste of time?

Misgivings such as those raised by the question posed in the first paragraph above, were probably shared by many publishers when the SciELO Project was set up and began to call for the participation of publishers of academic journals in the project. When the pilot project was initially set up in 1997, the repercussions of the debate surrounding Open Access had not yet been felt, nor had the Internet itself been popularized worldwide, something that occurred in the early years of the 21st century.

So, at the time SciELO was set up, there existed a scenario where academic publishing, and consequently the way in which it was communicated, were based around the traditional print publishing model, where academic journals fulfilled the role as the collective memory of knowledge, and the disseminator of research results to the research community, to academics and to society as a whole. Print had been the basis of this formal communication channel since 1665, when the first academic journals appeared on the scene.

People began to realize that the SciELO Project, in offering publishers the possibility of publishing their journals on the Web, was viewed by some as an innovation representative of Schumpeter's (1961) concept of "creative destruction", where the introduction of such an innovation would bring about the creation of new structures and thereby destroy the print based model.

Ernani Rufino dos Santos Junior (2010) corroborates the state of minimal change the field of scholarly communication passed through.

> As a consequence, the means of disseminating the results of research, and of communicating academic knowledge have remained virtually unchanged for more than three centuries within the academic community, having undergone no significant changes in its forms of publication since academic journals came into existence. It is this characteristic which confers upon the academic journal the status it holds as the major channel in the formal communication of knowledge. [*Translation*]

Today, the SciELO Project is seen as a point of reference within the field of scholarly communication both nationally and internationally, and is recognized for its approach based on excellence and the proficient way in which it increases the visibility and the Impact Factor of the journals which participate in the project. Abel Packer (2013), one of the founders of the project, along with Rogério Meneghini, presented a picture of the current state of SciELO during an interview given to the journal Open Access and provided the latest figures.

> The SciELO Brazil Collection is starting 2013 with 259 titles. The SciELO network, which contains 10 national certified collections, indexes and publishes more than 1,000 titles. SciELO covers all fields of knowledge, but the number of journals and articles vary significantly between them. The fields which contain the greatest number of journals are Health and Social Sciences, which together make up 60% of the col-

> lection. The fields of Agricultural and Applied Sciences each account for 12% of the journal total, while Biological Sciences make up 10% of the total. Engineering, the Exact Sciences and Earth Sciences each account for 7%, with Linguistics, Humanities/Literature and Fine Arts representing 4%. *[Translation]*

A distillation of the opinions of some of the pioneers behind the Project is therefore being sought here. People such as the founders Abel Packer and Rogério Meneghini, as well as the journal editors Charles Pessanha, Hooman Momen, Lewis Greene and Silvio Salinas are asked for their opinions on issues such as to what extent the project was perceived as being innovative at the time, the role taken by FAPESP and BIREME in the project, if the implementation strategy was a differentiating factor, and how it feels today to have been part of this historic project in the field of Brazilian scholarly communication.

Innovation and the pioneering spirit

The SciELO Project is placed in the context of the expansion of the Internet, where its pioneering spirit is the result of the fact that it was set up as the first national initiative in the online dissemination of academic journals. Internationally, it was the fourth initiative in this area coming after arXiv.org (1991), Bioline International (1993) and Highwire Press (1994). In this way, SciELO was able to leverage the integration of Latin American journals within the international context of the emergence of Open Access.

The innovative nature of the project is due to the evolution of SciELO's unique approach in the context of academic publication and to the fact that it works exclusively in an online environment, where everything published by SciELO is structured for open access dissemination via the Internet, or that is to say, free from constraints such as the need to pay for subscriptions, and with the right to reproduce the accessed article, provided its authorship is duly acknowledged.

The impact of the pioneering spirit and innovative nature of the SciELO Project on Brazilian scholarly communication is of primary importance in understanding how the chance to take part in this project reflected the vision of those involved.

Lewis Greene, who was at the time editor of The Brazilian Journal of Medical and Biological Research (BJMBR) relates that, despite the fact that this journal was indexed in the ISI - *Institute for Scientific Information* - database and PubMed, readers were not finding it easy to get access to articles. In this way, Greene understood that indexing was simply not sufficient to allow access to the published articles.

Another point addressed by Greene refers to the low visibility experienced by hundreds of journals published in developing countries, because it was like this for the BJMBR. They were having print runs of between 500 and 2,000 copies, but they didn't have sufficient funds to send copies to libraries abroad, apart from the fact that there was no great interest in these libraries in receiving such journals. In a reaffirmation of the concept formulated by Gibbs (1995) in which he states that much of the research output produced in the third world is invisible, and widening the scope of this remark to the experience of BJMBR which was indexed in ISI – nowadays known as Journal Citation Reports, published by Thomson Reuters (JCR) – and in PubMed, its editor was nevertheless aware of the difficulty experienced by readers in getting access to the journal and the consequent lack of interest internationally in the articles it contained.

In this way, Lewis Greene, in his interview, views his participation in the SciELO Project in the following way: "I was obviously very thrilled to learn about the SciELO Project, whose objective was to make available in online form the full text of every article published in the BJMBR and in other journals. I therefore gave my immediate support to this initiative."*[Translation]*

Silvio Salinas, who was editor of the Brazilian Journal of Physics at the time relates that his journal already had a similar tradition of publishing given that it had been in existence for twenty years when the SciELO Project saw the light of day. Nevertheless, it is interesting

to observe the insight of the interviewee because he confers on the SciELO experiment a greater professionalization with respect to new editorial practices, bearing in mind that in the past, journals were scarcely indexed at all and were produced in a very outmoded way.

Charles Pessanha, the editor of the journal Social Science Data (Ciências Sociais Dados) points out in his interview that his great motivation for participating in the SciELO project was the fact that the project resolved some bottlenecks in the dissemination of Brazilian academic output, for example, the circulation and quality of academic journals, as well as giving more transparency to the journal decision making process.

Pessanha also states that:

> Right from the start, I realized that this was an ambitious and innovatory project. Despite this, its implementation needed to overcome a certain amount of resistance. More conservative publishers spoke out in support of the printed journal (in reality, the SciELO Project was never opposed to print publications) and for some, there was no interest in free access because their journals already had subscribers. *[Translation]*

When questioning the interviewees about the fear that they may have felt in participating in a project such as SciELO which was proposing such a radical approach, it can be seen that, in the opinion of Meneghini, the co-founder of the SciELO program, a major question mark was put against getting the buy-in of academic journal publishers.

Nevertheless, it can be observed in the words of Greene, Salinas and Pessanha, that some people had no fear and were encouraged by their participation in the project. So, Greene states that, because of his perception that the SciELO Project was consistent with the fledgling movement in support of open access, he had no fear, since he believed that this movement would change academic journal publication policies. Salinas explains that the journal for which he was responsible had already taken the decision to publish in English, as well as

making the journal available on the Web page of the Brazilian Society of Physics (Sociedade Brasileira de Física). Nevertheless, the quest for greater visibility brought about its participation in the SciELO Project, because it was understood that such a participation would provide the visibility being sought. Pessanha could already see that the SciELO Project had the great potential to resolve some of the bottlenecks in the dissemination of academic output.

As a consequence of this, Meneghini's fear of getting the buy-in of the publishers of academic journals was dispelled during the two year period from 1998 to 2000, after the preliminary pilot phase of the project and its de facto implementation.

The SciELO implementation strategy

The SciELO Project is the result of the cooperation between FAPESP - the State of São Paulo Research Foundation (*Fundação de Amparo à Pesquisa do Estado de São Paulo*) and BIREME - Latin American and Caribbean Center in Health Sciences Information. These are national and international institutions, respectively, working in the fields of scholarly communication and scientific publishing.

The implementation of the SciELO project, which took place after the completion of a pilot project of 10 Brazilian journals from different disciplines, was successfully carried out between March of 1997 and May of 1998 with the development and evaluation of an appropriate methodology for electronic publishing on the Internet. The project has been in continuous operation since June 1998, incorporating new journal titles and expanding its operations to include other countries. As of 2002, the project began to receive financial support from the National Council for Scientific and Technological Development (*Conselho Nacional de Desenvolvimento Científico e Tecnológico* - CNPq).

The strategy for the implementation of this project was of fundamental importance because, based on this, it initially sought to win the trust of editors who participated in the pilot. Its non-interventionist and participatory nature lead the ten publishers that participated in

the project to contribute in a decisive way to the formulation of the original SciELO methodology and its consequent success.

Just what was so different about the implementation of the project is pointed out in the words of those interviewed below on this matter.

In the opinion of Lewis Greene: "Without a doubt, the pioneering spirit in the adoption of Open Access was represented principally by the transparency of the process and by the leadership of Abel Packer and Rogério Meneghini."*[Translation]*

Charles Pessanha relates that in a recent meeting of the Brazilian Association of Scientific Editors (*Associação Brasileira de Editores Científicos* - ABEC) it was recalled that:

> SciELO was the first international database to offer full texts in Open Access without any restrictions. It is the pioneering indexer of the *Gold Open Access* model. Another important detail of SciELO is that it has, in total, a greater number of journals in the Humanities, Applied Social Sciences, and Arts and Literature. It is a fact that this is not usual as far as the large international indexers are concerned. *[Translation]*

Silvio Salinas puts forward an interesting opinion. He notes that in his vision: "At the time I think all our periodicals were published in open access. I think this question of closed access was not even raised."*[Translation]*

Lastly, Meneghini, the co-founder of the project, points out:

> We did not feel that we were exhibiting this pioneering spirit in the context of Open Access, since at the time this term did not even exist and it was just at the beginning of the millennium that this movement began. I usually say that we were born as open access before the international movement had begun in this direction. *[Translation]*

The importance of FAPESP and Bireme

The interviewees were asked if the fact that the project had the support of institutions such as the State of São Paulo Research Foundation (*Fundação de Amparo à Pesquisa do Estado de São Paulo* - FAPESP) and the Latin American and Caribbean Center in Health Sciences Information (BIREME) was a factor that added a greater degree of trust to SciELO.

Here are some of their replies:

Table 1 - Opinions on the importance of the support of FAPESP and BIREME

Interviewee	Opinion
Abel L. Packer	This partnership between FAPESP and BIREME was fundamental, firstly because it ensured the quality, efficiency and success of the project, and secondly because it represented an opportune moment in the project since there was one time when the publishers looked at online publishing with many reservations and doubts. The coming on-board of FAPESP and BIREME as leaders of the project made a very big difference.
Charles Pessanha	There are two "midwives" of SciELO that are very important to its journey. The first is the ethos of BIREME with its know-how in scholarly communication, data aggregation, and dealing with large indexers and repositories such as MEDLINE, Thomson Scientific, etc.. It had a tradition of working online, of great expertise in the digital field, in addition to its international character. Secondly, there was FAPESP with its tradition of large scale developments in modernizing science. FAPESP was a pioneer in the definition of criteria for the evaluation of Brazilian academic journals. These criteria served as a basis for the pioneering program of support to journals in the country.

Continue...

Continuation...

Interviewee	Opinion
Lewis Greene	Reaffirming his enthusiasm on hearing of the SciELO Project and of its objective in making the full text of each work published in the journals available online, immediate support of the initiative was endorsed since, when asked if the fact that the project had the support of FAPESP and BIREME represented an element of trust, his reply was "Definitely!".
Rogério Meneghini	These institutions gave support to the program from its inception, the first one with financial support and the second one with infrastructure support. Both are solid institutions and conveyed trust in the Program in its early stages.
Silvio Salinas	Without a doubt, this was important. In our case, it was the support of FAPESP that imparted trust.

As can be seen, the opinions of the interviewees attach a great importance to the support given by both FAPESP and BIREME to the implementation of the project. The fact that the two institutions brought a sense of trust to the project is highlighted given that the project represented, as we saw earlier, a major innovation within the Brazilian academic community. The support of these two institutions also ensured the quality, success and efficiency of SciELO.

Participation in SciELO: perceptions

The interviewees were asked how they felt, almost 15 years later after the project began, about their participation in the project from its inception, and how they feel today after the consolidation of the project as a milestone in Brazilian academic publishing. As far a Greene is concerned, "It gave me great satisfaction to participate in the initial stages of the SciELO Project and to continue to contribute to it up to the present". *[Translation]*

Charles Pessanha reports that:

> I confess that I feel proud to have been part of the Project right from the beginning. It was a learning experience. I began to enjoy the company of a group of intellectuals that, certainly, added much to my view of knowledge. In addition to the previously mentioned duo of Abel Packer and Rogério Meneghini, there were my colleagues, members of the scholarly committee, represented here by Lewis Joel Greene, and the technical staff of SciELO, represented here by Fabiana Montanari. *[Translation]*

Salinas is very much aware of his participation in the consolidation of SciELO which is an important milestone in Brazilian scholarly communication. Lastly, Meneghini reports that: "The start was a delightful adventure; the present is a question mark. Although we have the approval of a good part of the scholarly community, we still have to establish ourselves as a stronger institution". *[Translation]*

Figure 1 - World cloud related to participation in the SciELO Project.

The word cloud depicts the terms that appear most frequently in the interviews with the founders and with some of the publishers that participated in the SciELO Project from its inception. It can be seen

that words such as Project, SciELO, Community, Beginning, Scientific and Represented appear in the replies of the interviewees.

Final considerations

It can be noted that the pioneering spirit and innovation introduced by the SciELO Project by its indexing of journals and online publication in open access sets itself up, a priori, as a major innovation within the Brazilian scholarly community. This was made possible by its detailed methodology, the result of which is the SciELO Web site that provides immediate access to articles published by the journals indexed in the SciELO database. The growth of the project can be observed by an examination of the numbers. In 1997 the project had 10 indexed journal titles and in 2013 it had grown to 259 indexed journal titles from Brazil.

In addition to its innovative nature, characteristic of Schumpeter's creative destruction, the SciELO Project found support for its initiative of online publication within the group of academic publishers.

This chapter sought to present the views of these pioneers and how they viewed their participation within the project, as well as discover what points were critical to their participation in such an innovative initiative as SciELO.

It is important to stress that the "courage" of the 10 initial academic publishers in jointly building up the project with the SciELO team brought about results such as the consolidation of the project as a milestone in national scholarly communication, given that it succeeded in making academic journals better known nationally and internationally. This has resulted in bringing about a change as to how the journals are indexed in international databases. In support of this observation is that SciELO achieved first place two years in succession in the *Ranking Web of World Repositories*.

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Chapter 3 – The SciELO Network in perspective

Abel L. Packer, Nicholas Cop and Solange M. Santos

Introduction

The SciELO Network is the result of an international cooperative open access program in scholarly communication called the SciELO Program. As of August 2013 the Network covers a total of sixteen countries: fifteen from Ibero-America, and South Africa. Each participating country manages an online open access collection of peer reviewed journals called a National SciELO Collection. There are also two thematic collections: an international thematic collection in Public Health and a Latin American Social Sciences collection of selected articles translated to English.

The functions performed on each SciELO collection are: indexing the journals according to specific criteria; incorporating the measurement of access, downloads and citations into each collection and journal; publishing the full texts online in HTML, PDF, and increasingly, in ePUB formats; and interoperating the collections and journals within the SciELO Network and on the Web.

The SciELO Network is an implementation of the SciELO Program led by the State of São Paulo Research Foundation (FAPESP). It funds the development and operation of the SciELO Brazil collection which cooperates with other national collections in the SciELO Network.

The SciELO Program aims to improve the quality and impact of the journals that it indexes and of the research they communicate. The SciELO Network operates in a decentralized fashion with national collections that each have their own governance, management, opera-

tion and funding from national research agencies and research related institutions. All national collections follow the same methodology and technological platform. SciELO Brazil is responsible for the development and maintenance of this methodology and the platform, and also acts as the Network secretariat.

This chapter describes the origin, evolution, state of development, challenges and anticipated future trends of the SciELO Network. It also describes how the governance, operation and funding are adapted to national conditions.

Origin and foundations of the SciELO Network

The SciELO Network was initiated in 1998 with the establishment of the SciELO Brazil Collection and after the Comisión Nacional de Investigación Científica y Tecnológica (CONICYT) Chile began a similar project to publish Chilean journals in electronic format using the approach and methodology of the SciELO Brazil Collection (Packer *et al* 1998; Prat 1998). Table 1 shows the number of collections and countries participating in the Network, the total number of journals indexed since SciELO began 15 years ago, and the number of journals indexed as of August 2013.

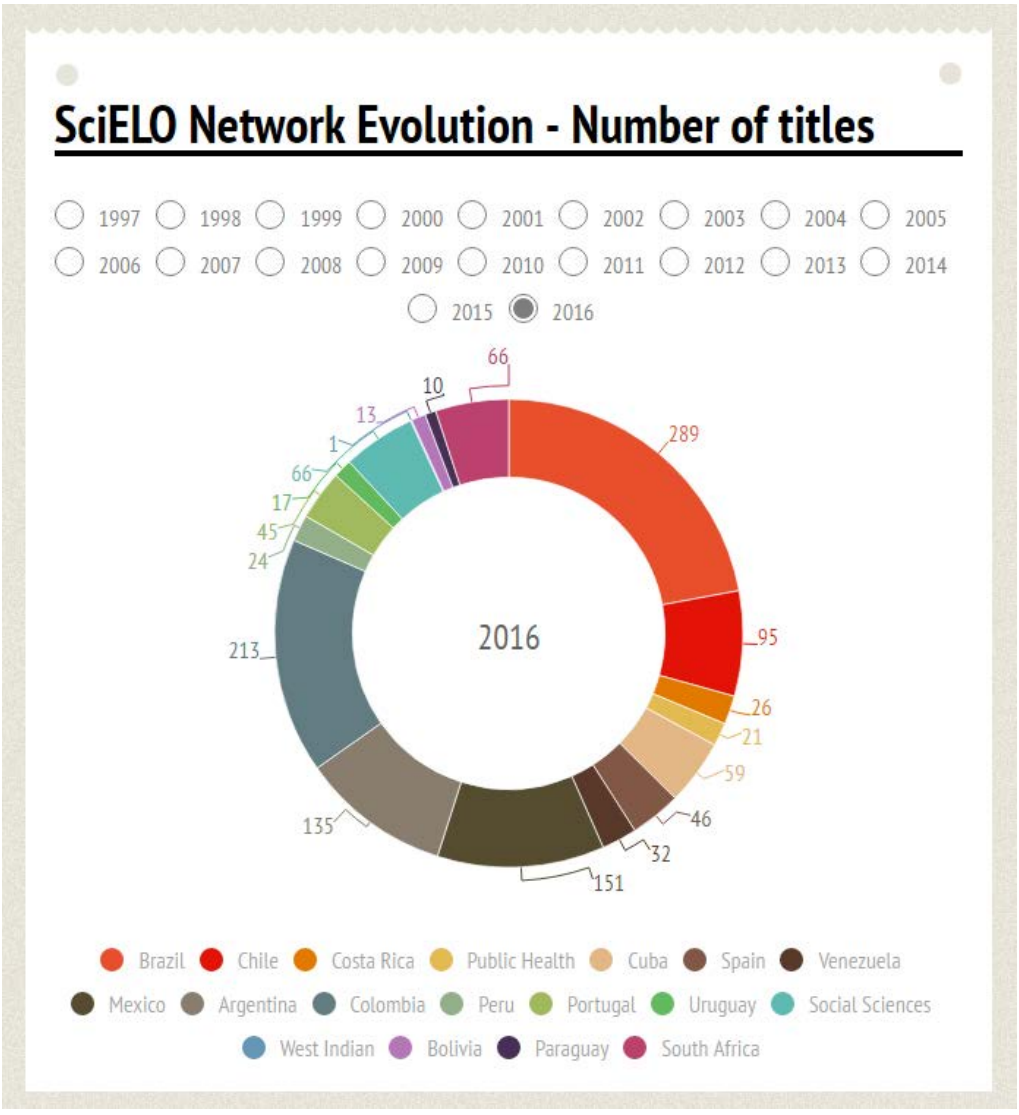
Table 1 - The evolution of the number of collections and journals indexed in the SciELO Network.

Year	Number of Collections in Operation	Collections		Journals Indexed		
		Certified	In Development	All	Active	Certified
1998	1	Brazil		324	275	275
	2	Chile		103	92	92
2000	3	Costa Rica		18	13	13
	4	Public Health		15	15	15
2001	5	Cuba		48	44	44
	6	Spain		53	35	35
	7	Venezuela		53	28	28
2003	8	Mexico		113	104	104
	9	Argentina		104	102	102
2004	10	Colombia		156	156	156
	11		Peru	15	15	
	12	Portugal		44	26	44
2005	13		Uruguay	10	10	-
2006	14	Social Sciences		33	33	33
	15		West Indian	1	1	-
2009	16		Bolivia	14	14	-
	17		Paraguay	7	7	-
	18	South Africa		28	28	28
2013	**18**	Total Network		**1 139**	**998**	**969**

The regular operation of SciELO Brazil was established after the successful implementation of a one-year pilot project which ran from March 1997 to February 1998 with ten selected Brazilian journals. The pilot was led by the São Paulo Research Foundation (FAPESP) and the Latin American and Caribbean Center in Health Sciences Information

of the Pan American Health Organization / World Health Organization (BIREME/PAHO/WHO). The objectives of the pilot were to investigate and test different approaches, methodologies and technologies to publish full text journals on the Web that also contained integrated tools to measure citations and downloads for evaluating journal performance and complement the ISI Journal Citation Reports, the international reference for journal evaluation. The results of the pilot project were

Infographic: SciELO Network Evolution - Number of titles



presented and discussed in an international seminar in March 1998 (Antonio and Packer, 1998).

Since its inception, the SciELO Network continues to evolve following its two original and principal driving objectives. The first one is to follow, adopt and adapt to the SciELO environment the state of the art in methodologies and technologies for online indexing, publishing and interoperating journals. The second one is to increase the visibility, availability and use of full text articles and to improve the impact of the journals and of the research they publish.

These objectives are supported, on the one hand, by a set of methodologies and technologies called the SciELO Model, or the SciELO Platform, designed for the management, indexing, publishing and interoperation of journal collections and, on the other hand, by international, regional and national policies and programs oriented to strengthening equitable access to scholarly knowledge. These objectives also contribute to strengthening national scholarly communication capacities and infrastructures as an integral part of national research infrastructures.

Both objectives were formulated to raise the profile and visibility of national journals and of the research they communicate. Prior to SciELO, the international indexing of these national journals, and thus their visibility, was very limited.

The SciELO Model provides a road map, methodologies and technologies for the establishment, governance, management and operation of national SciELO collections of journals and their interoperation within the SciELO Network and on the Web. The basic documentation on the SciELO Model and the related bibliography is published in the *About SciELO* section of the SciELO Network Web site.

Political and financial support to the SciELO Program has always been provided by the State of São Paulo Research Foundation (FAPESP), beginning in the early days of the pilot project. FAPESP created the special SciELO Program to provide grants for the continued development of the SciELO Brazil Collection and of its related international

cooperation activities. These grants are renewed every two years after a review and approval of progress reports that are submitted during each period. The progress reports describe the goals met during the period and the plans for future development and projects. As of 2002, SciELO Brazil also receives financial support from the Brazilian National Council for Scientific and Technological Development – CNPq (*Conselho Nacional de Desenvolvimento Científico e Tecnológico)*.

It is important to note that in 1998, in addition to SciELO, FAPESP created the Programa Biblioteca Eletrônica (Electronic Library Program) to give the state of São Paulo academic community access to international commercial scholarly content (Krzyzanowski, 1998). In the year 2000, the project was transferred to the Ministry of Education and was integrated into the well-known Portal de Periódicos da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), one of the most important public programs in developing and emerging countries (Almeida, Guimarães and Alves 2010) for providing access to scholarly information. "In short, the financial support granted to SciELO to improve scholarly communication was also part of a broader FAPESP strategy aimed at democratizing the access to both national and international journals". *[Translation]* (Packer 2009).

The international and regional policies and programs that contributed to the foundations and strategies of the SciELO Network are UNESCO's Information for All Program (IAP) and BIREME's Virtual Health Library (VHL). These two programs were leaders in the international and regional promotion of the democratization of access to scholarly information. In fact, SciELO was developed as a VHL Associated Network and the SciELO Network concept was derived from the VHL model developed by BIREME (Packer 2000; 2005). BIREME also cooperated in the development of the methodological and technological platform that evolved to become the SciELO Model of indexing, publishing and interoperating.

The SciELO Network is based on two rationales: library and network. The library rationale reflects the operation of collections of journals under two driving parameters – quality control in the development

of the collections and openness to best serve the users. The network rationale reflects the cooperation among countries, institutions and people, as well as the interoperability of contents from the collections that are managed in a decentralized fashion.

Each country in the SciELO Network is responsible for the governance, financing, management and operation of the corresponding national collection while following a set of common principles, compatible methodologies and technologies. The same applies to thematic SciELO collections which can involve multiple countries.

The SciELO operational framework encompasses three levels of networking: (i) social networking, involving people and institutions related to the production, intermediation and use of scholarly information; (ii) content networking related to the interoperability achieved through links between data elements; and, (iii) informed and learning environment networks related to the interchange of information and to the development of enabling environments that improve national capacities.

In SciELO's early stages, there were three important and remarkable forces that provided exceptional credibility and impetus for advancing and consolidating SciELO as a point of reference for the indexing of quality journals.

The first one was the authoritative leadership given by the prestigious and reputable institutions FAPESP, BIREME and CONICYT-Chile which were responsible for the start-up of the SciELO Network and for the selection of top national journals, based on their commitment to quality control, to start the collections.

The second one was the indexing of the SciELO open access journals by Google Scholar. This exponentially increased the number of accesses to SciELO journals, from hundreds to tens of thousands. This increase was unthinkable to many and brought attention to SciELO as a very attractive, unique and interesting solution to bringing journals online and making them visible and accessible worldwide.

The third one was the adoption of SciELO indexing as a key metric for financial support to journals in Brazil by the Ministry of Science, Technology and Innovation, and for ranking them in the evaluation of graduate program publications by the Ministry of Education. In 2002, the Ministry of Education of Chile included the number of publications in SciELO Chile journals in the model for distribution of resources to the universities (SciELO Chile 2002).

The presence and effects of these three driving forces evolved in different speeds in the other countries of the SciELO Network.

The SciELO Model for the indexing, publishing and interoperability of journal collections

The SciELO Model, or SciELO Platform, comprises the set of policies, principles, methodologies, technologies and procedures to implement, develop and operate a SciELO Collection at national or thematic levels and to integrate it into the SciELO Network.

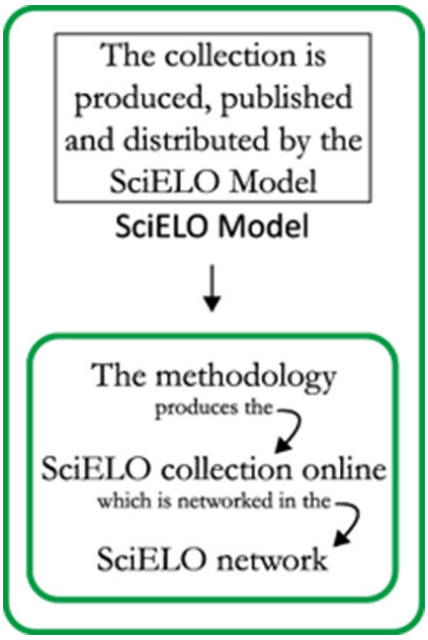


Figure 1 - The SciELO Model.

The components of the SciELO Model are: (i) the SciELO Methodology, (ii) the SciELO Collection of journals based on the SciELO Methodology; and (iii) the network of SciELO Collections.

The Model's first component is the SciELO Methodology, which enables the online indexing, publishing and interoperability of collections of academic journals.

Figure 2 - SciELO applies quality control and evaluation criteria to journals.

The online indexing component is driven by quality control criteria and procedures that are used to select journals for inclusion into the collection and for their retention. The SciELO Network has a network level indexing guideline that each national collection adapts to its local conditions.

The online publishing component follows methodologies for: (a) the cataloging of the indexed journals; (b) the structuring of the journal texts in XML format according to the SciELO standard DTD; (c) the storage of the formatted texts in databases; (d) the online publication in HTML, PDF and increasingly in ePUB format; (e) the logging of transactions for the production of statistics and bibliometric indicators; and, (f) the applications and interfaces that are used by users to retrieve the texts and bibliometric indicators.

The interoperability is based on Web standards for the export, interchange and exposure for harvesting of the SciELO contents. Interope-

rability is meant to maximize the presence and visibility of the SciELO collections as a whole, and of the individual journals and articles in the many Web services and indexes available on the Internet.

The SciELO Methodology is freely available to all members of the Network. It is also applied by others to collections outside of the SciELO Network. The SciELO Program is responsible for the development and maintenance of the SciELO Methodology and does so through the SciELO Brazil National Coordinating Institution which produces SciELO Brazil, the SciELO National Collection for Brazil. The SciELO Brazil National Coordinating Institution, described in more detail in the section "The SciELO Network Structure and Functioning" of this chapter, shares the SciELO Methodology with the other national coordinating institutions in the Network of national SciELO collections, and also provides the required technical support. The on-going development of the methodology is open to all members of the Network.

The Model's second component is the SciELO Collection of Journals, which results from the application of the SciELO Methodology to the creation and operation of online national or thematic collections of journals. This component involves the governance, management, production and online operation of a SciELO Collection.

The implementation and development of a national collection in a country according to the SciELO methodology follows three main steps: (i) a closed pilot project with the operation of 3 to 5 journals with the objective of learning the methodology and the setting up of the necessary technological infrastructure prior to going live; (ii) the publication of the collection online and going live as a trial or as an "in-development" collection until compliance with SciELO requirements for certification is achieved; and (iii) the development and full operation of the certified collection online with access to all network services.

A SciELO collection is certified when it meets the following conditions:

- The National Coordinating Institution has been established;
- The Advisory Committee has been established and is operating regularly;
- The scope and composition of the Collection has been published;
- Opens Access and Creative Commons licenses have been adopted;
- Interoperability with the SciELO Network has been accomplished by the integration of the Web services;
- The "Guide of Policies and Assessment Criteria of Journals for Inclusion and Retention in the SciELO Collection" has been approved by the Advisory Committee and made publicly available on the collection site.

SciELO Collections are periodically evaluated using the SciELO Model as a reference. The evaluation of the SciELO Collections is an integral part of the SciELO Program related to its purpose of contributing to the continuous improvement of its published academic journals, and to the development and strengthening of infrastructures and national capacities.

Periodic evaluation, carried out every four months, is essential to ensure that the SciELO Network operates in a decentralized manner, but following the same methodology and technology.

The pioneer collection was SciELO Brazil <http://www.scielo.br> which was launched in March 1998 after a one-year pilot project that actually also gave birth to the SciELO methodology.

The Model's third component is the actual SciELO Network of SciELO Collections, which involves the cooperation and interoperability among each of the national and thematic collections and their integration through the global Portal of National Collections – <www.scielo.org>. This component of the Model supports the cooperation among countries to maximize the visibility, accessibility, usage and impact of articles, journals, collections of journals and the network of collections. As stated earlier, the SciELO Network concept and ope-

ration are based on the VHL (Virtual Health Library) methodology developed by BIREME/PAHO/WHO.

Figure 3 - The SciELO Network of Interoperable National SciELO Collections.

The updating of the three components of the SciELO Model is carried out in a coordinated way. Each new modification is first tested in one or two collections prior to its dissemination to all collections in the network.

The SciELO Network: state of development

As of August 2013, the SciELO Network is composed of 16 countries, each represented by a corresponding national journal collection. The participating countries are primarily from Latin America and the Caribbean but also include Portugal, Spain and South Africa. There are also thematic collections which are developed at regional and global levels. The SciELO Public Health Collection, for example, includes journals from Latin America, Spain, Italy and the United States in addition to journals from the World Health Organization.

The distribution of journals and articles as of August 2013 is represented in Table 2 for SciELO certified national collections, in Table 3 for national collections in development and in Table 4 for thematic collections.

Table 2 - SciELO Certified Collections: distribution of journals in 2013 and articles as of August 2013.

SciELO Network - Certified Collections - journals and articles in 2013									
Country	Starting year in SciELO Network	Journals				Documents			
		Actives		No Active	Total	All Years		2013	
		n	%			n	%	n	%
Argentina	2004	102	11%	2	104	19 266	5%	632	3%
Brazil	1997	275	30%	49	324	242 781	57%	11 701	61%
Chile	1998	92	10%	11	103	38 879	9%	1 318	7%
Colombia	2004	156	17%	-	156	32 113	7%	1 327	7%
Costa Rica	2000	13	1%	5	18	4 911	1%	270	1%
Cuba	2001	44	5%	4	48	20 370	5%	1 152	6%
Mexico	2003	104	12%	9	113	17 639	4%	603	3%
Portugal	2004	26	3%	18	44	7 604	2%	247	1%
South Africa	2009	28	3%	-	28	6 146	1%	839	4%
Spain	2001	35	4%	18	53	24 202	6%	883	5%
Venezuela	2000	28	3%	25	53	14 622	3%	67	0%
Total		903	100%	141	1 044	427 633	100%	19 049	100%

Source: SciELO Global Portal http://www.scielo.org August 2013

Table 3 - Number of journals in Collections in Development by country.

SciELO Network - In Development Collections - journals and articles in 2013				
Country	Starting year in SciELO Network	Active Journals	Documents	
			All years	2013
Bolivia	2009	14	2 507	285
Paraguay	2007	7	547	0
Peru	2004	15	5 217	304
Uruguay	2005	10	1 909	74
Jamaica	2006	1	1 090	0
Total		47	11 270	663

Source: SciELO Global Portal http://www.scielo.org August 2013

Table 4 - Number of journals by Thematic Collection.

SciELO Network - Thematic Collections - journals and articles in 2013				
Thematic Area	**Starting year in SciELO Network**	**Active Journals**	**Documents**	
			All years	**2013**
Public Health (a)	2000	15	26 090	1 025
Social Sciences (b)	2006	33	665	-
Total		48	26 755	1 025
(a) 11 journals from national collections				
(b) interrupted in 2010				

Source: SciELO Global Portal http://www.scielo.org August 2013.

The SciELO Network structure and functioning

The SciELO Network is a fully decentralized network, with the following common governance, managerial and operating principles:

- One unique national collection per country, under the overall leadership of a national institution related to research, preferably a research funding agency. This leadership is essential to positioning the development of SciELO as an integral component of the national research infrastructure. This principle implies that there will always be one national SciELO Collection portal per country;
- One institution responsible for the coordination of the operation of the national collection. This institution, called the National Coordinating Institution, represents the national collection in the SciELO Network and therefore is formally recognized as such in the relationship with the other national coordinating institutions in the Network. A formal relationship is required with SciELO Brazil regarding network coordination and secretariat activities;
- SciELO Brazil is responsible for the maintenance of the methodologies and the technologies, and the related technical support for proper testing and distribution of new versions to the SciELO Network. In addition, SciELO Brazil is responsible for the maintenance of the global Portal of National Collections, and for the interoperability of the contents within the SciELO Network and with Web systems, services and indexes. It is also responsible for the periodic follow-up of the performance of the individual collections to review their status within the Network. It organizes periodic online meetings to share new developments, experiences, lessons learned and challenges.

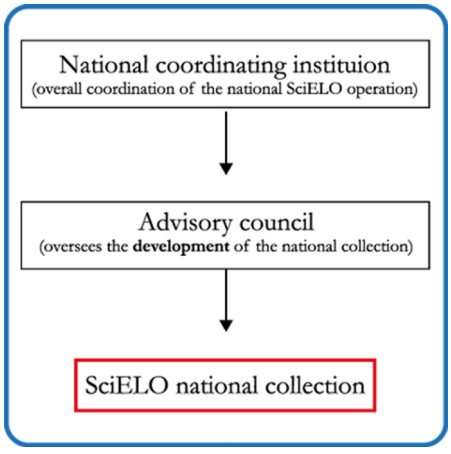


Figure 4 - Governance structure of a SciELO National Collection operation.

Based on these principles, the governance of a SciELO National Collection is generally led by a national institution related to research that takes on the responsibility for the financial viability and sustainability of the National Collection, and for the execution of the functions required to develop, publish and promote it.

The current general governance structure in the SciELO Network is implemented as shown in Table 5.

Table 5- SciELO Governing institutions and roles by country.

Country	**Institution & role**
Argentina	Political and financial: *Consejo Nacional de Investigaciones Científicas y Técnicas* (CONICET).
	Operational*: Centro Argentino de Información Científica y Tecnológica* (CAICYT-CONICET).
Bolivia	Political: *Viceministro de Ciencia y Tecnología; Ministerio de Educación*.
	Financial*: Viceministro de Ciencia y Tecnología; Pan American Health Organization* (PAHO).
	Operational *Viceministro de Ciencia y Tecnología;) and Universidad Mayor de San Andrés*.
Brazil	Political and financial: *Fundação de Amparo à Pesquisa do Estado de São Paulo* (FAPESP) and *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (CNPq).
	Operational: *Fundação de Apoio à Universidade Federal de São Paulo* (FapUNIFESP).
Chile	Political, financial and operational: *Comisión Nacional de Investigación Científica y Tecnológica* (CONICYT).
Colombia	Political : *Departamento Administrativo de Ciencia*, *Tecnología e Innovación* (Colciencias)
	Financial: *Instituto de Salud Pública de la Universidad Nacional de Colombia; Vicerrectoría de Investigación de la Universidad Nacional de Colombia*;
	Operational: *Instituto de Salud Pública* , *Universidad Nacional de Colombia*.

Continue...

Continuation...

Country	Institution & role
Costa Rica	Financial: *Biblioteca Nacional de Salud y Seguridad Social* (BINASS-SS) and *Vicerrectoria de Investigacion*.
	Operational: : *Biblioteca Nacional de Salud y Seguridad Social* (BINASSS) and *Caja Costarricense de Seguro Social*(CCSS)
Cuba	Political: *Ministerio de Salud Pública and Consejo Nacional de las Sociedades Científicas de la Salud*.
	Financial and operational: *Ministerio de Salud Pública and Centro Nacional de Información de Ciencias Médicas*.
Mexico	Political and financial: *Consorcio Nacional de Recursos de Información Científica y Tecnológica* (CONRICYT) and *Universidad Nacional Autónoma de México* (UNAM)
	Operational: *Dirección General de Bibliotecas* (DGB-UNAM)
Paraguay	Political, financial and operational: *Instituto de Investigaciones en Ciencias de la Salud*, *Universidad Nacional de Asunción* (IICS-UNA).
Peru	Political and financial: *Consejo Nacional de Ciencia*, *Tecnología e Innovación Tecnológica* (- CONCYTEC).
	Operational: *Universidad Nacional Mayor de San Marcos*.
Portugal	Political, financial and operational: *Direção-Geral de Estatísticas da Educação e Ciência* (DGEEC-) , *Ministério da Educação e Ciência*.
South Africa	Political: Department of Science and Technology; and Department of Higher Education and Training.
	Financial and Operational: Academy of Science of South Africa (ASSAf)
Spain	Political and financial *Ministerio de Economía y Competitividad*
	Operational: *Biblioteca Nacional de Ciencias de la Salud Instituto de Salud de Salud Carlos III*..
Uruguay	Financial and Operational: *Biblioteca Nacional de Medicina*. *Centro Nacional de Información en Medicina y Ciencias de la Salud* (BINAME-CENDIM), *Facultad de Medicina* , *Universidad de la República* (Udelar).
Venezuela	Political: *Centro Nacional de Innovación Tecnológica* (Cenit) ; Financial and Operational: *Fundación Sistema Nacional de Documentación e Información Biomédica* (Fundasinadib);

In summary, the current general governance structure in each of the countries shows that National Science Councils and Ministries or their dependencies play a crucial role in the political support to a National Coordinating Institution, and that universities play a critical role in providing operational support in addition to partial financing.

This can be seen more clearly in the figure below which is a graphical representation of Table 5.

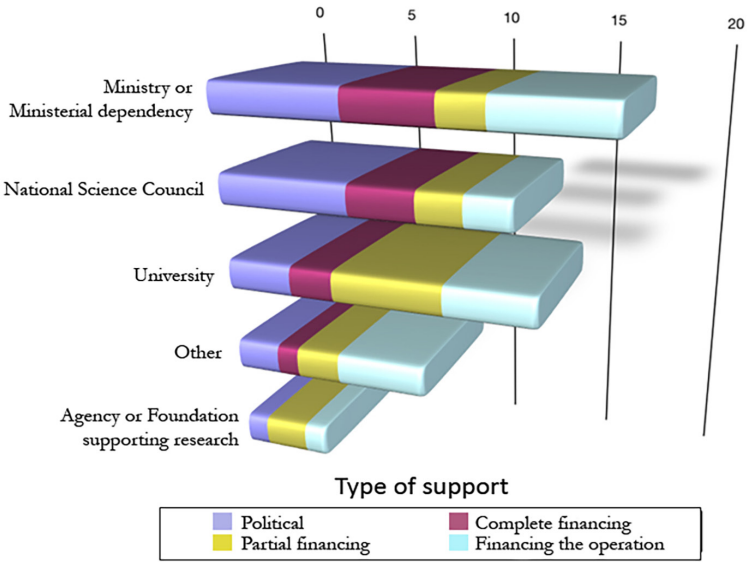


Figure 5 - Graphical representation of Table 5 - governing institutions and roles.

More specifically, the management of a SciELO Collection is led by a National Coordinating Institution that oversees its development and operation, usually under the guidance of an Advisory Committee with periodic follow-up carried out by SciELO Brazil. In many cases the institution responsible for the overall political leadership and funding of a National Collection also plays the role of the National Coordinating Institution. The current National Coordinating Institutions are listed in Table 6.

Table 6 - SciELO National Coordinating Institutions by country.

Country	**SciELO National Coordinating Institution**
Argentina	*Centro Argentino de Información Científica y Tecnológica* (CAICYT-CONICET).
Bolivia	*Viceministerio de Ciencia y Tecnología*.
Brazil	SciELO Brazil/ *Fundação de Apoio à Universidade Federal de São Paulo* (FapUNIFESP.
Chile	*Comisión Nacional de Investigación Científica y Tecnológica* (CONICYT).
Colombia	*Instituto de Salud Pública* , *Universidad Nacional de Colombia*.
Costa Rica	*Biblioteca Nacional de Salud y Seguridad Social* (BINASSS).
Cuba	*Centro Nacional de Información de Ciencias Médicas*.
Mexico	*Dirección General de Bibliotecas* , *Universidad Nacional Autónoma de México* (DGB-UNAM)
Paraguay	*Instituto de Investigaciones en Ciencias de la Salud*, *Universidad Nacional de Asunción* (IICS-UNA)
Peru	*Consejo Nacional de Ciencia*, *Tecnología e Innovación Tecnológica* (CONCYTEC).
Portugal	*Direção-Geral de Estatísticas da Educação e Ciência DGEEC-* , *Ministério da Educação e Ciência*.
South Africa	*Academy of Science of South Africa* (ASSAf).
Spain	*Biblioteca Nacional de Ciencias de la Salud*, *Instituto de Salud Carlos III*.
Uruguay	*Biblioteca Nacional de Medicina*, *Centro Nacional de Información en Medicina y Ciencias de la Salud* (BINAME-CENDIM), *Facultad de Medicina* , *Universidad de la República* (Udelar).
Venezuela	*Fundación Sistema Nacional de Documentación e Información Biomédica* (Fundasinadib)

The Advisory Committee oversees the development of the National Collection, including the indexing function and the inclusion of new journals and the retention of already existing and indexed journals in the collection. The Advisory Committee may also review the performance of the National Collection and of the individual journals for usage and impact, and recommend appropriate actions.

The presence and functioning of an Advisory Committee by country collection is described in Table 7.

Table 7 - SciELO Advisory Committee by country.

Country	**SciELO Advisory Committee**
Argentina	Selected by Board of CONICET; Members are leading researchers, technologists, editors and university professors from the different disciplines.
Bolivia	Does not have a formal Advisory Committee. It has the active participation of journal publishers, many of which are university presses, and representatives from PAHO and the Ministry of Science and Technology that jointly evaluate journals for inclusion and retention in the national collection.
Brazil	Members are 1) Operational Coordination of SciELO Brazil; 2) representative from ABEC, the Brazilian Association of Scientific Editors; 3) representative from FAPESP; 4) representative from CNPq; 5) representative from CAPES; 5) five scientific editors representing the disciplines of Agricultural Sciences, Biology, Exact Sciences, Humanities and Social Sciences, Linguistics and Fine Arts.
Chile	An Advisory Committee is being formed and invitations have been sent out for representatives to be selected from each of the disciplines.
Colombia	Journal evaluations are done by the National Advisory Committee. Prior evaluation of the contents is done by an evaluator selected from a list of evaluators by discipline.
Costa Rica	Members are renowned researchers from the different disciplines of the National Collection..
Cuba	Members are a president, a secretary and eight other members renowned for their research and their publications.

Continue...

Continuation...

Country	SciELO Advisory Committee
Mexico	The Journals Committee of CONACYT acts as the Advisory Committee.
Paraguay	Members are from the publishers of the journals in the SciELO National Collection.
Peru	There is one representative from each of the publishers that publish the following journals: 1) the Revista Peruana de Biología, 2) the Revista Peruana de Medicina Experimental; 3) the Revista de la Sociedad Química del Perú; 4) the Director of the Council for Science and Technology, CONCYTEC; and 5) the Director of Systems and Communication of CONCYTEC.
Portugal	Members are leading researchers, editors, publishers and university professors from the different disciplines.
South Africa	Members are 1) Chair of the Committee on Scholarly Publishing in South Africa, 2) Director, Scholarly Publishing Programme (ASSAf), 3) ASSAf project Officer, 4) ASSAf members who are experts in the field, related fields and an expert of another field to ensure objectivity. These panel members are not allowed to be current editors within the field being evaluated.
Spain	Members are leading researchers, technologists, editors, publishers and university professors from the different disciplines.
Uruguay	Members are 1) one representative from ANII; 2) one representative from FNR; 3) one representative from publishers in the area of health; 4) one representative from publishers in other disciplines; 5) one representative from the SciELO National Coordinating Institution.
Venezuela	Fonacit had a well structured committee between 2002 and 2009 whose members were leading researchers and technologists. Fonacit issued official calls for the annual evaluation of journals for entry into the National Register of Journals and for which journals to finance for inclusion in SciELO Venezuela. Currently the evaluations are done by a committee of SciELO Venezuela formed specifically to undertake that task.

Conclusions

The development of the SciELO Network is a common endeavor yet with a focus on national conditions and priorities. Most of the collections are an integral part of the national infrastructure of research and are supported by national policies on academic information. The fully decentralized operation of each collection following common principles, methodologies and technologies is a key feature of their sustainable development. At the same time, the continued interchange of information and experiences among the national coordinating institutions combined with the periodic evaluation of collection and journal performance contributes to the advancement of the Network as an international program of cooperation oriented to the progress of research and the democratization of academic information.

SciELO in numbers

SciELO National Collections

August 2013

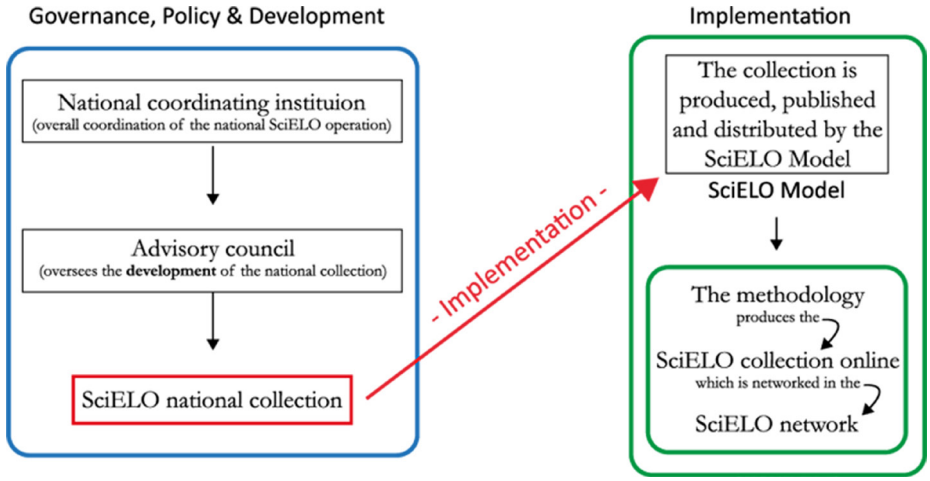
Total across all collections

1,022 Journals
28,781 Issues
425,654 Articles
9,319,095 Citations

Thematic collections

Public Health
Social Sciences

SciELO in concepts



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Chapter 4 – Criteria for the Selection of Journals to Index and Publish in the SciELO Network Collections

Fabiana Montanari and Abel L. Packer

Introduction

The SciELO Network indexes and publishes collections that consist of peer-reviewed journals of an academic nature that conform to minimum quality criteria which have been established for the network as a whole. The journal evaluation process is decentralized and carried out by the SciELO Network and is the responsibility of the coordinating institutions of the national collections. This is reflected in the composition of the advisory committees and in the adaptation of evaluation criteria to meet the particular needs of the academic output of each country which is communicated in its journals.

The indexing of journals is an integral part of international scholarly communication. This process consists of the systematic harvesting of metadata (or of the bibliographic record) which identify the articles and other types of content which have been published by the academic journals that participate in the indexes. The metadata is arranged in bibliographic indexes with the objective of establishing a systematic monitoring and record of published research. This metadata also acts as a reference source for users searching for academic information in support of their own research or as a way of measuring the academic output relating to countries and geographical regions in general, thematic areas, institutions, research groups and individual researchers.

The indexes which take the form of catalogs were originally published in print form and, from the end of the 1960's, these were arranged in databases which were loaded onto computer systems. With the

emergence of the Internet, these bibliographic indexes moved into an online environment with progress being made towards the possibility of universal access. Their importance grew in the academic and research policy arenas since they acted as sources of reference information which could be used to identify and measure the academic output of countries, institutions, research groups and even individual researchers. The communication of research results in indexed journals therefore achieved the consensus of the researchers and systems used to evaluate academic output.

Over the last two decades this state of affairs experienced renewed growth with the appearance of the ranking of journals by Impact Factor. This created a critical situation for journals produced by developing countries which were not in a position to monitor developments in indexing on an international level, and whose journals generally registered a low Impact Factor. It was at this juncture that the SciELO Program was created in 1998 with the objective of developing a leading organization for the indexing of quality national journals which would complement international indexes and count upon the active participation of the academic community of each country (Packer and Meneghini 2007; Packer 2009). One of the conditions and objectives of the program was to promote the indexing of journals in their corresponding national collections, based on the quality of the content and its communication, as well as its improvement. The program therefore established guidelines for the evaluation of journal quality and, in this way, support by example the processes used in the indexing of the SciELO collections.

This chapter describes the origin, the make up and application of the common evaluation criteria for the evaluation of the SciELO Network journals and their adaptation by the national collections.

Origin and application of the indexing criteria

The criteria which govern the evaluation of journals and support the decisions taken as to their admission and retention in the collections of the SciELO Network, as well as the policies and procedures related to their application, were originally discussed in March 1998 at "The Seminar on Evaluation Criteria and the Selection of Academic Jour-

nals", held by the State of São Paulo Research Foundation – FAPESP (*Seminário sobre Critérios de Avaliação e Seleção de Periódicos Científicos, realizado na Fundação de Amparo à Pesquisa do Estado de São Paulo* - FAPESP)

The recommendations of the seminar were adopted in the guide for the indexing of the journals in the SciELO Brazil Collection. This guide underwent timely amendments and the guidelines which were specific to Brazil were removed so that a general guide could be created for the indexing of journals by the whole SciELO Network. Even so, this general guide is adapted for each SciELO collection by taking into account the conditions and characteristics of research and scholarly communication in the respective country or within a particular thematic area.

The initial development of the SciELO Brazil Collection was based on the automatic admission of journals provided they satisfied the two following criteria. Firstly, journals which were already indexed in the ISI databases (now known as Web of Science), MEDLINE (now better known for its Web version PUBMED) and PsycInfo were admitted. Secondly, journals which scored highly in evaluation systems used by The National Council for Scientific and Technological Development (CNPq) and FAPESP to subsidize financial assistance to journals, were likewise admitted (Krzyzanowski *et al* 1991; Krzyzanowski and Ferreira 1998). This policy of automatic admission was applied up to 2001. Automatic admission was responsible for the inclusion of 73 journals into the SciELO Brazil Collection, representing 27% of the total of 277 active titles as at September 2013. Sixty four of these automatically included journals still part of the collection today.

One year on from its launch, the need to formally establish the criteria and procedures for admission to the SciELO Brazil Collection became a pressing requirement, owing to the growing demand for admission from journals which were not automatically eligible, a demand which was stimulated in large part by the growing success of SciELO. The list of journals which had been evaluated by FAPESP and CNPq totaled more than 400 titles at the time, of which little more than a third complied with the requirements which had been defined for automatic admission (Krzyzanowski and Ferreira 1998). At the same time, the development of the SciELO Program established the process of the selection of journals as the centerpiece in the achievements

of its objective of contributing to the improvement in the quality of journals. Therefore, up to 2001, the SciELO Brazil Collection operated two admission procedures: an automatic process for those journals which satisfied the selection requirements, and an evaluation process for the remaining journals. From 2002, journals began to be admitted based on the selection criteria which had been established for this. Since the start of the evaluation process, the SciELO Brazil Collection has analyzed 1,960 requests involving 888 journals, with 257 being approved. Amongst those which received approval, 177 (68.8%) were evaluated two or more times. In the same period, 13 journals were excluded from the collection because they did not fulfill the selection criteria or because they no longer published in open access.

Generally speaking, this journal selection process took place in other collections of the SciELO Network, which in a majority of cases, made it a priority that the initial collections should be made up of journals with the widest range of international indexing or which received the best scores in national evaluation systems. The evaluation criteria specific to journals of each collection were established to formalize the acceptance of journals which were not automatically eligible.

SciELO criteria and the evaluation of academic journals

The development of the SciELO Collections revolves around the admission and exclusion of journals. This process constitutes the function of indexing of the SciELO Program, whose implementation and operation is the responsibility of the coordinating institution of each collection. The process is based on the criteria, policies and common procedures for evaluation defined for use by the whole network. (SciELO 2010b). The conceptual framework and the common criteria upon which the indexing function of the SciELO Program is based are presented next.

Scope of the SciELO Collections

The SciELO Network Collections are both national and thematic in nature. The aim of the national collections is the indexing, publishing and dissemination of peer-reviewed journals published by national

and regional institutions which communicate original academic research. The national collections are both multidisciplinary and multilingual in nature. For their part, the thematic collections cover a specific subject and are regional or global in extent, as in the case of the public health collection. The journals can be published in different languages, but the majority are published in the languages of the countries of the journals, and in English.

The journals indexed by SciELO are edited and published by learned societies and professional associations, universities and research institutes, government bodies and other institutions related to research and education. Some journals are published by regional entities such as regional learned societies, but these are included in the country collection which corresponds to the city in which the journal is based. The great majority of the journals are not-for-profit. In spite of this, a small number of them are published in partnership with commercial publishers.

All journals indexed in the SciELO Collections are current and published in open access according to the frequency of each journal and without any embargo. A delay in publication is assessed as a serious failure in the performance of the management of the journal and / or the national collection. This practice of publishing journals in the SciELO Collections follows the so-called Gold Road of Open Access.

As far as possible, the SciELO Collections make available back issues of indexed journals since this is an option for the publication of complete runs of journal collections. The most noteworthy example of this is the journal "Memórias do Instituto Oswaldo Cruz" which has issues in SciELO going back more than 100 years.

The national coordinating institutions of the SciELO Network define the scope of their respective collections in accordance with their national policies and conditions while adhering to the general publishing criteria which predominate in the field of the original research, peer--review, and keeping the journals current and in open access.

SciELO criteria

The evaluation of journals according to defined criteria is an integral part of the process of creating and developing the national and thema-

tic collections, and is responsible for defining the conditions governing acceptance and retention of a journal into the SciELO Network.

It is one of the principal functions of the SciELO Program. In fact, the program came into existence with the aim of complementing international indexing practices, which historically speaking, limited the coverage of journals from developing countries, particularly in the Web of Science (WoS) and Journal Citation Reports (JCR). The coverage of international indexes has improved over the last few years, particularly with the emergence of Scopus and the widening of the indexing coverage undertaken by WoS.

However, the process of selecting journals for the SciELO collections has a particular relevance because it is carried out with the involvement of the national research community with a view to continually improve the visibility of the journals and subject areas represented in the national and thematic collections. That is to say, the principal function of SciELO's journal evaluation is to contribute to the improvement of the communication of research which is done through the national journals. In this sense, the process of journal evaluation and selection contributes to the following objectives of the SciELO Program:

- Increasing in a sustainable way the visibility and availability of full text articles, and the credibility, both nationally and internationally, of the journals indexed.
- Developing core collections of journals of increasing quality in accordance with international standards and their importance for the advancement of national research.
- Contributing to the comprehensive evaluation of national research.

The selection process is carried out based on common criteria for the evaluation of the journals. The criteria meet the following objectives:

- Gathering background information on the management and operation of the journals submitted to the selection process of the SciELO Collection, their performance taking into consideration articles published in the last three issues, their presence in other bibliographic indexes, as well as the number of citations the journals already indexed in SciELO have received. This is to provide

evidence to support the decisions to be taken in the process of admitting new journals;

- Monitoring the performance of the journals already indexed to support the processes of evaluation for retention in the collection;
- Producing performance indicators for the journal collections.

The SciELO criteria analyze and measure the performance of the journals according to: the academic nature of the contents published; the explicit adoption of peer review in the evaluation of submissions; the representation of the editorial committee of the research community of the discipline or area in question; the flow of articles as measured by the number of articles published; the frequency and timeliness with which they are published; the compliance with ethical standards of research; and how the results are communicated and the bibliographic standards used from the academic publishing industry. These criteria apply to the evaluation which is carried out for the inclusion of new journals as well as to the retention of journals already in the collection.

Figure 1 highlights the main criteria used in the evaluation of academic journals:

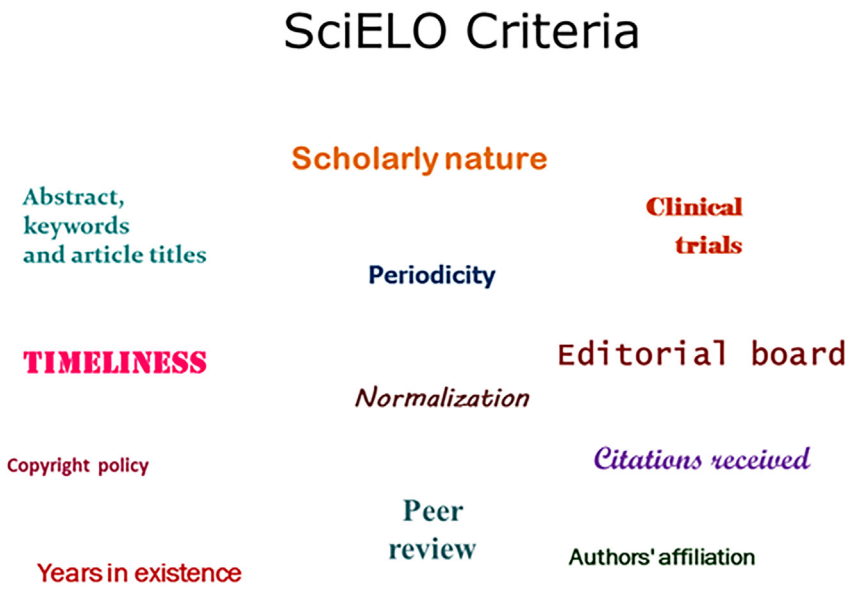

Figure 1 - 1 List of criteria used by SciELO to evaluate journals

The SciELO Criteria can be grouped as follows, according to the objective of the evaluation:

- **Formal aspects:** includes a review of the standards, structure and organization of the journal content based on different bibliographic standards (ISO -International Organization for Standardization; International Committee of Medical Journal Editors; Vancouver Style; APA Style -American Psychological Association; and ABNT - Brazilian Association of Technical Standards, among others). Among the aspects taken into account in the analysis are: a statement with complete details of the affiliations of the authors, the members of the editorial body and the ad hoc reviewers; the publication of the procedures adopted by the journal for the analysis and evaluation of submissions (peer review) which are usually part of the guidelines to authors; the complete institutional affiliations of all the authors, and a statement in the articles themselves with the principal dates of the peer review process (date of receipt and approval) for the submissions; and prior registration of clinical trials. The attention given to the formal aspects is directly related to the quality of the metadata collected during the indexing and generation of the bibliometric indicators.
- **Editorial flow:** takes into account the analysis of the timeliness and frequency of publication, the number of articles published in a year, the rejection rate, and the time taken to process submissions. Aspects such as these make up indicators of the production flows of academic output that is communicated via journals, with the benchmark values dependent upon the subject area in which the journal is classified and the characteristics of the country of publication. They also indicate the timeliness and speed of communication. Nevertheless the timely publication of journals is a determining factor in the evaluation because journals with delays in publishing are not included in the selection process for inclusion in SciELO and are liable to be excluded if already indexed.
- **Scholarly content:** includes the analysis of the academic nature of the journal and the quality of the articles. In particular, it analyses: the percentage of original articles; consistency of the articles

with the thematic focus of the journal; quality of the methodology, tables, and graphic elements; and the representativeness and contribution made to the development of the subject area and to the SciELO collection. An analysis of the academic content is carried out with the participation of the academic community drawn from the different subject areas and countries. A central issue in the analysis of the content is identifying the quality of the process of evaluation of the submissions.

- **Impact:** analyzes the number of citations received from the journals indexed in the SciELO collection and in the other indexes in which the journal is also indexed. The analysis of these aspects takes into consideration the benchmark values of each subject area in which the journal is classified. The application of this criterion, in the case of citations received from SciELO journals, depends upon the number of journals and articles already indexed.
- **Editorial management:** involves the analysis of the aspects related to the process of submissions; efficiency of the editorial and graphic production; composition of and representativeness of the editorial board; efficiency in administration, and the penetration of the journal in national, regional and international contexts;

These criteria are adapted to the specific needs of the national and thematic collections of the SciELO Network. These "nationalized" criteria, i.e. criteria adapted to a national collection, must be published on the Web portal of the national collection. The national collections also have usage statistics based on the number of accesses and downloads, and on bibliometric indicators based on citations. These statistics and indicators are generated by the SciELO platform itself and are updated weekly.

The approved journals must comply with all of the criteria at the time of admission, or undertake the commitment to comply with them after a period of time, such as occurs in the case of quality journals that do not publish the required number of articles or those whose editorial boards require a broader representativeness. The granting of a period of time to completely fulfill the criteria comes from SciELO's objective of developing capacities and capabilities. In many cases, indexing enables the complete fulfillment of the criteria since journals,

once indexed, receive more visibility, more recognition by evaluation systems and thus more submissions, thereby driving the journals towards fulfilling the criteria within the given time period.

Based on fulfillment of the above criteria, the national coordinating institutions can take the option of having the journals automatically admitted, a process which mainly takes place during the initial creation of their collections. In general, journals that belong to any recognized international index or to a national indexing and/or journal evaluation system, are eligible for automatic admission.

All the criteria used to referee the admission of journals into the SciELO collections also apply to their evaluation for retention, which includes additional criteria, such as: the timeliness in sending the files to SciELO which is considered an indicator of the timeliness of publication; indicators of journal usage based on the number of accesses and downloads; and citation indicators of citations received in total and per article.

In the case of an unfavorable outcome of the evaluation of a journal's performance, the publisher is notified of the improvements that need to be made and which must be addressed within the established time frame. In rare cases, especially for those concerning delays in publication, the journals are excluded from the collections. The exclusion of journals from the SciELO collections does not affect ongoing access to issues already in the collections.

In decisions regarding both the admission and retention of journals, the publishers who believe that they have been penalized have the right to appeal. The outcome of any reassessment of the criteria elements in question may be to uphold the original decision or reverse it partially or in its entirety. In many cases, the analysis of the criteria elements in question brings about a complete re-evaluation of the journal in question.

The application of the criteria of journal evaluation for the admission of new titles or for the retention of titles already indexed in the SciELO national and thematic collections, as well as the analysis of the resources of the journals submitted for selection, are the responsibility of the respective national coordinating institutions which should

be able to rely on the support of an advisory committee composed of representatives of the academic community of the respective country. This committee is defined in the common criteria as the SciELO Collection Advisory Committee.

The SciELO Advisory Committee: composition and functions

The creation and development of the national and thematic collections in the SciELO Network are the responsibilities of the national coordinating institutions that must be supported by Advisory Committees of an academic nature and be representative of the national research community. The establishment of advisory committees is an integral part of the journal selection system of the SciELO Network and is provided for in the guide to the common criteria for evaluating journals. On the one hand, the committee ensures SciELO's place as part of the national infrastructure of research and scholarly communication. On the other hand, it ensures the neutrality of decisions and the transparency of process, conditions that are considered fundamental to the development of national and thematic collections.

In the common criteria, the Advisory Committees are responsible for analyzing, discussing and making recommendations in the following areas and lines of action:

- Improvement of the academic nature of national and thematic collections as a whole and of the individual journals;
- Inclusion of new journals in the collections;
- Exclusion of journals from the collection;
- Periodic evaluation of the performance of the collection as a whole and of the individual journals based on statistical and bibliometric indicators of usage and impact;
- Updating the evaluation criteria for admission and retention of journals in the collection;
- Defining and improving the functioning of the Committee in order to achieve the above mentioned goals in an efficient manner.

The composition of the Advisory Committees follows a model that includes researcher editors who represent all the publishers of the journals of the SciELO collection, and representatives of institutions that support research and scholarly communication. The compositions of the committees vary in the different national and thematic collections since the compositions reflect the peculiarities of scholarly communication in the countries that participate in the SciELO Network.

Following this model which brings together an Advisory Committee made up of representatives of publishers and institutions which support research and scholarly communication are the journal collections of South Africa, Brazil, Costa Rica, Cuba, Mexico, Peru and Uruguay. The Spanish and Chilean collections have committees composed of researchers from the different subject areas. In Portugal, the committee is composed of directors of different universities and faculties in the country. The creation of the Bolivian SciELO Collection is carried out by a group of academic publishers while SciELO Argentina, in addition to academic publishers, also has researchers in the different subject areas.

The Advisory Committees meet regularly to evaluate requests for the inclusion of journals in the collections, as well as to monitor the performance of the journals admitted. The committees may also depend upon the participation of external experts and consultants in their meetings and activities. The frequency with which the Advisory Committees meet and when they review applications for admission and retention of journals can vary from collection to collection.

The meetings to evaluate applications for admission to the collections of the SciELO Network occur once a year in South Africa, Costa Rica, Spain and Mexico; twice a year in Bolivia, Chile, Cuba, Peru and Portugal, and at least every three months in Argentina, Brazil, Colombia and Uruguay.

In turn, the meetings to evaluate the retention of journals in the collections are carried out annually in Bolivia, Chile, Costa Rica, Spain, Mexico and Portugal; semiannually in South Africa, Colombia, Peru and Uruguay, and at least quarterly in Argentina, Brazil and Cuba.

In the case of Brazil, due to the high demand of journals from different fields of knowledge, the national Advisory Committee has proposed the establishment of specific committees to analyze sets of journals from a particular area. The conclusions and recommendations of these committees are assessed by the national committee for final decision. In recent years, SciELO Brazil has carried out specific evaluations of journals from the following disciplines: nursing, physiotherapy, physical education and dentistry.

The national coordinating institutions of the SciELO Network act as the executive secretariats of the advisory committees responsible for scheduling, organizing meetings, and preparing background papers and recording the conclusions and recommendations which result from the meetings.

Conclusions

The selection of journals for indexing, understood as the set of criteria and procedures systematically applied to the evaluation of the performance of journals with the objective of deciding their admission and retention in the collections of the SciELO Network, is one of the essential functions of the SciELO Program in the sense that it identifies quality journals and journals of merit to be indexed, and contributes to their systematic improvement in terms of their editorial management, adherence to standards and recommended practices in scholarly communication. The selection of journals is carried out in each country with the support of the academic community in order to promote the comprehensive coverage of all subject areas and the transparency of the evaluation processes, thus complementing the international indexes. The development of national capacities in editing and publication is part of and a result of this selection process, and contributes to progress in national research.

The evaluation of the performance of the journals bestows upon the national coordinating institutions of the SciELO Network, the national development agencies, the evaluation systems for academic output, the

editors of the institutions responsible for the journals and the researchers with updated indicators on the results achieved by the SciELO collection, by the journals and the research they communicate.

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Chapter 5 - Production of SciELO Collections and Journals

Solange M. Santos and Abel L. Packer

Introduction

The SciELO Model encompasses a set of methodologies and technologies to create, develop, operate and interoperate decentralized collections of Open Access journals. A collection is created starting with a few journals, usually 3 to 5, to learn the model and the related processes. Once a collection is working properly it is published on the Web on an experimental basis until it meets the criteria to become a SciELO Certified Collection and therefore be indexed in the SciELO Network portal and entitled to use all the network features and services. In all these steps, the production of the collection as a whole and of each individual journal follows the same procedures with adaptations to national conditions. The production target is to have the collection and its journals available on the Web and updated regularly. All collections have the same storage and retrieval applications and procedures, which facilitate the cooperation among the network secretariats and teams on the maintenance, updates and solutions to problems, and on the exchange of experiences and solutions.

As stated in an earlier chapter, SciELO was developed as a pilot project running from March 1997 to February 1998. This period was dedicated to the development of the methodology and technology for the publication of journals in full text on the Web as part of a collection. The pilot project had the active participation of editors of 10 selected journals from different subject areas, which made up the first SciELO Brazil collection.

The SciELO project was formulated with two concurrent objectives. The first was to move journals to online publishing on the Web. The second was to address the chronic problem of visibility that was affecting academic journals in developing countries (Gibbs 1995). To address the complexity of online journal publication, and also to structure a full text database with associated bibliometric indicators, SciELO developed a methodology that included the pioneering use in Latin America of the Standard Generalized Markup Language (SGML) to structure document sections, paragraphs and bibliometric elements that would enable the creation of a bibliographic index as well as an integrated monitoring of journal performance.

The pilot project succeeded in having the participation of well-known and respected national journals, which helped to address and overcome the many issues and resistance raised by the pioneering activities of SciELO in the production of online journals such as: the perception by many that quality would be affected by online publishing; the problem of preservation of digital contents because of the rapid obsolescence of technologies; security concerns and data integrity; ensuring property rights and copyright; loss of subscriptions, and so on. When SciELO started, only a few Latin American journals tried out the online publication model. The majority were not in a position to do this.

This chapter describes the SciELO Collection standardized production processes and procedures, and the main adaptations made and implemented by the different national collections.

The foundations of the SciELO Collections and journal publishing

When SciELO was launched, digital online publishing was in its infancy. There were enormous technological barriers and much resistance from publishers, editors, readers, and others in the field. There was also the perception that digital online publishing was not something done by quality journals. SciELO had three major strengths on its

side to help to overcome these barriers and resistance: first, the credibility and respect of FAPESP among researchers, and of BIREME in the academic information storage and retrieval community; second, the acceptance by 10 top Brazilian journals to participate in the pilot project; and, third, a methodological approach that did not interfere with the traditional production of the print journals.

Thus, the basic production methodology of SciELO journals starts when the final edited files are available in PDF or in another print ready format from desktop publishing software, such as InDesign, FrameMaker and Ventura. The journals selected to be indexed and published by SciELO in the pilot had committed to sending the files to the SciELO secretariat to be marked up, loaded into the database and subsequently made available for online retrieval and exchange on the Web (Figure 1). The workflow that SciELO developed to publish online journals ran in parallel with the workflow of the print version which continued to be carried out by the journal publishers (Figure 2).

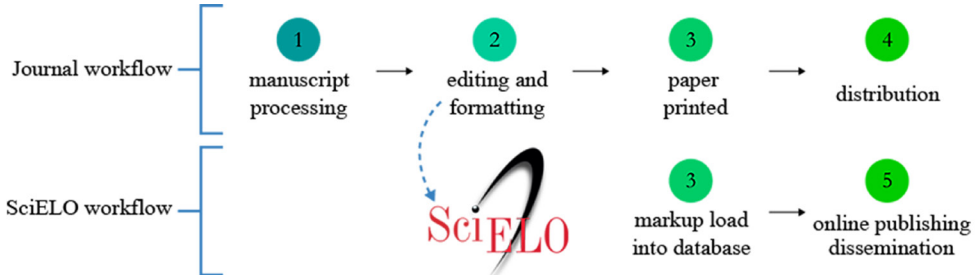

Figure 1 - SciELO online journal production workflow in parallel with the journal workflow for the print version.

The original files received from the journal publishers were converted to plain text coded in HTML format (HyperText Markup Language) to be marked-up according to the SciELO SGML structure, and then stored in a database for online publishing and distribution.

This production workflow approach, based on HTML files, had been in place since SciELO was launched in 1998 and is being used by the 16 national collections. In 2013, SciELO adopted a new workflow based on full XML texts.

Publishing workflow based on HTML

The original basic workflow of the operation of a SciELO collection begins with the receipt of the full text digital files sent by the journal publishers to the SciELO collection operational unit.

The text are converted to HTML format to preserve the integrity of the original text and to have its main structure and bibliographic metadata elements marked-up according to the ISO general standard 8879/1986 SGML (Standard Generalized Markup Language), and specifically to the SciELO DTDs (Document Type Definition) available at <http://www.scielo.org/php/level.php?lang=en&component=42&item=4>. Figure 2 shows the basic elements of the SciELO DTD. The markup process structures the article into three main parts: in the front, it identifies the metadata elements that generate the bibliographic record; in the body, it identifies each paragraph of the full text; and, in the back, it identifies the references cited by the article. The marked-up text is loaded into a database to generate the bibliographic index for retrieval and interoperability, the full text for publishing and distribution, and the citation-based bibliometric indicators.

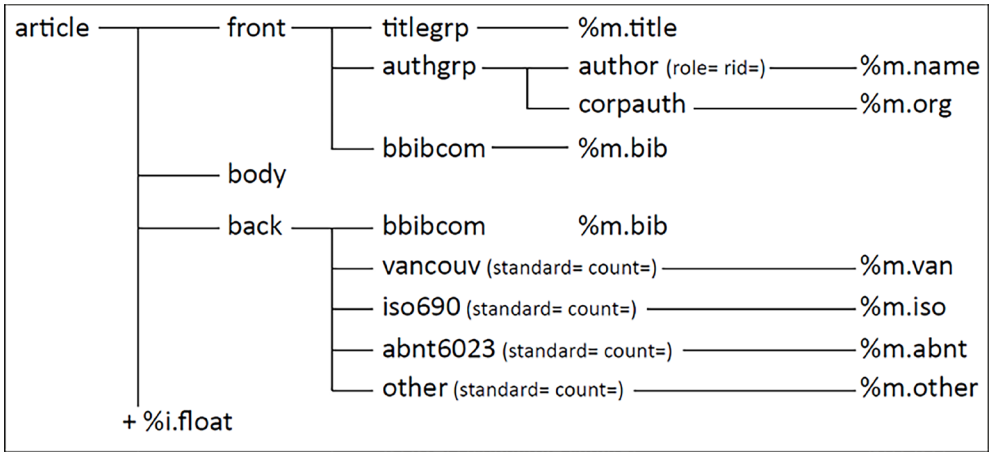

Figure 2 - The main structure of a SciELO digital article that is used in the publishing workflow based on HTML.

The SciELO database is updated to an Internet server for online operation and further processing. From the bibliographic index database, the metadata of the full texts is then extracted and exported to external databases, such as LILACS (Latin American and Caribbean Health Sciences Literature), PUBMED/MEDLINE, Web of Science, Google Scholar, CrossRef, etc. The metadata has embedded backward links to the full text in SciELO.

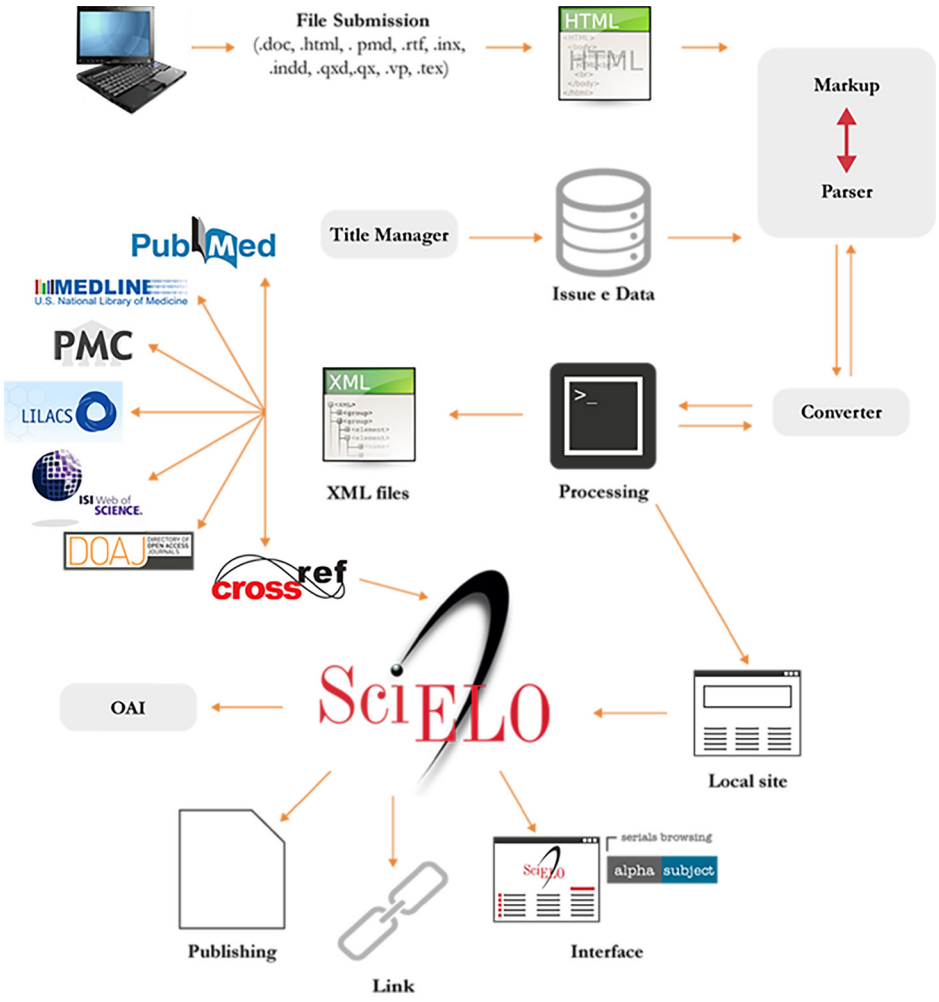

Figure 3 - The SciELO journal publishing workflow based on HTML text files..

The principal steps in the SciELO production workflows shown in Figure 3 are briefly described as follows:

1. SciELO receives the digital files that are sent by the publishers in several different formats.
2. All non-HTML files received are converted to HTML.
3. The markup process is carried out on the HTML texts with quality control to ensure the integrity of the texts, links, images, and the correct identification of the bibliographic elements (metadata);
4. The files are loaded to a local database server with an in-house Web interface in which the quality control is carried out before the journals are made available on the public site;
5. The files are transferred to the public server to operate in open access via the public Web interface.
6. Once the SciELO database is updated, the article metadata is exported to national and international bibliographic indexes and databases so that the articles become widely available on the Web.

The SciELO publishing model and, more specifically, the methodological and technological components, are continually being developed to solve problems and are updated in order to respond effectively to the conditions and demands of developing and emerging countries while at the same time remaining current with the international state of art in editing and publishing of digital online journals.

The journal production process based on HTML files was an appropriate solution when SciELO began as it included presentation and bibliographic data elements. However, with the development of text display related technologies such as XML, CSS, etc., the SciELO HTML based solution became progressively obsolete. In 2013, in order to remain current with the international state of the art in article publishing, SciELO adopted an online journal publication workflow based on the entire full text being structured in Extensible Markup Language (XML).

Publishing workflow based on XML

During the last 3 years, the SciELO Program was promoting the professionalization of journal production through the adoption of state of-the-art publishing solutions and services. New technologies, publishing models, and workflows have created a demand for even more automation and faster production. In this context, SciELO adopted XML marked-up texts as the basic journal text content for

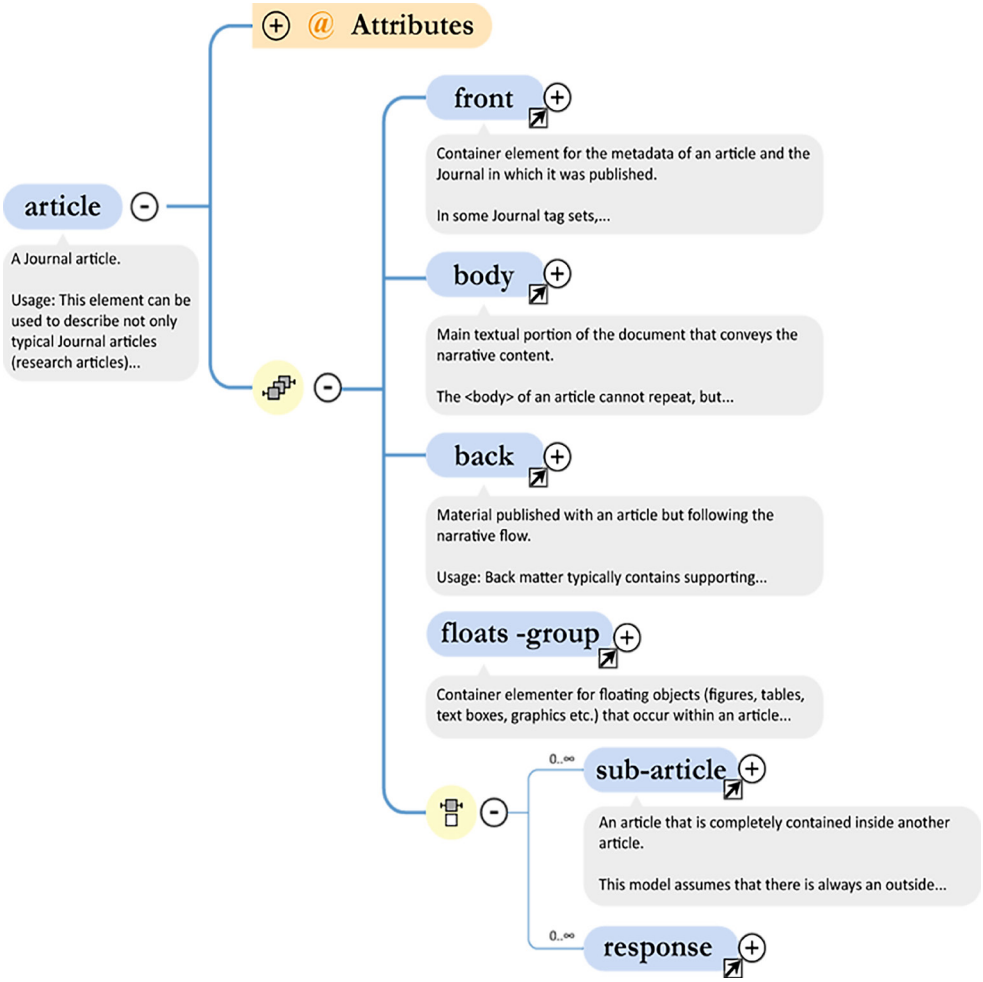

Figure 4 - The main structure of a SciELO digital article used in the publishing workflow based on XML
Source: SciELO Publishing Schema - SPS v1.0

database storage, online publishing and interoperability with both metadata and full texts. One important reason for this decision was to facilitate compliance of the SciELO Health Sciences journals with the NLM PubMed Central full text repository requirements. XML texts are also a source of different display formats, such as HTML, PDF and ePUB.

For the structuring of the XML marked-up XML full texts, SciELO adopted, with few modifications, the Journal Article Tag Suite (JATS), NISO Z39.96-2012. The modifications, which were made to answer SciELO's needs, consist of the XML elements and parameters that describe author affiliation, sponsors and bibliographic references. The resulting SciELO Publishing Schema derived from JATS is available at <http://scieloorg.github.io/ scielo_publishing_schema/>.

With the adoption of XML full texts, the SciELO publishing workflow was modified to be able to receive the journals articles in both PDF and XML formats according to the SciELO Publishing Schema (Figure 5) in which PDF files are converted to XML. The workflow includes a specific step for the submission of the full text of the SciELO journals that are part of the NLM PubMedCentral repository.

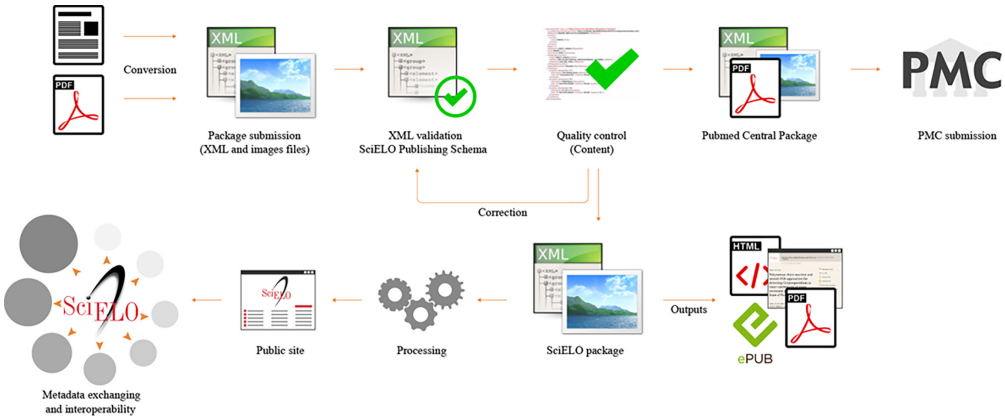

Figure 5 - SciELO Journal Publishing Workflow based on XML text files.

The main steps of the new SciELO publishing workflow are shown in Figure 5 and are briefly described as follows:

1. SciELO receives the manuscripts in XML or PDF formats;
2. The PDF files are converted to XML files;
3. The XML files are validated according to the SciELO Publishing Schema;
4. The XML files are checked for the integrity of the text, links, images, and the correct identification of affiliation, funding statements, cross references, table codification and bibliographic elements (metadata);
5. For journals that are in PubMed Central, the files are packaged according to the Pubmed Central Package specifications for proper submission;
6. All files are prepared according to the SciELO Publishing Package (SciELO Publishing Schema requirements) for storage in the SciELO database;
7. The process then follows the same steps 4 to 6 of the description of Figure 3, that is, the files are loaded in a local database server, transferred to the public server and made available under open access, and the article metadata is exported to national and international bibliographic indexes and databases.

The adoption of XML for the full texts adds much more flexibility and many more capabilities to the SciELO operation in terms of interoperability and generating display formats that best fit the different mobile device screens. The weekly update of SciELO journals includes the immediate transfer of metadata to other systems such as CrossRef, WoS, PubMED, Scopus, Google Scholar, DOAJ, DOAR, LILACS, and AGRIS. The full texts in XML allows appropriate displays for the different screen sizes, as well as in print. Figure 6 shows the different presentations of SciELO articles generated from the XML coded texts.

Figure 6 - An XML article shown in SciELO HTML, XML-SciELO XSLT, PMC Classic Article , PMC PubReader and ePUB..

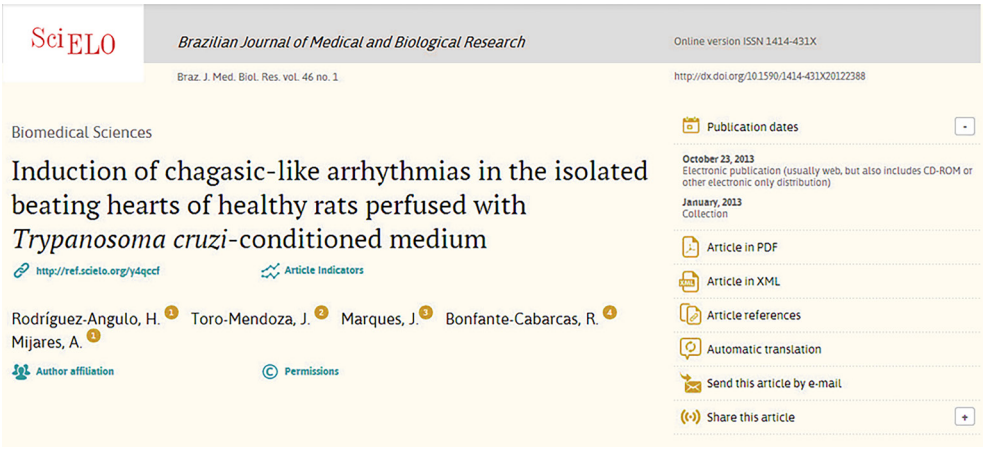

Figure 7 - SciELO XML article page layout.

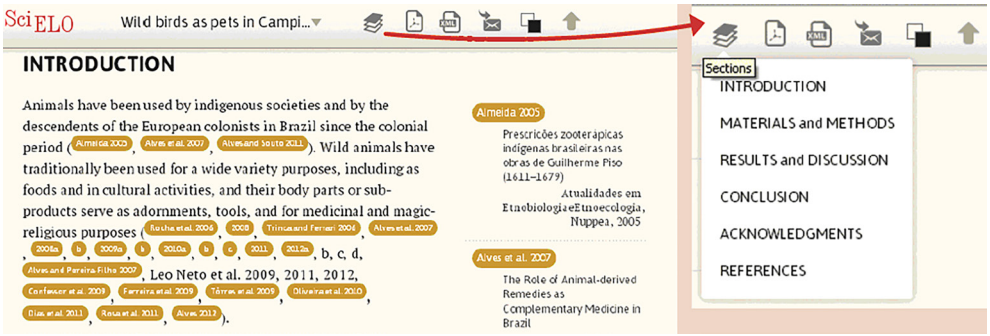

Figure 8 - SciELO XML article menu navigation.

Conclusions

The organization and functioning of the SciELO production system was designed, from its inception, to operate collections of digital journals with the aim of maximizing the availability and visibility of the article metadata and of the full texts, and therefore of the research they communicate. The production workflow has been improved over the years to best meet these objectives and remain current with the advancements in the international state of the art.

The structuring of the texts using SGML and XML data languages to facilitate storage, processing, retrieval and interoperability is a major strength of the SciELO production system. It facilitates the preservation of the digital contents as software and hardware technologies evolve. It automates the multiple indexing of the contents, including adapting the contents to the exchange, transfer and exposing of metadata to the different protocols and systems. It gives article publishing and dissemination greater flexibility, reach and impact by allowing texts to be displayed and printed in different formats, styles and devices. It facilitates the production of statistics and bibliometric indicators. Also, the production systems facilitate the compliance of SciELO journals with international standards in scholarly communication.

Finally, a central characteristic of the SciELO production system is the quality driven environment it implements and projects, and that is self-reinforcing and provides the opportunity for continued learning. In addition to the methodologies and technologies of SciELO, this quality and learning environment is achieved through common principles and objectives which revolve around the Open Access modus operandi. This common superstructure drives academic publishing across the entire SciELO network of collections.

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Chapter 6 – The SciELO Technological Platform: the first 15 years and future projections

Abel Packer, Fabio Batalha Cunha dos Santos, Gustavo Oliveira da Fonseca, Jamil Atta, Roberta Mayumi Takenaka Graneiro and Rondineli Gama Saad

Introduction

The SciELO Network of open access journals functions in a decentralized form. The governance, management, funding and operation, including the IT infrastructure are the responsibility of each country participating in the network. Nevertheless, all the collections operate with the same methodological and technological platform which ensures compatibility of content and their interoperability.

This chapter describes the principal characteristics and the evolution of the SciELO technological platform as well as the advances which are planned for the next few years.

The SciELO Network technological platform

Institutional leadership and framework

The first version of the SciELO technological platform was developed under the "Project for the development of a methodology for the preparation, storage, dissemination and evaluation of academic publications in electronic form" (*Projeto para o Desenvolvimento de uma Metodologia para a preparação, armazenamento, disseminação e avaliação de publicações científicas em formato eletrônico*), that was carried out between

February 1997 and February 1998. As the title of the project makes clear, the objective was to develop a solution to the question of indexing and publishing academic journal collections in digital form, operated on the Web with performance monitoring by number of citations and accesses. The project was successfully implemented, and the platform running the first version of the SciELO Brazil Collection was launched in March 1998. This was the beginning of the normal ongoing operation of the SciELO Program. The solution came to be known as the SciELO Model, and was soon adopted by Chile as a solution. This was the first example of the expansion of the SciELO Network for which provision was made in the original project.

Right from the start, there were two big challenges which had to be faced in order to achieve the aims and objectives of the project. On the one hand, the opposition of many journal editors that opposed to online digital publishing and spoke out in defense of print publishing by claiming that journals published on the Internet did lack quality. On the other hand, there was the construction of a technological solution when online publishing was in its infancy, at a time when such technological solutions were in short supply and not really suitable for the conditions appertaining in Latin America and the Caribbean.

> So that the solution that has been explored and proposed by the project may be used widely in the region, it should be based on low-cost IT technology, preferably in the public domain, easy to use and transferable to different hardware platforms, including environments where telecommunications may be limited or low- speed channels predominate. (Packer *et al* 1998). *[Translation]*

It was only possible to overcome these challenges thanks to the institutional leadership and framework which were responsible for the operation of the project. It fell to the State of São Paulo Research Foundation (FAPESP), devoted to leadership in the Brazilian scientific community, to be responsible for the general coordination and financing of the project. The Latin-American and Caribbean Center in Health Sciences Information (BIREME/PAHO/WHO), a recognized

international center in the automated management of health science information, assumed responsibility for the coordination of the project at the operational level, which also included the development of the technological platform. The framework made provision for the establishment of a technical team wholly dedicated to the project and composed of librarians, systems analysts and programers. This team had the support of a core group comprised of 10 journal publishers from different subject areas, whose journals had been selected to make up the test collection for the project. This core group also acted as a focus group and would closely follow the development of the project. The project also had full Internet access via the Academic Network of São Paulo (ANSP), whose development project was at that time headed by FAPESP.

This governance structure and framework evolved and was replicated in the operation of the national collections of the SciELO Network, with adaptations to national conditions, but always with the leadership of nationally recognized research institutions and with a dedicated technical team, and access to technologies and the Internet. The SciELO Brazil Collection team, which is responsible for the development and maintenance of the technology platform, has the support of a dedicated group of developers, and is also responsible for development of the SciELO Network Global Portal which indexes the total set of the collections and journals.

The SciELO technological platform has been developed using Open Source software so that all developments are immediately made available for use by the SciELO Network as well by other journal collections not indexed by SciELO, such as universities that have adopted the SciELO Methodology to publish their journals.

All the developments follow Open Source coding standards. This allows the cooperation of and contribution from the members of the network and other interested parties in the use of tools which have been produced within the context of the SciELO project and in the development of new functionalities and enhancements.

The first version of the original platform made a pioneering use of applications, languages and resources which were at that time unk-

nown to the majority of IT professionals. Taken together with SciELO's pioneering adoption of Open Access, the SciELO Model has become a yardstick in the field of online scholarly communication in the countries of the Latin American and Caribbean region.

The modular structure of the technological platform and its evolution

The technological platform implemented the concept of decentralized development and operation of the SciELO Network, according to a model of the management of resources and information flows based on four principal components: the network of collections, the individual collections, the journals in the collections and the articles in the journals, as shown in Figure 1. Each of these components can be accessed independently or directly on the Web.

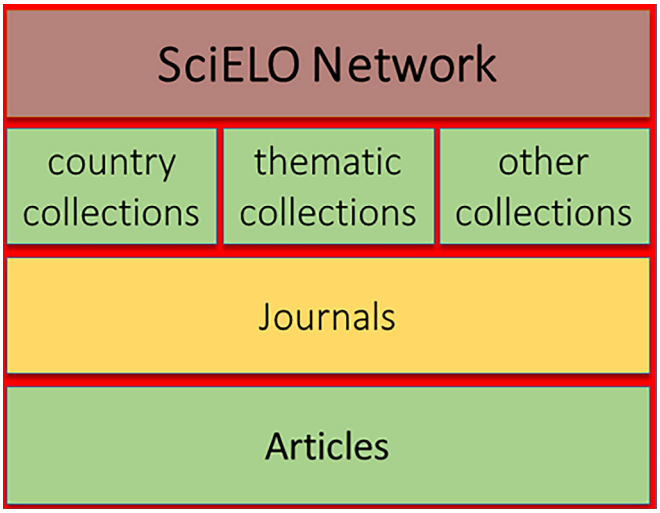

Figure 1 - The structure of information in the SciELO methodology

The technological platform for the operation of an individual SciELO collection was designed and implemented by means of modules of one or more applications. The modules were formulated to carry out each one of the principle functions of the SciELO methodology for the indexing, publication and interoperability of online journals. This

modular architecture facilitated development and maintenance by allowing the work undertaken by the development team to be divided up. It also permitted the use of different programing languages and data storage structures and the combination of off-line and online applications.

The original platform was developed in 1996 and 1997, and has kept its original structure for the last 15 years. However, its processing capacity as well as its complexity have evolved considerably by bringing together the solution to problems, limitations and requests for new functionalities with the adoption of innovative technologies in the storage, retrieval, online publication and interoperability of texts. This evolution explored and extended to the maximum the capabilities of the original platform architecture, its components and technologies, and these reached the limit of their capacity in 2010, when new developments were abandoned and the construction of a new platform was begun.

The most important decisions in the development of the original platform were related to the structuring of the texts and their loading into the databases. This involved, on the one hand, the adoption of the metalanguage SGML (Standard Generalized Markup Language, an ISO standard from 1986) for the integrated structuring of the metadata and the full text of the documents and, on the other hand, the adoption of the ISIS system for the storage of the structured databases. The structuring of the data was defined by a DTD for the texts in SciELO. The DTD was based on the ISO 12083:1994 standard (Information and documentation -- Electronic manuscript preparation and markup) for the integrated structuring of metadata and full text documents. This standard was applied to the identification of metadata and bibliographic elements at the beginning of the articles which make up the bibliographic reference, and to the identification of the bibliographic references of the documents cited in the articles. The full text was structured as HTML for purposes of its presentation on the Web.

With the metadata it was possible to construct the bibliographic index of the articles which is used for searching and for interoperability. It was possible to create the bibliometric database of citations from the structuring of the references cited in the articles.

The adoption of SGML and the ISIS database management platform made the biggest difference to the viability of SciELO. The structuring of the texts made the storage and retrieval of the full texts feasible. The ISIS system developed by BIREME, and geared to the processing of complex data structures and document databases, enabled the persistence of textual content structured in SGML. ISIS also has a powerful programming language for the extraction and formatting of data which facilitated the generation of texts in HTML. Associated with the articles marked-up in SGML and HTML, and stored in ISIS databases, are the corresponding PDF files which the platform also stores, permitting the user not only to read the articles online in their HTML version but also offline in their PDF version.

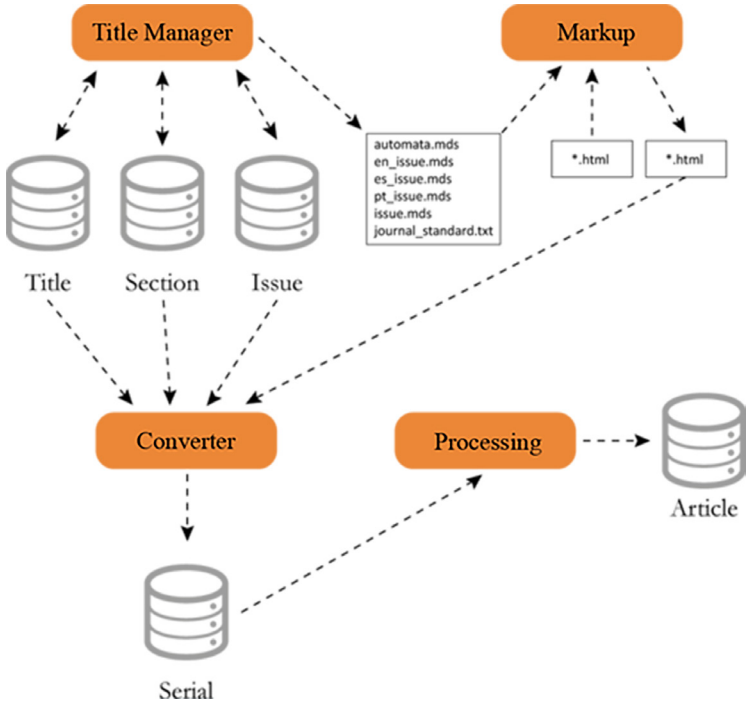

Figure 2 - Current architecture of the SciELO technical methodology.

As can be seen in Figure 2, the original platform used during the past 15 years is basically composed of the following modules:

- Title Manager.
- Markup.
- Converter and Processing for Publication.
- Public Interfaces - the SciELO national (or multi-country) collection sites, and thematic collection sites

The Title Manager module contains the tool that is responsible for the management of the journals, issues and issue sections; the Markup module is the tool used to structure the original documents according to the data elements as defined by the SciELO DTD; the Converter and Processing for Publication module are the tools responsible for the persistence of the documents digitized and structured in databases that feed the public interface of the sites of each country, and of the Global Portal itself; and, Public Interfaces which comprises the set of SciELO sites of each country, of each thematic collection, of the sites that popularize scholarly knowledge and of the Global Portal which aggregates the content of all the individual collections just mentioned of the SciELO Network. In regard to the maintenance, problem resolution and improvements to the operation of the SciELO collections over the past 15 years of operation, many technologies were evaluated and applied with the objective of maximizing the resources for publication, dissemination and interoperability. The general development efforts were committed to maintaining the applications updated in terms of programming languages, compatibility with operating systems and information services, as well as in terms of of implementing services such as the OAI-PMH protocol, techniques for the indexing of metadata by third parties such as Google and Google Scholar, exporting metadata to CrossRef to get article DOI's, and also to PubMed, the Web of Science, DOAJ, LILACS, and AGRIS. Also part of these development efforts were public exposure of metadata in XML PMC for all of the articles, integration with the Global Portal through layers of Web services, optimization of the platform to address the increasing access to the site by users, processing of bibliometric and informetric data, services associated with the articles, RSS feeds, and a federated search system, amongst other functionalities.

With regard to the retrieval and publication on the Web of the contents of the collections, journals and articles, the developments and improvements during this period were organized according to a layered architecture of processing the data flows as shown in Figure 3.

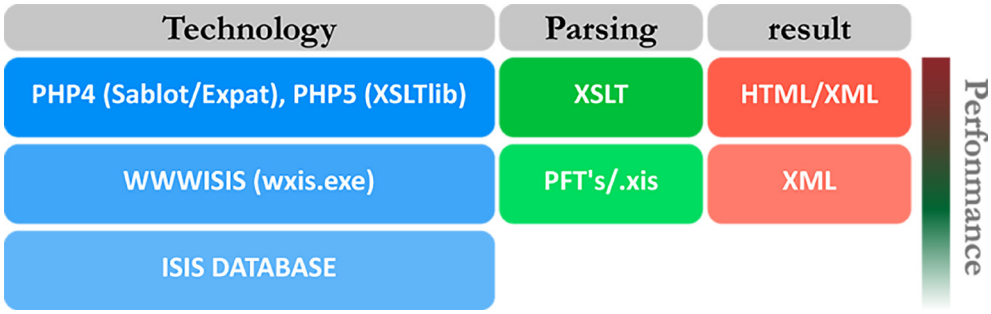

Figure 3 - Layout of the information architecture of SciELO.

Figure 3 shows how the concept of metadata exposure is currently centered in the application, making it necessary to always carry out and implement developments in the layers of the applications whenever there is a new request to retrieve a particular type of information, such as including new fields and new computed data. The applications level in the SciELO methodology is made up of tools such as the individual collection sites, the Global Portal site, the search and retrieval of contents, protocols and so on. Depending on the type of improvement made, it may be necessary to implement the developments in all of the layers of the stack in the architecture of the SciELO site, involving modifications from the lowest level (the databases) up to the top of the stack (the results layer).

An important aspect in the development of the platform is the growing number of accesses to the sites which became more noticeable with the indexing of SciELO in Google and in Google Scholar. In the case of the SciELO Brazil collection, the number of accesses to it jumped from 25 million per year in 2005 to 103 million per year in 2007. Since then, more than 70% of the accesses to the SciELO Brazil site originate from searches done in Google. As stated previously, the SciELO collections also operate as repositories of PDF files associated with the articles

stored in the databases that receive a large number of accesses. In 2011, the SciELO platform was enhanced with the Ratchet <https://github.com/scieloorg/ratchet> application. This application registers not only accesses directly to the individual collection interfaces but also the direct downloads (e.g. from a Google search) of the PDF files of the articles. This allowed broadening the coverage of counting accesses to include those originating from the results of searches done in external search engines, such as Google, that point directly to the PDF full text of the articles. With this adjustment in the counts, the monthly download average rose to 34 million in 2011 and to 37 million in 2012, in other words, 1.23 million per day based on this monthly average. In 2012, the number of accesses per month through the Web interfaces was 16.7 million and 21 million directly to the PDF files. Out of the total number of accesses, 44% were to the full texts in HTML and 56% were to the full texts in PDF. Figure 4shows the monthly evolution of accesses and downloads for 2011, 2012 and 2013 (Jan. - March only).

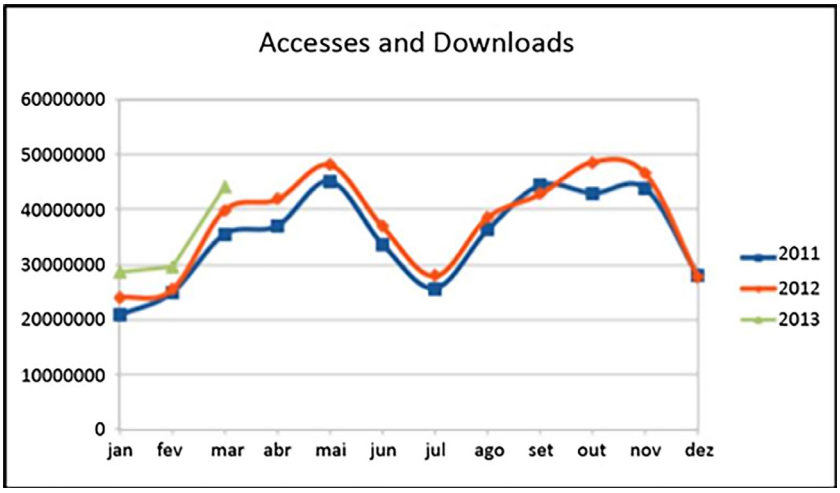

Figure 4 - Monthly distribution of the number of monthly accesses during the last three years 2011 - 2013 as recorded by Ratchet <http://wiki.bireme.org/en/index.php/CISIS>..

To efficiently address this increasing number of accesses to SciELO Brazil, it was necessary to expand the capacity of the dedicated hardware infrastructure quite often which, in 2013, is made up of two

front-end servers to handle the user requests, a load balancing server to distribute the user requests between the front-end servers, DNS servers, backup servers and servers providing operational and development support. In addition to the hardware infrastructure for publication and operation of SciELO Brazil, a set of other servers is used under the SciELO Program as is the case with the SciELO Books collections, BHL-SciELO (Biodiversity HeritageLibrary), and other collections and Web sites that are less accessed. The other servers are also used for operating management tools, blogs, tools to support the editorial process, and so on.

The management of the SciELO Brazil Collection continually makes provision for the investment of resources for the maintenance and updating of the equipment infrastructure to respond appropriately to the growing number of accesses and to the needs of each product. A major part of this plan includes the systematic monitoring of the performance of the platform and of the infrastructure as a whole. Figure 5 presents an example of the results of the uptime report for the SciELO Brazil site for the period June 2012 to August 2013.

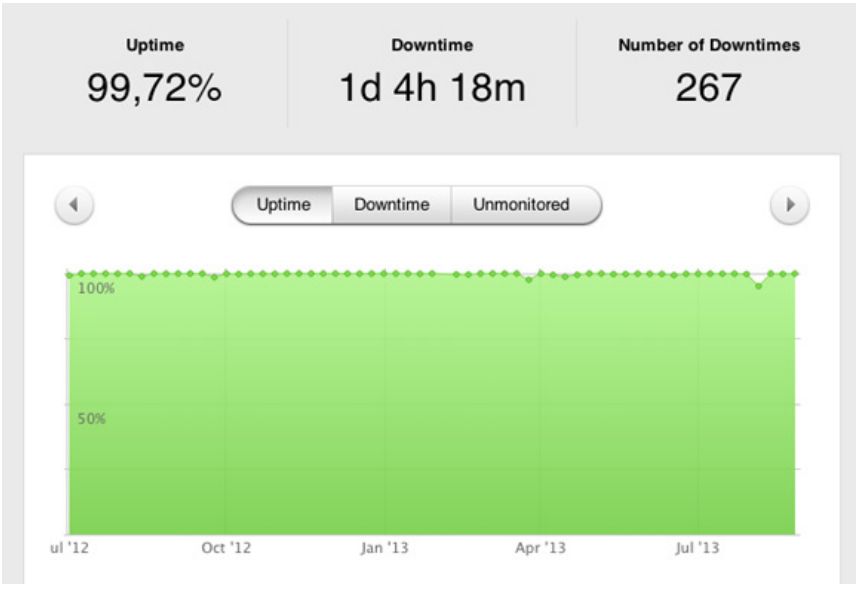

Figure 5 - Uptime report for the SciELO Brazil site for the period July 2012 to August 2013.

The new SciELO platform of common services and applications

With the passage of time the SciELO platform, like many of the other technologies that revolve around the Internet, have had to evolve together or succumb to the fast growth curve required by the market. In this race against time, the SciELO team followed and adopted technologies that were created, became obsolete and were updated in order to upgrade the platform, solve problems and address the demand for new functionalities.

With the purpose of following the state of the art in the technologies of programming, structuring of texts, and dissemination and interoperability, the SciELO IT team, in response to the SciELO Program line of action to update the technological platform, carried out an evaluation in 2010 of the architecture and business model of the platform with a focus on overcoming the obsolescence and paradigms established during the 15 years of operation of the Program, and aiming to making the platform architecture more sustainable, more interoperable and more professional.

As a result of the evaluation, it was evident, on the one hand, that the platform continues to fully serve the normal, on-going operations of SciELO and, on the other hand, the obsolescence of the platform, particularly in its ability to keep up with the speed demanded by the market in upgrading technologies and services. Moreover, many of the tools that today support the technological architecture and methodology of SciELO will no longer have official support from their representatives, such as the suite of ISIS applications which are currently based on persistent metadata and full text of the SciELO publishing methodology.

In addition to the strengths, weaknesses and principal risks associated with programing languages and tools that supported the development of the project up to 2010, the evaluation focused as well on the business model adopted over the 15 years of the project. In this model, the institutions responsible for the management and operation of the

national collections are responsible for the installation and maintenance of their particular SciELO platform, something which requires a dedicated team that possesses the specific technical knowledge. This approach has the advantage of being decentralized, and of developing local capabilities and capacities, however it presents a lot of complexity, and difficulties in maintenance and efficient operation, especially in the timely adoption of updates.

In fact, the SciELO Brazil team, in many cases, assumed the responsibility of undertaking the maintenance and updating of the platforms of some of the countries. The formulation of a new business model was centered on overcoming these problems so as to maximize robustness of the platform and its updating over the entire network. In this sense, the new business model under construction is based on the concept of Software as a Service (SaaS). This concept was already implemented in the new tool for the management of journals - SciELO Manager <https://github.com/scieloorg/scielo-manager> - and for issues and sections, and it continues to be implemented for the collections of the SciELO Network.

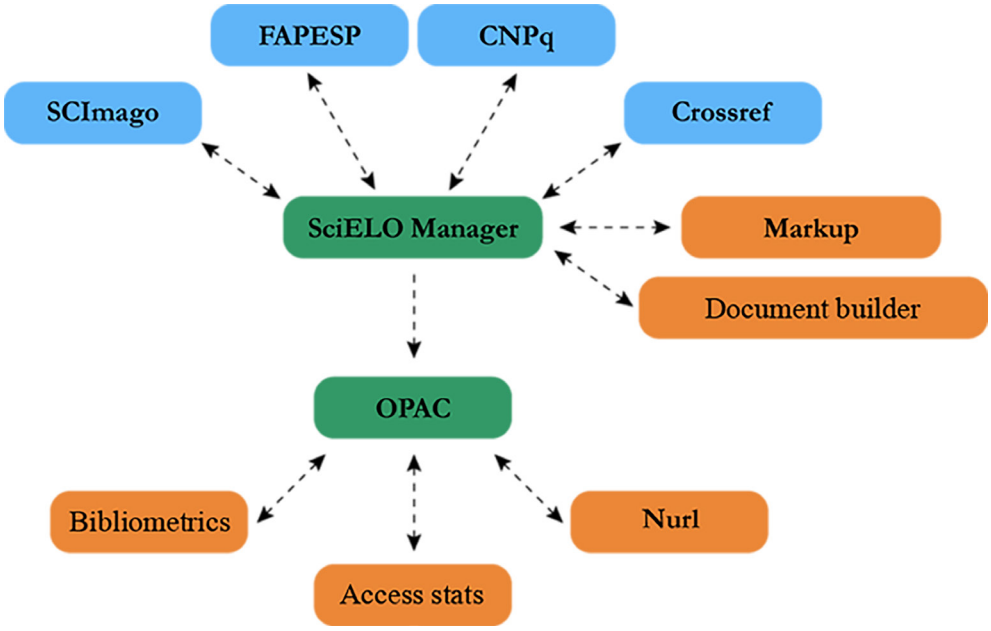

Figure 6 - Macro view of the new architecture.

An important aspect in the updating of the SciELO technological platform is the adoption of an architecture of resources, modules and processes centered on source data rather than on the applications. Figure 5 presents a schema of this architecture which is characterized by a principal entity - SciELO Manager - responsible for the centralized management of the cataloging data of the collections and which acts as a source of primary data for an ecosystem of applications. The application named OPAC (Online Public Access Catalog) represents a projection of the records in accordance with specified criteria, making possible the construction of regional and thematic sites and a variety of services under these contexts.

This approach strengthens the development of rich API's (Application Programing Interface), which will allow integrated access to the diverse facets of the SciELO metadata, enabling the decentralized development by companies, institutions, experts, developers and researchers. With the availability of these API's, the development of applications will no longer be restricted to only the SciELO team. At the same time, it will accelerate the use of SciELO contents for new services geared to the different devices such as mobile phones, tablets, TV, and Google Glass, in addition to solving the general or specific problems relating to the indexing and retrieval of contents in the different knowledge areas, and to bibliometric analysis.

Conclusions

The SciELO technological platform, over its 15 years of operation, is characterized by its ability to adjust and evolve through the adoption of new technologies and solutions to respond effectively to demands.

The SciELO platform is heading towards a technological model based on cloud computing which will enable the teams of the Network to focus on managing the Network's contents rather than the infrastructure of applications that will continue to be managed by the SciELO Program via the SciELO Brazil collection.

Throughout its 15 years of operation, the improvement of the original platform continued until 2010, at which point the SciELO Program began the transition to a new platform. The outlook of this new platform is to increase the sustainability and, especially, the capacity for decentralized development. The continuous dissemination of the methodology for the various potential external contributors will occur through presentations and participation in events, on-going updating of the applications, unrestricted use of the policies of Open Source development in all the new developments, public repositories of source code, use of standards for writing source code, and the use of quality assurance processes to guarantee quality such as in the review of coding and automated testing, thus creating a favorable environment for collaborative development.

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Chapter 7 – The impact of SciELO Chile: an undergraduate support tool

Atilio Bustos-González and Patricia Muñoz Palma

Introduction

Chile was the first country to follow Brazil in installing SciELO. It was Anna María Prat who saw that the SciELO project was solving the problem of access to the academic information communicated in the best academic journals that were being published in the country. Up until then, journals were few in number and gave preference to the authors, the subject matter and the readers within the country, and they were published only in print. Print as a format had all the limitations associated with "the transfer of atoms" (i.e. documents sent by post) (Negroponte 1995 ; Meneghini, 1998). In 1997, the same year in which SciELO was set up in Brazil, with the help of CONICYT and the participation of Anna María Prat, the Pontifical Catholic University of Valparaíso created the Electronic Journal of Biotechnology, which was the first scientific electronic-only journal conceived in Latin America (Bustos-González 1998 ; 1999). SciELO began operating in Chile in 1998 with CONICYT as the national institution charged with implementing the methodology, building the collection and operating the services of SciELO Chile (Prat 2000). When examining the Chilean experience, it is difficult to separate out the support given by both CONICYT and SciELO since a strategic alliance was established which has resulted in benefits to the country and the region, namely, the early setting up of academic publishing in electronic format, the firming up of a business model which would later be known as Open Access, and the adoption of more professional practices by academic journal publishers. All these aspects have not been studied much and would merit greater attention.

SciELO Chile started with three journals, each having a long academic tradition: The Chilean Medical Journal (Revista Médica de Chile), the Chilean Journal of Geology (Revista Geológica de Chile, currently known as Andean Geology), and the Journal of Literature and Linguistics. At the beginning of 2012, SciELO Chile was managing access to a collection of 88 national journal titles. The subject breakdown of the collection is as follows: Arts and Humanities (28.4%), Social Sciences (26.1%), Health Sciences (19.3%), Life Sciences (13.6%) and Physical Sciences (12.5%).

In 2011, the 21.64% of Chilean academic output which had international visibility was communicated by SciELO Chile journals. Adding together the production of Chilean authors in the other SciELO Network journals (3.14% in 2011), it can be seen that 24.78% of the national academic output was communicated by means of journals which form part of the SciELO Network. In 1999, the proportion of Chilean academic output which was communicated by the first journals signed up by SciELO Chile represented some 15.12% of the total national output, and if the SciELO Network in its entirety is taken into account, an additional 1.59% could be added to this figure. In the 13 year period, the proportion of academic output by Chilean authors published in journals indexed in SciELO Chile shows and increase of 8.07%.

Both the head offices of SciELO in Chile and Brazil have been particularly demanding as far as the rules for adding journals to their collections are concerned (Packer 2000; Packer 2001; Goldenberg, Castro and Azevedo 2007 ; SciELO-Brazil 2004 ; Cetto 2011 ; SciELO Chile 2012 ; Santos and Noronha 2013). Over the years, they have kept up a pressure on the publishers which is designed to bring about a constant improvement, evidenced in these two countries by the high rate of overlap between the SciELO collections and the titles published in the country which are indexed in Scopus or Web of Science (WoS). In addition, the improvements are noted by the fact that the number of constituent journals in their SCiELO collections indexed in the third quartile is greater in number than the titles from the same country indexed in the fourth quartile. (SJR, SCImago Journal and Country Ranking, 2013).

Another area where, up to the present time, there have been no wide ranging empirical and representative studies, is in determining the impact that SciELO has had on the patterns of information consumption exhibited by the different academic communities. (Cartes-Velásquez 2012).

The objective of the present document is solely to present the results of the study of the patterns of consumption of academic information that is communicated by SciELO Chile by different academic communities, taking into account the academic level of the targeted groups, the behavior of users working in the different subject areas, and the level of use made of SciELO Chile in relation to other information services, both commercial and open access. Although these results form part of a larger study, this document analyses patterns followed by the different groups in their search for references and the access to the full text in the SciELO Chile collection. The value placed by the various communities on the different forms of access, and the place from where this access takes place, is also identified. Then, an analysis of what information is on offer and what is actually asked for is presented, broken down by subject area. The way the information is accessed, and the place and frequency of access is defined. An analysis is provided of the different ways in which SciELO Chile is used for teaching purposes. Finally, the value that different types of users place on the SciELO Chile collection is presented.

Evaluation of SciELO Chile

The objective of this study was to evaluate the impact of the Scientific Electronic Library SciELO Chile on the teaching of undergraduates, graduates and on the national academic community, and its effect on international academic collaboration. An attempt was also made to determine the efficiency of the design and of the service delivered by the public agency charged with its maintenance (i.e. CONICYT). The study was awarded in 2012 by the Academic Information Program of CONICYT to the SCImago Research Group following an international open tender process.

The tender document contained the following questions which required answers: What is the impact of SciELO Chile on the training of undergraduates? What practical steps are academic staff taking to encourage the use of SciELO Chile by undergraduate students? What are the habits of the students in regards to their use of the journals which are part of SciELO Chile ? What subject- related practices do academics and researchers have in the way that they use SciELO Chile? Why are the SciELO Chile usage statistics so high? Is this because of use or because of the combined action of web crawlers and library metasearch engines on the open access journals? Are there uses of SciELO Chile which were not foreseen when the system was originally designed? How much do undergraduates know about, find useful and value SciELO Chile? How much do academics and researchers know about, find useful and value SciELO Chile? How much do the editors of national academic journals know about, find useful and value SciELO Chile? As far as the journal editors are concerned, what are the strengths and weaknesses of SciELO Chile? What effect has the existence of SciELO Chile had on the visibility, quality and impact of academic output generated in Chile and in the region as a whole? What are the subject areas and professional disciplines in which SciELO Chile is more valued by students and researchers? Can the existence of SciELO Chile be justified? Do the services which are offered reflect the commitment taken on by SciELO Chile? And, finally, what are the major criticisms and recommendations for improvement that students, university professors, researchers and journal publishers can bring to the attention of SciELO Chile?

To answer these questions, the research project was structured in the following way:

- Bibliometric study of the SciELO Chile journals.
- Study of user perceptions of SciELO Chile.
- Study of the impact of SciELO Chile on undergraduate studies.
- Study of the impact of SciELO Chile on the Chilean academic community and on international collaboration.
- Study of the SciELO Chile production process.

This document focuses on an analysis of the impact of SciELO Chile on the different academic communities. These academic or learning communities are those made up of undergraduate and graduate students, and university professors who do not carry out academic research. They also include active researchers who can also take on undergraduate or graduate level teaching duties at their universities.

A national online survey was carried out with undergraduate and graduate students enrolled at mainstream and private universities throughout the country. A total of 8,269 responses were received which represents a percentage response rate of 6.04% of the total population of the participating universities (this is approximately 1.5% of the total number of university students country-wide enrolled in 2012). The sample had a 99% confidence level with a margin of error of approximately 1.4% for a simple random sampling. The regional distribution of the responses is representative of the size of the various student populations throughout the country, in the same way that the distribution by ages is representative of the age distribution of the student population of the country.

Another survey was carried out in parallel, with a target audience of 6,737 researchers and a sample of 3,222 university teachers from all over the country. A total of 2,349 responses was received which represents a response rate of 23.6%. The confidence level for the sample was 97% with a margin of error of approximately 2% for a simple random sampling. The sample of scientists is representative of institutions of all sizes situated in all areas of the country.

Results

With regard to the search for references, and from a breakdown of the services used by undergraduate students, the service most used by undergraduate and graduate students is Google (Table 1). For degree studies in Biomedicine, the most used services are PubMed, Biomed Central, EBSCO and Science Direct (Elsevier). SciELO Chile comes fifth out of the twenty choices in the survey. For degree studies in the

Natural Sciences, the most used services are Yahoo, the CINCEL website <www.cincel.cl> , and Science Direct (Elsevier). Students in this category put SciELO Chile in twelfth place out of the twenty choices in the survey. For Social Sciences and Humanities degree studies, the most used services are Dialnet, Redalyc and the Latindex Catalog. Students in this category placed SciELO Chile eleventh out of the twenty choices in the survey. For Engineering degree studies, the most used services are Yahoo, the website of the BEIC Program - Electronic Library of Scientific Information <www.beic.cl> - and Scirus. Students in this category placed SciELO Chile sixteenth out of the twenty choices in the survey. For degree studies in Forestry, Agriculture and Livestock, the most used services are the Web of Science (WoS), Science Direct and Scopus, with students in this category placing SciELO Chile seventh out of the twenty choices in the survey.

Table 1 - Distribution of the services most commonly used when searching for references. Respondents were able to select more than one commonly used service.

	Students	**Teachers**	**Researchers**
SciELO Chile	83%	84%	80%
Google	88%	66%	68%
Science Direct	22%	43%	50%
Google Scholar	34%	33%	46%
Dialnet	10%	29%	26%
Redalyc	10%	25%	23%
Latindex Catálogo	2%	24%	22%
Scopus	3%	20%	32%
Biomed Central	9%	13%	15%
CINCEL	2%	7%	10%
WoS	3%	6%	12%
Scirus	4%	6%	9%
BEIC	1%	0%	1%
Otro	25%	27%	24%

SciELO Chile is the most used service when full-text articles are searched for by students (79%), teachers (57%) and researchers (46%). Google (71%) and Google Scholar (29%) are the second and third most used services by students. Proportionally speaking, students are the greatest users of SciELO Chile, with students from the following disciplines constituting the users that use SciELO Chile the most – Social Sciences - Arts and Humanities (41.9%), and Biomedicine (33%). Natural Sciences uses SciELO Chile the least (3.6%) (Table 2).

Table 2 - Distribution of the services most commonly used when searching for full-text articles. Respondents were able to select more than one commonly used service.

	Students	**Teachers**	**Researchers**
SciELO	79%	57%	46%
Google	71%	36%	29%
Science Direct	19%	32%	27%
Google Scholar	29%	16%	21%
Dialnet	7%	16%	11%
Redalyc	9%	14%	11%
Latindex Catálogo	2%	13%	9%
Scopus	2%	9%	13%
Biomed Central	6%	7%	6%
WoS	2%	4%	10%
CINCEL	1%	3%	4%
Scirus	4%	2%	4%
BEIC	1%	0%	1%
Otro	21%	16%	14%

In the distribution by service used to search for full-text articles, Biomedicine stand out as the largest user with the following services being used in particular: Pubmed (83.4%) and Biomed Central (73.0%). SciELO Chile is placed in fifth position out of twenty. In the Natural Sciences, the principal service used is the CINCEL website (11.3%) and print books (9.3%). SciELO Chile is rated sixth out of twenty. In the Social Sciences and Humanities, the principal services used are Dial-

net (75.8%), RedALyC (73.3%) and the Latindex Catalog (70.0%). SciELO Chile is placed in tenth position out of twenty. In Engineering, the principal services used are Scirus(29.3%), print books (25.6%) and the university library (25.5%). SciELO Chile is placed fourteenth out of twenty. Finally, Forestry, Agriculture and Livestock principally uses WoS (34%) and Science Direct (25%). SciELO Chile is placed in fifth position out of twenty.

Students aged between 20 and 22 (41.3%) are, proportionally speaking, the group which uses SciELO Chile the most when searching for full-text articles. This age group corresponds to those years during which students study the subjects in their degree program. The use of SciELO Chile drops to about 29.4% in the cases during the period in which students are satisfying the requirements for graduation (thesis, degree project, seminar or final degree project).

The different age groups show differing ways of accessing SciELO Chile. In the case of students, Google (39%) is the preferred method of access, while teachers and researchers go straight to the SciELO Web site (33.3% and 35.6%, respectively). The usage pattern of students is consistent since the sum of the accesses via Google (39%) plus those directly to SciELO Chile (32.4%) (Table 3) coincides with the 79% of students that search for full text articles in SciELO Chile (Table 2).

Table 3 - Distribution of preferred access points to SciELO Chile.

	Students	**Teachers**	**Researchers**
.cl Site of SciELO Chile	32,40%	33,30%	35,60%
.org International site of SciELO	9,30%	9,10%	14,10%
Directly to the site of a SciELO journal	5,40%	16,90%	16,30%
Google	39,00%	27,70%	23,20%
SciELO site of a country other than Chile.	1,00%	1,70%	1,10%
User's university library Web site	12,70%	9.5%	8,60%
Yahoo	0,10%	0,40%	0,10%
Other (specify)	0,10%	1,30%	1,10%

SciELO Chile is the preferred access point for the macro-category Social Sciences and Humanities (36%). Google is the preferred access point for the remaining macro-categories. Google Chrome is the preferred browser of students in all degree studies and of all ages.

Students access SciELO from their homes (72.47%). In contrast, teachers and researchers access it principally from their offices (Table 4).

Table 4 - Distribution of places from which the services are principally accessed.

	Students	**Teachers**	**Researchers**
Office or medical practice	-	7,31%	35,23%
Home	72,47%	4,17%	14,40%
Campus	8,02%	2,56%	9,43%
Research laboratory	-	1,61%	20,76%
Library	11,48%	0,44%	1,10%
Cafeteria/dining hall with WiFi	1,17%	0,15%	0,15%
Computer lab	3,76%	0,15%	0,22%
Classroom	0,67%	0,15%	0,29%
Specialized laboratory	1,33%	-	-
Place of work	0,37%	-	-

Notebooks are the devices used by 91.4% of the students to access SciELO Chile. Although researchers and teachers state that they use notebooks (64.5%), they also use desktop PC's (56.4%). The use of PDA's / tablets only registers 0.8% in the professors' responses and 0.4% in those given by the students.

The students' preference is to consult SciELO Chile monthly (36.8%) whereas researchers and teachers consult SciELO Chile weekly (37.5%). The frequency of access is principally weekly for students in the macro-categories of Engineering (30%), and Forestry, Agriculture and Livestock (37%). In the case of Biomedicine, Natural Sciences, Social Sciences and Humanities, the frequency is monthly.

From the perspective of the consumption of information, the study of information made available in SciELO Chile was carried out by assigning Scopus thematic areas at the title level of the academic journals. This issue is revisited at the article level in the scientometric study. Table 5 shows the number of titles and their percentage weight of the total, and in the subsequent columns, the demand expressed for each thematic area by the various groups surveyed.

Table 5 - Journal offering and the corresponding expressed demand for information from SciELO Chile.

	SciELO Chile offering		Expressed demand in SciELO Chile		
	# of titles	**% of the total**	**Students**	**Teachers**	**Researchers**
Social Sciences	7	7,50%	20%	26%	27%
Education	2	2,20%	18%	23%	17%
Medicine	11	11,80%	27%	23%	13%
Arts and Humanities	23	24,70%	11%	14%	17%
Agricultural and Biological Sciences	11	11,80%	12%	12%	20%
Psychology	2	2,20%	16%	10%	9%
Environmental Sciences	0	0,00%	11%	7%	17%
Biochemistry, Genetics and Molecular Biology	1	1,10%	15%	6%	11%
Neuroscience	1	1,10%	9%	6%	3%
Engineering	5	5,40%	6%	5%	7%
Earth and Planetary Sciences	2	2,20%	5%	4%	6%
Economics, Econometrics and Finance	3	3,20%	6%	3%	4%
Immunology and Microbiology	1	1,10%	9%	3%	5%
Chemistry	1	1,10%	5%	3%	7%
Veterinary	1	1,10%	5%	3%	4%
Dentistry	2	2,20%	5%	3%	1%
Nursing	1	1,10%	7%	2%	1%

Continue...

Continuation...

Pharmacology, Toxicology and Pharmaceutics	0	0,00%	9%	2%	4%
Computer Science	0	0,00%	1%	2%	2%
Mathematics	2	2,20%	3%	2%	2%
Business, Management and Accounting	3	3,20%	2%	2%	1%
Law	8	8,60%	8%	2%	5%
Energy	0	0,00%	2%	1%	2%
Physics and Astronomy	0	0,00%	2%	1%	1%
Material Science	1	1,10%	1%	1%	3%

Regarding the information offered, it can be observed that in the areas in which the country shows its greatest academic strengths, mainly, Engineering, Mathematics, Computing Sciences and Earth and Planetary Sciences, there are no domestic journals published. The country's strengths are concentrated in the following thematic areas: Electrical Engineering and Electronics, Software Engineering, Biochemistry, Civil and Structural Engineering, Plastics and Polymers, and Engineering and Geology. In broad thematic areas, the country's strengths which are concentrated in Engineering, Mathematics and Computer Science (CONICYT, 2013) do not have any titles in the SciELO Chile collection. And on the contrary, in the thematic areas represented in the collection, the performance of the country is shown to be declining. The only exception to this is Geology.

Regarding the demand for information, the three disciplines searched for the most by students are: Medicine (27%), Social Sciences (20%) and Education (18%). For teachers, they are: Social Sciences (26%), Education (23%) and Medicine (23%). And for researchers, they are: Social Sciences (27%), Agricultural and Biological Sciences (20%), Education (17%) and Arts and Humanities (17%).

In the distribution of usage according to the macro-categories of the student's degree studies and to the type of student using SciELO Chile, it can be observed in Table 6 how the respondents in Engineering (82%), Social Sciences and Humanities (63%), and Natural Sciences (59%) stand out. The majority declares that it does not use SciELO Chile. Taking the student body as a whole, it is principally under-

graduates in the macro-categories Biomedicine (56%) and Forestry, Agriculture and Livestock (45%) that use SciELO Chile. In terms of graduate students, it is those in Forestry, Agriculture and Livestock programs that particularly mention the use of SciELO Chile journals. In aggregated terms, 40% of all students use SciELO Chile.

Table 6 - Use of SciELO Chile by macro-category of the degree program studied.

	Biomedicine	**Natural Sciences**	**Social Sciences and Humanities**	**Engineering**	**Forestry, Agriculture and Livestock**	**Total**
Do not use SciELO	39,51%	58,78%	63,22%	81,71%	35,59%	60,06%
Undergraduate	55,47%	34,77%	30,49%	14,58%	44,58%	33,45%
Thesis student	3,67%	6,09%	3,85%	2,72%	12,37%	4,29%
Graduate student	0,80%	0,00%	1,49%	0,58%	7,12%	1,52%
Teaching assistant	0,55%	0,36%	0,95%	0,41%	0,34%	0,67%
Total	100%	100%	100%	100%	100%	100%

Taking into account the age of the respondents, and the degree program in which they use SciELO Chile, 38% of the students in the age bracket 20 to 25 years old that use SciELO Chile are undergraduates (Table 7).

Table 7 - Use of SciELO Chile by age.

	17-19	**20-22**	**23-25**	**26-28**	**28-31**	**32 or older**	**Total**
Do not use SciELO	77,38%	58,63%	48,39%	35,82%	38,81%	37,89%	60,38%
Undergraduate	21,92%	38,69%	38,25%	36,42%	28,36%	21,05%	33,15%
Thesis student	0,13%	1,73%	11,13%	17,91%	11,94%	9,47%	4,26%
Graduate student	0,17%	0,31%	1,29%	8,36%	20,15%	31,58%	1,54%
Teaching assistant	0,39%	0,65%	0,94%	1,49%	0,75%	0,00%	0,66%
Total	100%	100%	100%	100%	100%	100%	100%

Regarding the use of SciELO Chile in undergraduate programs, Table 8 shows the extent to which students view differently from their professors the educational role that the professors make of SciELO Chile as learning resource. The teachers (75.79%) and researchers (67.03%) recommend the use of SciELO to their students, who, in turn, confirm it in their responses (71.67%). This invalidates the declaration made by the students in the same table who indicate that they use SciELO Chile on their own initiative (78.26%).

Table 8 - Distribution of the uses of SciELO Chile for teaching purposes and in study habits.

	Students	**Teachers**	**Researchers**
Includes articles from SciELO in the bibliography of the course program.	50,77%	66,32%	64,76%
Uses articles from SciELO in the preparation for classes	45,54%	85,79%	72,05%
Gives reading assignments based on articles from SciELO	24,00%	38,42%	34,06%
Carries out discussions with his/her students based on articles from SciELO.	30,98%	55,79%	51,18%
Recommends the use of SciELO to the students	71,67%	75,79%	67,03%
Discusses his/her published articles with his/her students	48,15%	58,42%	62,30%
The students use SciELO on their own initiative	78,26%	38,95%	27,66%
Students cite articles from SciELO in their undergraduate theses	64,74%	61,05%	60,53%
Students cite articles from SciELO in their graduate theses	22,47%	44,21%	61,32%

Teachers emphasize the use of SciELO Chile to prepare for their classes (85.79%). Teaching methods most frequently identified by the students are: reading assignments based on articles from SciELO Chile (76%), class discussions based on articles from SciELO Chile (69%), and using

articles from SciELO Chile for class reports (55%). The academics and researchers indicated in interviews that SciELO Chile has the advantage of being available in Spanish and as such makes the reading of scholarly communications much less difficult for the students.

The survey of perceptions in the context of this study indicated that 80.8% of the researchers rate SciELO Chile as excellent or good, while 83.2% of the academics gave it the same satisfaction rating. SciELO Chile is rated excellent or good by 78.5% of the undergraduate students (Table 9).

Table 9 -Perceived value of SciELO Chile by type of user.

	Students	**Teachers**	**Researchers**
Excellent	10,74%	13,37%	12,13%
Good	67,27%	69,77%	68,67%
Average	9,29%	5,23%	5,70%
Fair	9,29%	8,72%	10,97%
Poor	0,83%	0,58%	1,05%
No opinion	2,57%	2,33%	1,48%

The satisfaction rating that students gave to the level of search success in SciELO Chile was an average of 6.3 on a scale of 1 to 10. The perceptions change in the macro-categories of Biomedicine, which rates it at 4.3 and Social Sciences which rates it at 4.2. Both ratings represent a lower level of satisfaction.

The level of recognition by students of the names of domestic journals in the SciELO Chile collection is low, and the students confuse them with other journals published abroad. Only the Revista Médica de Chile (Medical Journal of Chile) was mentioned more than 130 times in the open-ended questions. The journals that come after (lesser recognized) are mentioned 50 times or less.

Discussion

The usefulness of SciELO Chile is valued as a source of information in the teaching of the Social Sciences, Education and Medicine. This survey result is reflected in the research efforts, demonstrated by the intensity of use of SciELO Chile journals (27%). Other research communities that use SciELO Chile are Forestry, Agriculture and Livestock (20%), Education (17%), Arts and Humanities (17%) and Environmental Sciences. In turn, 26% of the teachers in the Social Sciences use it, as well as 26% of the teachers in Education and 23% in Medicine.

From the perspective of the students, 27% of those studying Medicine use SciELO Chile, and for those studying Social Sciences, Education and Psychology, the figures are 20%, 18% and 16% respectively. Taking into consideration what is stated in the previous two paragraphs, together with the analysis of the composition of the SciELO Chile collection and the research efforts displayed through the use of these journals, leads to the conclusion that SciELO Chile is an indispensable tool for students, teachers and researchers in the Social Sciences. It is a complementary tool in all the other thematic areas, with the exception of the first four years of teaching in Medicine where SciELO Chile is used by 27% of the students, 23% of the professors and less used by researchers.

The strength of SciELO Chile is in the Social Sciences. In the surveys, it was observed that for all types of users there were significant gaps between the intensity of use of SciELO Chile and of the reported use of Dialnet or Redalyc. In the case of the students, the gap between the use of SciELO Chile and the two other full text repositories just mentioned is at least 73 percentage points. For teachers, there is a 55 percent point spread between the use of SciELO Chile and Dialnet, and a 59 percent point spread between SciELO Chile and Redalyc. In the case of the researchers, this spread between SciELO Chile and Dialnet is 54 percentage points, and 57 percentage points between SciELO Chile and Redalyc.

It is noted that SciELO Chile is a tool intensively used for teaching as well as for learning in undergraduate studies. In the open ended ques-

tions of the survey, professors and students appreciated the language of publication (Spanish) and the open access nature of the articles. If this is what characterizes SciELO Chile, then it is desirable that SciELO makes an effort to improve the design and usability of its site to better address the actual use of this tool by these communities.

In the qualitative evaluation part of the study, the students, teachers and researchers equally value SciELO Chile as a useful and necessary tool. They also ask that its management remains with CONICYT, a body which gives guarantees of quality and sustainability to the initiative for the long term.

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Chapter 8 – Comparative Analysis of the Main Ibero-American Portals of Academic Journals: building webometric indicators for SciELO

Isidro F. Aguillo

Introduction

The Ranking Web of Repositories <http://repositories.webometrics.info/> is an academic exercise (Aguillo *et al* 2010) developed by the Cybermetrics Lab (IPP-CSIC) for promoting open access initiatives in general and institutional repositories in particular. Providing ranks to the current repositories intends both to increase the number of records in the existing services and to motivate other institutions to develop their own platforms. Starting in 2008 it is published every six months (end of January and July) and it ranks almost 2,000 repositories worldwide, of which less than 180 belong to Latin-American entries.

Open access repositories in Latin America are badly needed not only for easing the access of its researchers to their own scientific results but also for increasing the international visibility and impact of such academic output traditionally poorly distributed and even more poorly incorporated to the so-called mainstream science. Local journals are playing a central role for scholarly communication in the region even if the formal publication in international journals has increased considerably in the last decades. This is especially true for disciplines with strong collaborative ties with countries outside the region, but perhaps social sciences and humanities, technologies, soft and local sciences are still mainly represented in the journals published in Spanish or Portuguese.

Possible solutions to these problems were identified at the end of the previous century when the digital revolution allowed the cheap and universal publication of electronic versions of the journals or made possible the launching of new web-only titles that otherwise could not be feasible. Open access initiatives already on the way due to the explosive increase in the prices of journal subscriptions paved the road for the development of three different international proposals of digital libraries.

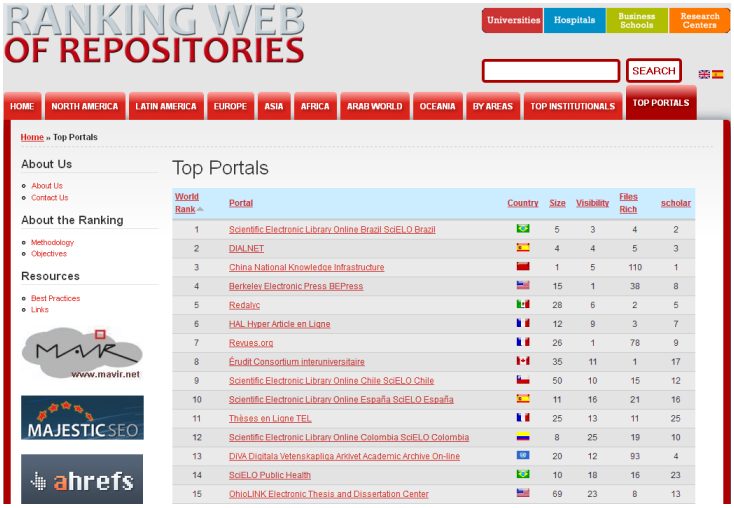

Figure 1 - Ranking Web of Open Access Portals. January 2013 edition showing the top positions of the three platforms analyzed in this study. For SciELO there are five entries of the network among the top 15. Numbers are ranks (lower is better).

Perhaps there are a few terminology problems as the three initiatives have different starting points and, although today they are converging to a very similar model, these original characteristics should be taken into account when trying to explain the observed differences and approaches to the tasks of compiling, making accessible, increasing the visibility and providing quantitative information on the scientific production published in the journals of the region. The three systems are introduced in the following paragraphs:

SciELO (Scientific Electronic Library Online) is a Brazilian initiative (Packer *et al* 1998; 2001 in Spanish) for hosting electronic versions of scientific periodicals, originally intending to increase the visibility of

Latin American journals, underrepresented in the international databases, especially in those used for evaluation purposes like Web of Science (ISI/Thomson Reuters). The main methodological contribution of SciELO was to directly assume the electronic publishing in its own Web portal, taking into account the then current standards for such a task. From the very beginning facilities for research evaluation were a priority for the SciELO developers (Meneghini 1998).

Redalyc was set up by the Universidad Autónoma del Estado de México (UAEMEX) and it is a portal that hosts journals that fulfill a series of strict criteria. Those criteria are both formal and qualitative and only open access journals are accepted. Redalyc directly hosts all the full text electronic versions of the papers even when the original journal provides such digital content. As in the case of SciELO, the editors are strongly involved in the development of quantitative tools for evaluation purposes and routinely monitor in depth the use of their services (Laboratorio de Cienciometría).

Dialnet has strong library roots as it was designed as an enhanced electronic bulletin of TOCS (tables of contents) of journals, a tested and successful model used for dissemination of the summaries of their print versions. Although books, thesis and proceedings are also included in this bibliographic database, its core consists of papers and the main unit is the journal. Unlike SciELO and Redalyc, Dialnet hosts a limited number of full text documents most of them linked to the original source, usually the journal website. Although originally developed and still managed by the Universidad de La Rioja in Spain, it is now shared by an international network of academic libraries.

For the purposes of this analysis, the different addresses of these platforms on the Web were identified (Table 1) . SciELO consists of a network of autonomous country websites with their own national collection of journals that share similar procedures and interface. Besides these country sites, there are additional websites for thematic collections (public health, social sciences) and single journals with contents that overlap with the former ones. Redalyc has only one discipline specific branch (Estudios Territoriales) but it has recently changed its domain and, in a striking decision, set up a different domain for the scientometric portal.

Table 1 - Web addresses of the platforms analyzed in this study (June 2013)

Nome	URL
SciELO	http://www.SciELO.org/
SciELO books	http://books.SciELO.org/
SciELO Argentina	http://www.SciELO.org.ar/
SciELO Brazil	http://www.SciELO.br/
SciELO Chile	http://www.SciELO.cl/
SciELO Colombia	http://www.SciELO.org.co/
SciELO Costa Rica	http://www.SciELO.sa.cr/
SciELO Cuba	http://SciELO.sld.cu/
SciELO Mexico	http://www.SciELO.org.mx/
SciELO Portugal	http://www.SciELO.gpeari.mctes.pt/
SciELO South Africa	http://www.SciELO.org.za/
SciELO Venezuela	http://www.SciELO.org.ve/
SciELO Public Health	http://www.SciELOsp.org/
SciELO Social Sciences	http://socialsciences.SciELO.org/
SciELO Bolivia	http://www.SciELO.org.bo/
SciELO Paraguay	http://SciELO.iics.una.py/
SciELO Peru	http://www.SciELO.org.pe/
SciELO Uruguai	http://www.SciELO.edu.uy/
SciELO *West Indian Medical Journal*	http://caribbean.SciELO.org/
SciELO Brazil Proceedings	http://www.proceedings.SciELO.br/
SciELO Ciência e Cultura	http://cienciaecultura.bvs.br/
SciELO ComCiência	http://comciencia.SciELO.br/
SciELO Conhecimento e Inovação	http://inovacao.SciELO.br/
SciELO Pesquisa FAPESP	http://revistapesquisa.fapesp.br/
SciELO Revista USP	http://rusp.SciELO.br/
SciELO Revista Virtual de Química	http://www.uff.br/RVQ/index.php/rvq
Redalyc (old)	http://redalyc.uaemex.mx/
Redalyc	http://www.redalyc.org/

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Redalyc *Laboratorio de Cienciometría*	http://redalycfractal.org/
Redalyc *Estudios Territoriales*	http://estudiosterritoriales.org/
Dialnet	http://dialnet.unirioja.es/

The coverage of the three portals is different, as while Dialnet is indexing a huge amount of journals as collected by its participant academic libraries, the journals in SciELO represent their geographical presence, with an obvious Brazilian bias, while Redalyc only includes journals with which agreements have been established. This has led to a bias towards Mexican titles.

The number of journals and papers covered by each platform is presented in Table 2, although in the case of Dialnet most papers with open full text version are not hosted locally. For comparative purposes, this table also introduces the webometric data, which were collected as described in the methodology section of this chapter. Google provided the number of pages and PDF files that, in the case of SciELO, are the result of combining individual results of the 17 different web domains, while the numbers for the other two portals refer only to their main websites (<redalyc.org> and <dialnet.unirioja.es>).

Table 2 - Journal coverage and relative size of the three portals: Number of journals and papers obtained from information provided in the websites. Webometric data extracted from Google (mid-June 2013).

Portal	Journals	Papers	Webpages	PDF Files
SciELO	1.022	424.828	32.811.390	439.037
REDALYC	811	284.159	2.130.000	384.000
DIALNET	8.653	3.857.326	4.180.000	202.000

The objective of this study is to describe, in a quantitative way, the presence and visibility or impact in the Web space of these three platforms, using indicators that are used or will be considered in future editions of the Ranking Web of Repositories. The expected results are to be used in the evaluation of the strengths and limitations of the three platforms.

Methodology

The informetrics methods have evolved significantly in the last decade, including the emergence of new sub-disciplines like altmetrics and the impact of the social profiles and the standard identifiers. New indicators are also being extensively tested and even h-index is subject to much debate with a full family of different complementary indicators being developed.

For the purposes of this analysis, four different informetrics sub-disciplines are considered, using specifically those indicators that are used or can be used in the building of the composite indicator that is used for rank repositories in the Ranking Web of Repositories.

Bibliometric methods are used for collecting information about the number of publications deposited in the repositories and their visibility according to the number of citations they receive as given by the data provided in tools like Web of Science or Scopus. A few papers have been published already analyzing the bibliometric characteristics of our targeted platforms (Miguel 2011).

In the Ranking Web of Repositories, the main bibliometric source used is Google Scholar, a free academic database that is probably the largest citation database currently available. The bibliometric information is extracted following the webometric approach described by Aguillo (2012) that consists in using operators for filtering by domain (site: <scielo.org>) and file format (filetype:pdf), excluding the citations. The data were harvested during mid June 2013 for the whole database and also for the papers published during the 5 year period between 2008 and 2012, the procedure used for identifying recent contributions in the Ranking Web.

The webometric methods have been described by the editors of the Ranking in several papers (Aguillo *et al* 2006; Aguillo *et al* 2009), although as the sources are changing, the current techniques are similar but not the same as previously described. Collection of the Web data is mainly done through indirect ways using the huge databases compi-

led by the commercial search engines (now Google and Bing, years ago also Yahoo, AltaVista and Exalead). This approach is still the standard for estimating the presence of related indicators, so the total number of pages can be obtaining using a filtering syntax like site: <Redalyc.org> and similarly the rich files, a term that refers to the popular document types like Adobe Acrobat (.pdf) or the office management ones, like MS Word (.doc), MS PowerPoint (.ppt) or PostScript (.ps), need an additional filter: filetype: doc (both filters and delimiters, and the syntax are valid for both Google and Bing).

But the central tool in webometrics is the link analysis that unfortunately is no longer feasible from free sources like AltaVista or Yahoo. There are several commercial providers that independently index the Web for building very huge databases, that are very popular among experts in SEO (Search Engine Optimization), that is, the activities related to better positioning websites in the lists of results of major search engines. The Ukrainian provider Ahrefs (http://ahrefs.com/) was chosen because it allows obtaining the number of backlinks and originating domains for all levels (including subdomains, especially important to separate the several SciELO sites that share the same domain).

Altmetrics is in the very early stage of development (Priem and Hemminger 2010), therefore, it still lacks a universally agreed to methodological standard, although older concepts like citing and URL-mention can be useful if considered in the context of social networks and tools. In this work, such an approach has been adopted since all the websites can be almost unequivocally identified by their URL (in this case, a part of it being the domain or subdomain, see Table 1).

The social tools that can be used for academic metric analysis are still under discussion, but the ones cited in Table 3 are usually accepted as the most promising for preliminary review.

Table 3 - Social tools used in the altmetrics analysis.

Tool	Web address	Type
Facebook	facebook.com	General social network
Twitter	twitter.com	Social messaging
Linkedin	linkedin.com	Professional social network
Academia.edu	academia.edu	Academic social network
Researchgate	researchgate.net	Academic social network
Mendeley	mendeley.com	Bibliography social sharing
Slideshare	slideshare.net	Presentations social sharing
YouTube	www.youtube.com	Video social sharing
Wikipedia	www.wikipedia.org	Encyclopedia social building
	en.wikipedia.org	English version
	es.wikipedia.org	Spanish version
	pt.wikipedia.org	Portuguese version

The method uses Google as a proxy with a syntax as follows: site: <academia.edu>, <scielo.cl>, where the filter scan is for mentions in the social tool and the string searched is the URL of the Web domain address of the repository intended to be analyzed.

Usage as a metric is providing huge amounts of information about the way the information is accessed but unfortunately the lack of standards and reliable sources is seriously limiting the development of a strong usage metrics discipline. For demonstration purposes, since it is unlikely that this variable could be incorporated to the Ranking Web in the near future, the Traffic Rank provided by Alexa <www.alexa.com> is probably the best option available (Vaughan and Yan 2013)

Results of the bibliometric analysis

The bibliometric section of the Ranking Web is focused on data harvested from Google Scholar, currently the largest bibliographic citation database. We used the approach described in Aguillo (2012), delimiting the items hosted in the Websites of the portals analyzed. For each Web

domain, the number of papers (or abstracts, but not citations) were collected, identifying the total number, those in PDF format and the recent ones, published between 2008 and 2012 (segregating also for this group those available in PDF). The results (Table 4) show that a large percentage of probable PDF documents are not ending with the PDF extension, making them invisible to the specific Google Scholar operator and severely penalizing their position in this variable of the Ranking Web.

Table 4 - Number of items for each portal according to the Google Scholar database.

Name	Google	Google Scholar			
	Total	Total	PDF	2008-12	PDF (2008-12)
SciELO	459.000	3.320	941	2.280	790
SciELO Books	13.600	836	804	713	686
SciELO Argentina	1.230.000	20.200	2.350	12.700	1.640
SciELO Brazil	18.700.000	327.000	114.000	148.000	54.500
SciELO Chile	228.000	40.100	8.150	20.400	5.520
SciELO Colombia	2.360.000	57.400	9.430	35.900	7.470
SciELO Costa Rica	596.000	4.460	197	1.770	161
SciELO Cuba	928.000	19.900	1.520	10.200	1.130
SciELO Spain	1.770.000	25.100	4.190	12.900	2.560
SciELO Mexico	2.060.000	14.500	1.410	11.500	1.160
SciELO Portugal	127.000	1.170	91	934	81
SciELO South Africa	730.000	4.560	813	4.230	774
SciELO Venezuela	171.000	0	0	0	0
SciELO Public Health	3.370.000	22.700	5.920	9.030	2.590
SciELO Social Sciences	147.000	502	23	199	11
SciELO Bolivia	31.400	2.640	162	1.180	102
SciELO Paraguay	7.190	644	32	396	30
SciELO Peru	26.000	4.840	710	2.600	385
SciELO Uruguay	17.800	1 890	251	1.080	160

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SciELO West Indian Medical Journal	57.300	1.810	7	1.270	4
SciELO Brazil Proceedings	7.280	2.290	61	718	18
SciELO Ciência e Cultura	26.200	1.430	203	560	100
SciELO ComCiência	2.480	512	0	509	0
SciELO Conhecimento e Inovação	2.050	255	21	39	1
SciELO Pesquisa FAPESP	24.900	85	85	77	77
SciELO Revista USP	880	18	0	18	0
Redalyc (old)	896.000	0	0	0	0
Redalyc	2.130.000	849	534	385	181
Redalyc Laboratorio de Cienciometría	21	0	0	0	0
Redalyc Estudios Territoriales	1	0	0	0	0
Dialnet	4.180.000	413.000	44.700	137.000	13.700

The reason for the very low number of records in Redalyc is different and it is probably related to the way this platform provides access to full text, usually in a frame embedded in the main results window. This technical choice made its contents very difficult to crawl by the Google Scholar robot.

Dialnet has more items than SciELO Brazil but also has the problem related to the correct use of the PDF extension. However the coverage of recent papers in SciELO Brazil is proportionally better.

National SciELO databases only amount for about two thirds of the size of the Brazilian ones, Colombia and Chile being the main contributors according to Google Scholar.

Results of the webometric analysis

The Ranking Web takes into account several variables that are obtained from the large commercial search engines, namely Google (www.google.com) and Bing (www.bing.com), the Microsoft tool which also provides the database to Yahoo (www.yahoo.com). The size is estimated for the total number of webpages but also for the so-called "rich files". Other formats are far less common and were not included in this analysis.

The results are shown in Table 5. Although there is overlap among the different SciELO databases, their combined total (Table 1) is far larger than the ones of the other two services. Even the SciELO Brazil repository is also considerably larger when only Google data is taken into account. However this search engine is known for counting duplicate or pages no longer available, thus the Bing figures should also be used for obtaining a more reliable picture. In this case Dialnet is larger than SciELO Brazil and Redalyc. As this total corresponds to counting webpages, results include the large number of indexes and tables of contents in the huge collection of journals, books, thesis and proceedings in the Dialnet collection. Most of the records link to external sources or to abstract or metadata only pages.

The ratio of rich files regarding the total number of webpages is of utmost importance, not only because it is an important variable in the ranking, but also because the main purpose of these platforms is to provide access to full text documents for increasing their visibility. It can be expected that the links (in this case working as true bibliographic citations) are probably established if the target is the final document. Unfortunately in many repositories, the links are intended to be usurped by the metadata pages as this is the unfortunate recommendation suggested by librarians, which obviously violates author rights and that, combined with the use of handles, severely penalizes those repositories in the Ranking Web. The very low ratio (the best ones are for SciELO Books) probably points to an excess of emphasis on the metadata.

Data in Table 5 show clearly that, because of its advantages, only the PDF format is used, although other formats are counted in the Ranking Web, namely: doc & docx; ppt & pptx and ps & eps. Open Office formats and Excel ones (usually for large collections of numbers) are available in such low figures that they are not included in the aggregation of rich files.

Table 5 - Rich files according to Google and Bing (mid-June 2013).

Name	**Google**						**Bing**				
SciELO	**Total**	**Rich**	**PDF**	**DOC**	**PPT**	**PS**	**Total**	**Rich**	**PDF**	**DOC**	**PPT**
SciELO Books	459.000	2%	7.070	5	7	0	20.700	9%	1.960	1	0
SciELO Argentina	13.600	36%	4.890	0	0	0	3.640	32%	1.180	0	0
SciELO Brazil	1.230.000	2%	19.400	1	0	0	57.000	28%	16.000	0	0
SciELO Chile	18.700.000	1%	269.000	751	1	3	982.000	20%	197.000	8	1
SciELO Colombia	228.000	13%	30.400	16	1	2	119.000	21%	24.700	15	0
SciELO Costa Rica	2.360.000	1%	29.400	4	0	0	70.200	21%	15.000	0	0
SciELO Cuba	596.000	0%	1.520	0	0	0	12.200	15%	1.820	0	0
SciELO Spain	928.000	1%	6.930	0	0	0	38.700	9%	3.660	0	0
SciELO Mexico	1.770.000	1%	22.600	4	0	0	87.800	19%	17.100	1	0
SciELO Portugal	2.060.000	0%	4.020	4	0	0	60.700	7%	4.280	0	0
SciELO South Africa	127.000	1%	876	0	0	0	5.560	7%	399	0	0
SciELO Venezuela	730.000	0%	2.270	0	0	0	8.430	5%	453	0	0
SciELO Public Health	171.000	6%	9.390	26	0	0	51.600	13%	6.950	4	0
SciELO Social Sciences	3.370.000	1%	27.600	0	0	0	66.200	25%	16.300	0	0
SciELO Bolivia	147.000	1%	822	0	0	0	2.380	27%	649	0	0

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SciELO Paraguay	31.400	6%	2.010	0	0	0	5.130	24%	1.230	0	0
SciELO Peru	7.190	6%	457	0	0	0	1.780	29%	521	0	0
SciELO Uruguay	26.000	20%	5.120	0	0	0	22.300	20%	4.570	0	0
SciELO West Indian Medical Journal	17.800	5%	974	2	0	0	5.370	18%	964	0	0
SciELO Brazil Proceedings	57.300	2%	1.070	0	0	0	3.600	23%	813	0	0
SciELO Ciência e Cultura	7.280	15%	1.080	0	0	0	2.960	11%	318	0	0
SciELO ComCiência	26.200	5%	1.260	0	0	0	3.500	26%	922	0	0
SciELO Conhecimento e Inovação	2.480	23%	570	0	0	0	763	0%	1	0	0
SciELO Pesquisa FAPESP	2.050	15%	302	0	0	0	1.960	1%	14	0	0
SciELO Revista USP	24.900	12%	2.960	3	0	0	5.890	6%	331	0	0
Redalyc (old)	880	0%	1	0	0	0	45	0%	0	0	0
Redalyc	896.000	19%	167.000	5	0	0	242.000	7%	15.800	14	0
Redalyc Laboratorio de Cienciometría	2.130.000	18%	384.000	2	0	0	67.400	41%	27.300	0	0
Redalyc Estudios Territoriales	21	0%	0	0	0	0	8	13%	1	0	0
Dialnet	1	0%	0	0	0	0	1	0%	0	0	0
Dialnet	4.180.000	5%	202.000	31	0	0	1.440.000	4%	61.100	8	0

Visibility is by far (50% of the total) the most important variable involved in the Ranking Web. The last version of the indicator considered not only the external inlinks (backlinks), but also the number of different web domains originating in these backlinks. For this study we chose the Ahrefs provider <ahrefs.com> and applied a correction (square root) to the total number of backlinks for decreasing the weight of outliers (interlinking among the members of the networks). Table 6 shows the log-normalized results of multiplying the number of domains by the square root of backlinks. Domain linking is used for measuring diversity but, in the case of the central domain <SciELO.org>, the most important ones are probably those of its own network. Apart from the country systems, the public health server stands out due to the impact of medicine. This can also explain the similar, proportionally large impact of the Spanish platform, also focused on journals covering health issues.

Table 6 also provides the links coming from the TLD (top level domain) .edu, usually reserved for United States universities (although largely used worldwide too). Taking into account that more than 5,000 of the best higher education institutions are candidates for linking the portals, the low figures indicate a limited impact on the English speaking institutions, usually linked to the production of dominant, mainstream science, an issue that needs to be targeted perhaps by including (improved) interfaces in other languages and more abstracts and full documents in English. Aggressive dissemination of records in social tools can also play a role.

As expected, the former version of Redalyc (using the <uaemex.mx> domain) is still receiving more links than the new one, although this situation will be reversed in the near future. Its Laboratorio de Cienciometría is virtually unknown according to the data.

Table 6 - Number of backlinks, referred domains of these backlinks and those coming from the (mostly) United States institutes of higher education top level domain (.edu). Data supplied by Ahrefs (mid-June 2013). See text for explanation about how the visibility indicator is calculated.

Name	AHREFS			Visibilidade
	Backlinks	DomíniosRef	.EDU	Normalizada
SciELO	2.644.801	5.649	103	92
SciELO Livros	29.704	502	3	66
SciELO Argentina	146.529	3.159	48	81
SciELO Brazil	1.974.600	27.876	219	100
SciELO Chile	478.608	8.862	128	90
SciELO Colombia	192.473	1.847	37	78
SciELO Costa Rica	33.741	1.177	23	71
SciELO Cuba	44.737	1.608	26	73
SciELO Spain	238.729	4.037	42	83
SciELO Mexico	84.751	1.505	22	75
SciELO Portugal	40.174	179	6	60
SciELO South Africa	29.381	1.033	26	70
SciELO Venezuela	47.314	2.631	34	76
SciELO Public Health	138.195	4.483	46	82
SciELO Social Sciences	12.989	636	4	65
SciELO Bolivia	8.032	368	9	60
SciELO Paraguay	2.534	199	6	53
SciELO Peru	28.376	1.280	20	71
SciELO Uruguay	12.911	407	12	62
SciELO West Indian Medical Journal	10.454	582	13	63
SciELO Brazil Proceedings	3.464	313	3	57
SciELO Ciência e Cultura	12.434	717	6	65
SciELO ComCiência	19	15	0	24
SciELO Conhecimento e Inovação	907	65	0	44
SciELO Pesquisa FAPESP	62.880	2.566	8	77
SciELO Revista USP	20	3	0	16
Redalyc (old)	907.777	8.896	129	92
Redalyc	403.110	1.389	27	79
Redalyc Laboratorio de Cienciometría	11	2	0	12
Redalyc Estudios Territoriales	678	45	0	41
Dialnet	710.944	12.719	144	93

Results of the altmetrics analysis

Altmetric indicators are not still being considered in the Ranking Web, but preliminary studies suggest that certain social tools can be used for measuring visibility. Altmetrics is a new sub-discipline of informetrics that use mention analysis, the number of times the name or a URL of an institution, service, document or author appears in selected tools, similarly to citation or link analysis.

We selected several tools for testing, starting with Wikipedia <www.wikipedia.org>, which is probably the most relevant, considering the contents of these repositories.

Table 7 - Mentions in Wikipedia, including several of its language versions, through Google (mid-June, 2013).

Name	Wikipedia (Google)			
	All	English	Spanish	Portuguese
SciELO	1.390	81	287	9
SciELO Books	0	0	0	0
SciELO Argentina	1.400	20	135	2
SciELO Brazil	7.960	281	149	569
SciELO Chile	1.220	58	350	7
SciELO Colombia	46	3	10	0
SciELO Costa Rica	40	3	6	0
SciELO Cuba	76	2	32	0
SciELO Spain	129	3	50	1
SciELO Mexico	137	4	41	0
SciELO Portugal	7	0	1	1
SciELO South Africa	132	32	1	1
SciELO Venezuela	272	8	53	1
SciELO Public Health	431	78	21	33
SciELO Social Sciences	16	4	6	1
SciELO Bolivia	15	0	5	0
SciELO Paraguay	2	0	1	0

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SciELO Peru	148	7	35	0
SciELO Uruguay	3	0	1	0
SciELO West Indian Medical Journal	0	0	0	0
SciELO Brazil Proceedings	15	2	2	1
SciELO Ciência e Cultura	5	2	0	0
SciELO ComCiência	0	0	0	0
SciELO Conhecimento e Inovação	0	0	0	0
SciELO Pesquisa FAPESP	45	6	1	0
SciELO Revista USP	72	8	0	0
Redalyc (old)	4.000	54	292	14
Redalyc	53	1	28	1
Redalyc Laboratorio de Cienciometría	0	0	0	0
Redalyc Estudios Territoriales	0	0	0	0
Dialnet	20.700	93	1.420	13

For all the tools, we used an indirect approach, using a proxy for obtaining the results. In Google, it is possible to filter, by a web domain, the number of times specific URLs are mentioned. The syntax for Wikipedia and SciELO is therefore:

site: <wikipedia.org> “SciELO.org”

Quotation marks are needed for forcing the mention to the URL as such. This method has a few limitations because it cannot be used with very short URLs, since that generates too much noise, and will pick up e-mail addresses, although these mentions probably can be understood as part of the visibility measurement.

Table 7 shows the mentions for the whole of Wikipedia and for three specific language versions: English, Spanish and Portuguese. Patterns observed in the previous analysis also appear here, like the use of old Redalyc addresses, although the main difference is the large number of mentions obtained by Dialnet.

Table 8 - Mentions in selected social tools using Google as a proxy (mid-June, 2013).

Name	Ferramentas Sociais (Google)							
	Facebook	Linkedin	Academia	ResearchGate	Mendeley	Slideshare	Twitter	YouTube
SciELO	36.100	235	12.100	154.000	742	19.200	8.300	4.200
SciELO Books	20.200	7	172	0	2	4	2.190	1
SciELO Argentina	95.800	22	49.200	1.220.000	2.540	16.700	4.370	217
SciELO Brazil	233.000	3.210	51.300	1.540.000	13.300	120.000	20.100	21.900
SciELO Chile	6.480	115	10.600	5.080	882	2.110	1.780	126
SciELO Colombia	23.900	9	22.200	391	84	3.540	5.360	14
SciELO Costa Rica	2.080	1	2.280	328	2.190	164	71	6
SciELO Cuba	12.900	7	1.930	607	35	4.070	617	2
SciELO Spain	15.500	30	2.880	665	66	3.260	524	5
SciELO Mexico	84.100	7	24.500	353.000	128	9.610	2.970	3
SciELO Portugal	1.540	2	829	5	5	6	8	1
SciELO South Africa	1.020	2	5.290	23.300	7	821	278	9
SciELO Venezuela	16.300	10	14.700	56.900	56	5.270	3.400	4
SciELO Public Health	2.380	38	1.550	27.000	402	934	250	6
SciELO Social Sciences	26	2	592	3	0	2	23	0
SciELO Bolivia	2.020	0	293	22	2	85	64	9
SciELO Paraguay	52	0	213	6	0	7	4	0
SciELO Peru	10.200	15	6.880	14.100	10	1.450	289	2
SciELO Uruguay	968	1	74	151	2	63	31	0
SciELO West Indian Medical Journal	97	0	79	26	2	6	8	0
SciELO Brazil Proceedings	239	1	327	23	1	56	9	0
SciELO Ciência e Cultura	5.590	3	172	5	1	151	36	50
SciELO ComCiência	4	0	23	0	0	0	2	0

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Name	Ferramentas Sociais (Google)							
	Facebook	Linkedin	Academia	ResearchGate	Mendeley	Slideshare	Twitter	YouTube
SciELO Conhecimento e Inovação	44	0	8	1	0	5	3	375
SciELO Pesquisa FAPESP	11.500	44	76	57	1	179	649	136
SciELO Revista USP	0	0	0	0	0	1	0	0
Redalyc (old)	104.000	95	278.000	409.000	2.780	52.200	15.900	130
Redalyc	1.780	278	1.370	3.680	60	773	775	65
Redalyc Laboratorio de Cienciometría	5	0	0	0	0	1	4	0
Redalyc Estudios Territoriales	265	0	3	0	0	0	5	1
Dialnet	244.000	3.500	1.270.000	20.900	9.800	60.800	56.400	87

With the same methodological approach, the platforms were tested against some of the most popular social tools. Table 8 shows that, as expected, Facebook is extensively used, but the most research focused tools such as Academia.edu and ResearchGate are becoming more and more relevant. On the contrary, Mendeley has not yet played a key role in the scholarly communication processes in Iberoamerica, at least from the point of view of portals of open access journals.

Results of the usage metrics analysis

Usage is becoming a topic of strong interest in informetrics, as checking and evaluating the number and characteristics of visits and visitors to websites can provide additional information for better understanding of the way scientific information is communicated at the very basic level. Unfortunately most of the information available is collected using different procedures. Thus, the data source of the variables to be compared will not be standards, properly speaking.

Although Google Analytics is becoming a de facto standard (perhaps challenged by Piwik), it is still very problematic to obtain reliable information with it for a large number of websites.

An alternative is to use the traffic information provided by Alexa, a tool that ranks Web domains according to the visits intercepted by this system during a period of three months. Some limitations of this tool are that it does not provide raw numbers but rankings, only full domains are considered and, perhaps more important, geographical bias can be present as the system coverage is not evenly distributed.

Table 9 - Ranks (lower is better) according to Alexa (mid-June 2013). Only Web domains are ranked, so the positions of SciELO Spain (isciii.es) and Dialnet (unirioja.es) belong to their parent organizations.

Name	***Traffic Rank***
SciELO	96.855
SciELO Argentina	97.418
SciELO Brazil	9.595
SciELO Chile	39.630
SciELO Colombia	108.874
SciELO Costa Rica	342.334
SciELO Spain *	62.378
SciELO Mexico	111.215
SciELO Portugal	126.969
SciELO South Africa	533.869
SciELO Venezuela	83.706
SciELO Public Health	158.997
SciELO Bolivia	512.298
SciELO Peru	213.757
SciELO Uruguay	650.098

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Redalyc	81.821
Redalyc Laboratorio de Cienciometría	0
Redalyc Estudios Territoriales	30.184.318
Dialnet **	22.830

Figures in Table 9 are ranks (lower is better!) with SciELO Brazil being ranked in the top 10,000 world Web domains. The Dialnet rank is in fact due to the unirioja.es domain but the repository is clearly by far the most popular part of this otherwise small university. The traffic rank of SciELO Spain refers to its parent organization (Instituto de Salud Carlos III, isciii.es), but in this case the central domain deserves an important slice of the total. The Chilean platform is well known and frequently accessed probably because it is one of the first to be installed and because of governmental support. Redalyc is still struggling to make its new domain popular.

Discussion and conclusions

The quantitative exercise presented here cannot be understood without taking into account the methodology and guidelines used in the Ranking Web of Repositories. Of course, some of the results are providing information on how to improve performance in this ranking, but it is also true that new indicators have been included that are not currently being used in its calculations, although most of them probably will do so in the future.

The SciELO network is a strong group that is expanding its scope, but appears loosely integrated in spite of a common interface, a look-and-feel design that looks now a bit outdated. Comparing it with the other two portals with modern interfaces and advanced services, the SciELO platform requires a full refurbishment of its Web presence and a greater integration of services. Nevertheless the Web indicators are still solid, mainly because its competitors are making some mistakes, especially Redalyc that changed the main Web domain and maintains a different address for the scientometrics data.

The impact of Redalyc in Mexico has been very important but perhaps also in a negative way as it prevented the generalization of institutional repositories among Mexican universities. Only seven of them are represented in the Ranking Web with their own open repository, a very low figure when compared with around 35 in Brazil, although the core contents of many of these repositories are not journal papers but theses. Chile and Argentina, which are well represented in the SciELO network, specially the first, also have low numbers of institutional repositories. Chile has only 7 universities in the Ranking Web.

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Chapter 9 – SciELO Books

Adriana Luccisano, Nicholas Cop and Abel Packer

Introduction

SciELO Books <http://books.scielo.org> is an integral part of the SciELO Program with the objective of indexing and publishing online collections of academic books in digital format (eBooks), envisaging to maximize the visibility, availability, use and impact of the research and studies they publish.

Books have always been an integral part of the scholarly communication process and the move to eBooks was a natural process in the continuing evolution of the SciELO Program.

SciELO Books was officially launched in a public ceremony on March of 2012 with book collections from Brazilian university presses.

This chapter includes a high level management and operational template of SciELO Books that can be adopted and adapted by countries planning to implement a similar operation.

The raison d'être

The rapidly evolving global trend of new digital means for scholarly communication in the previous decade was a significant factor in deciding to expand the SciELO e-journal network operating under the SciELO Program to include eBooks. The eBook format was quickly becoming a popular one for scholarly communication and education.

The SciELO Program was instituted in 1998 and is funded mainly by FAPESP, the State of São Paulo Research Foundation.

The idea of SciELO Books was first discussed in 2007. The objective that was set out for SciELO Books was to index and publish on-line national and thematic collections of academic books with the purpose of maximizing their visibility, availability, and the use and impact of the research and studies published in them. SciELO Books was to operate as a cooperative network of university presses and other academic publishers, intermediary institutions and other institutions in the flows of scholarly communication. It was also to be an interoperable network, sharing goals, resources, methodologies and technologies with the SciELO Network of online journals with the objective of contributing to the development of scholarly communication in both media.

Figure 1 - The SciELO Program and its expansion to include eBooks under SciELO Books.

What is visibility?

- Content available in the important indexes that are most used by SciELO's audience - the public, educators, students and researchers.
- High ranking (e.g. first page) in search results returned to the user.
- Easy access from the index to the full text of the content.

A plan was then developed to bring in stakeholders and publishers in a pilot project whose objective was to determine the long term feasibility of such an academic eBook operation.

For the SciELO Books pilot to be successful, it was deemed essential to have:

- Content - A founding group of academic publishers.
- A home - A coordinating and executing agency to implement SciELO Books.
- A method - A methodology and a technological platform.
- A technical infrastructure - The staff, software, hardware, systems and network structure required.
- A funding source - Secure funding for the pilot.

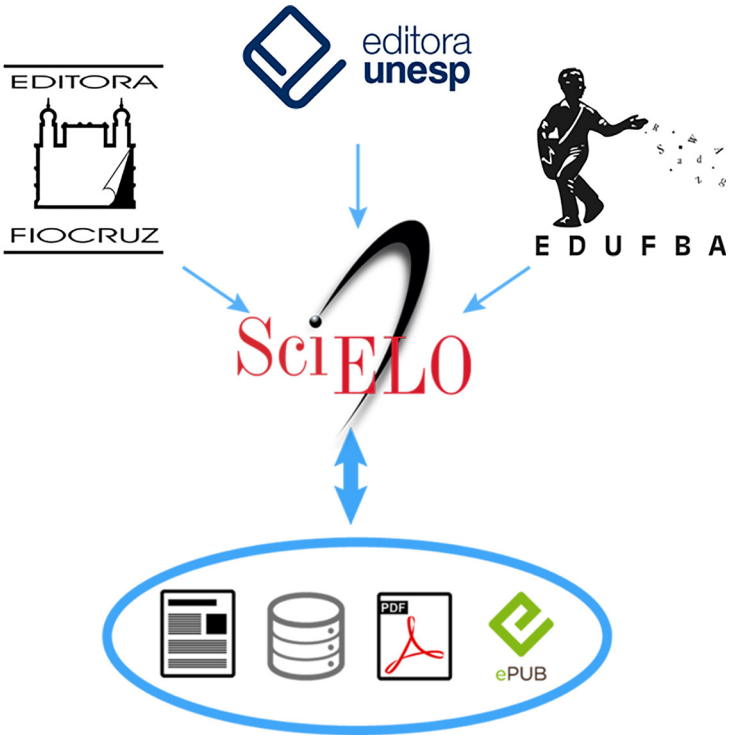


Figure 2 - SciELO Pilot project elements.

The pilot began in March 2011 and was led and funded by a founding group of academic publishers formed by the presses of the Universidade Estadual Paulista Júlio de Mesquita Filho (Editora UNESP), the Federal University of Bahia (EDUFBA) and the Oswaldo Cruz Foundation (Editora FIOCRUZ) in partnership with the Brazilian Association of University Presses (ABEU). Today these presses continue to lead the regular operations of SciELO Books.

Figure 3 - The founding members of the pilot project.

The present day development and operation of SciELO Books is managed under the SciELO Program of the State of São Paulo Research Foundation (FAPESP) in partnership with the Brazilian Association of University Presses (ABEU). This partnership builds upon the original pilot project that culminated in the official launch of SciELO Books on March 30, 2012. The responsibility for managing the execution of SciELO Books lies with the Foundation of the Federal University of the State of São Paulo (FapUnifesp). The methodologies and technological platform for SciELO Books, originally developed by BIREME / PAHO / WHO during the pilot project in cooperation with FapUnifesp and the publishers in the pilot, are now developed and maintained by SciELO itself.

Figure 4 - The current SciELO Books stakeholders.

Currently the SciELO Books collection is composed of peer-reviewed open access eBooks and eBooks for sale in all disciplines.

The vision of SciELO Books is not only to publish books in electronic format but also to enhance the visibility, the access, the use and impact of the research and studies published, principally in the Humanities where most of the intellectual production is published as books.

It is recognized that a significant number of citations made in journals in the Humanities refer to books, so SciELO Books will link citations between its journals and the books.

The governance and funding of SciELO Books

The SciELO Books governance is structured to meet the challenges of selecting publishers for participation in SciELO Books and the collections they submit. This is a function critical to SciELO Books and assures that the academic nature and quality of the collections in particular remain central to this initiative.

SciELO Books has a governance system formed by two main bodies that advise and oversee its development and operation. The Steering Committee oversees the system of governance and the Advisory Board is responsible for the operational management and implementation of SciELO Books.

The SciELO Books Steering Committee

The Steering Committee is responsible for overseeing the planning and sustainability of SciELO Books with regard to the development of appropriate business models, and methodologies and technologies of publication and dissemination. The Committee is also responsible for the approval, monitoring, and evaluation of the annual work plan of SciELO Books.

The recommendations of the Steering Committee are implemented by the Advisory Committee in conjunction with the publishers and institutions responsible for the SciELO Books collections.

Currently the Steering Committee consists of representatives from the founding publishers of SciELO Books (Editora FIOCRUZ, Editora UNESP and EDUFBA) and the SciELO Program as permanent members. Its composition is reviewed annually to taken into account the increasing number of participating publishers.

The SciELO Books Advisory Committee

The application of SciELO Books Criteria to the selection of publishers, books and book collections is performed by the Advisory Committee. The Advisory Committee is composed of researchers and academics nominated by the publishers that participate in SciELO Books. In general, the committee members come from the publisher editorial committees or are nominated by them.

The Advisory Committee is charged with the following tasks:

- Update the SciELO Books Criteria to continue to refine and improve the evaluation process designed to include new, permanent publisher members, book collections and books in the SciELO network;
- Continuously adjust and refine the functioning of the Advisory Committee in order to more effectively fulfill its objectives;
- Review requests for inclusion or withdrawal of publishers from the SciELO Books network;
- Review requests for admission and certification of book collections and make appropriate recommendations;
- Review requests for admission and certification of individual books and make appropriate recommendations;
- Accredit and disqualify publishers and/or collections;

The Advisory Committee meets at least 4 times per year to review the processes of admission of publishers and collections to the network. Only in special cases does the Advisory Committee review individual books. In general, it is understood that the evaluation of individual books is performed by the editorial committees of the publishers or of the independent collections.

Local governance: SciELO Books Network members

SciELO Books governance and management is modeled after the SciELO e-journal Network, thus there are common management, development and production methodologies that other expected SciELO Books National nodes in other countries will be adopting. The methodologies will be adapted to the conditions and needs of each of the participating countries, as they are in the SciELO e-journal Network.

Each of the SciELO Books National nodes is expected to have a National Coordinating Institution that represents the National Book Collection within the SciELO Books Network, and administers the local national SciELO Books Web site and liaises with the SciELO Books coordinating node in Brazil to exchange content and update the SciELO Books methodology and technical platform.

Funding of SciELO Books and the business model

OSciELO Books publishes two categories of eBooks: open access, published under the Creative Commons Attribution-NonCommercial license (CC BY-NC), and commercial eBooks sold at a price through online eBook retailers.

The financial sustainability of SciELO Books is based on the financial support of the participating publishers and on a percentage of the net revenues generated by the sale of the commercial eBooks. The publishers contribute a one-time fee for the publication of each title published under the SciELO Books brand.

The SciELO eBooks that are for sale are sold through eBook retailers with whom SciELO has agreements. Currently SciELO Books has agreements with Kobo and Google.

In general, the eBook retailers operate under the Wholesale Model. Under this model, the revenue that SciELO Books receives from the eBook retailer for each eBook sold is a fixed percentage of the eBook's Publisher's List Price (regardless of what price the retailer sells it at). This percentage is normally around 50%.

SciELO Books shares these revenues with its participating publishers according to a fixed percentage. It was set at 50% for 2013. In other words, a publisher participating in SciELO Books receives 50% of the revenues received by SciELO Books from the retailers for the sales made of that particular publisher's eBooks.

However, SciELO will begin to sell an eBook itself once the revenue received by the publisher for a title surpasses the amount the publisher pays to SciELO to have the title published. In 2013, this amount was R$ 1,000 (approximately US $500).

This model will be reviewed annually in order to ensure the self-sustainability of the SciELO Book project and to maximize the returns for the publishers.

A publisher participating in SciELO Books determines the List Price of an eBook that will be put for sale. The publisher can modify the List Price at any time, as well as change how the eBook will be made available: open access or for sale.

These financial contributions or fees give publishers access to all the services and functions performed by SciELO Books.

The Steering Committee annually sets the amount to be paid by the participating publishers per title published. Every six months the Steering Committee also sets and reviews the percentage split of net sales from the commercial eBooks. The amounts to be paid per title and the percentage split of sales are based on the annual operating budget of SciELO Books.

SciELO and ABEU regularly seek additional resources from project funds available for development and innovation from agencies that support research and education, foundations that support culture, and corporate sponsorships where there is no conflict of interest with the ethics and principles of scholarly communication.

The operational framework

The SciELO Books operational framework provides functions, products and services equitably to all the participating publishers. It also

permits the end user to easily find, download and read eBooks on any device via state-of-the-art technologies and methods.

The aims of the framework are to: (i) contribute to the improvement of online publication by the participating publishers, (ii) strengthen and expand the visibility and availability of the book collections, and (iii) evaluate the usage and demand of the books by measuring and keeping track of the number of accesses, downloads and citations.

The following figure shows the many partners that are involved in providing services to the SciELO Books publishers and the end-users.

Figure 5 - SciELO Books Operational Framework.

SciELO Books has four sets of functions and basic services on the Web which are supported by the operational framework: indexing, publication, interoperability and dissemination.

Indexing

The indexing performed by SciELO Books is a critical function of the SciELO operations since it determines how easily a user can find the

eBooks on the Web. The indexing is done at the book and chapter level according to international standards and passes through a process of quality control. This quality indexing permits the broad dissemination of SciELO Books on a global scale via information providers, eBook retailers and the SciELO Books site itself. The indexing is sent to the services of the many SciELO Books partners so that there is world-wide visibility of the eBooks for users to easily find and download. In addition, some indexing services also index the full text of each of the eBooks.

Internet indexes are used by the academic community and users in general to find relevant content on the Web. The SciELO Books partners below provide integrated search engines, called Discovery Services, specifically geared to academic communities. Major library consortia, academic libraries, researchers and the public use these Discovery Services as their single search interface to the Web and library respurces, in addition to or as a replacement to Google.

Figure 6 - SciELO Books Discovery Services partners.

SciELO Books are also indexed in Google and Google Scholar so that users can find SciELO eBooks when using these two search engines.

Finally, the eBooks themselves, along with the indexing done by SciELO, are sent to the SciELO Books online eBook partner retailers. These retailers distribute the open access eBooks as well as sell the commercial eBooks in their online retail stores. The revenue generated from sales of the commercial eBooks is split with the retail stores under the Wholesale model mentioned previously.

Figure 7 - SciELO Books eBook distribution partners

As stated earlier, the commercial eBooks currently are disseminated and made available only via the partner eBook retailers.

The indexing done by SciELO also includes links to the Brazilian Plataforma Lattes of curricula vitae of Brazilian researchers, enabling a user to link from the Brazilian authors of an eBook to their curricula vitae in Lattes.

Publication

Participating publishers may submit individual books or collections of books for inclusion in SciELO Books. A spreadsheet is submitted for each book with the standardized title, author, ISBN and access mode for the book (open access or commercial). The publisher must also send background on the peer review that was done for the book, for example by submitting a copy of the approval or a description of the approval process.

Books are submitted to SciELO preferably on-line and in digital format. Each publisher is given storage space for this operation on the SciELO servers. If for some reason the publisher does not have a digital version of the book, the publisher submits a print version that is in excellent condition which is then scanned to produce a digital version.

SciELO Books does not publish independently produced books.

SciELO Books believes in open standards and that users should be free to read on any device, so the eBooks are published in three different formats to provide complete interoperability with all available reader devices and software. These three de facto international format standards are:

- HTML (Hyper Text Markup Language), for viewing on Web browsers;
- PDF (Portable Document Format), for viewing and printing the book in the same format as the print version of the eBook;

- ePUB (Electronic Publication), for viewing on mobile devices, eReaders and via eReader software and apps. This format adjusts the text and page size of the eBook to the different screen sizes of these devices, such as PC's, tablets, mobile phones and TV's.

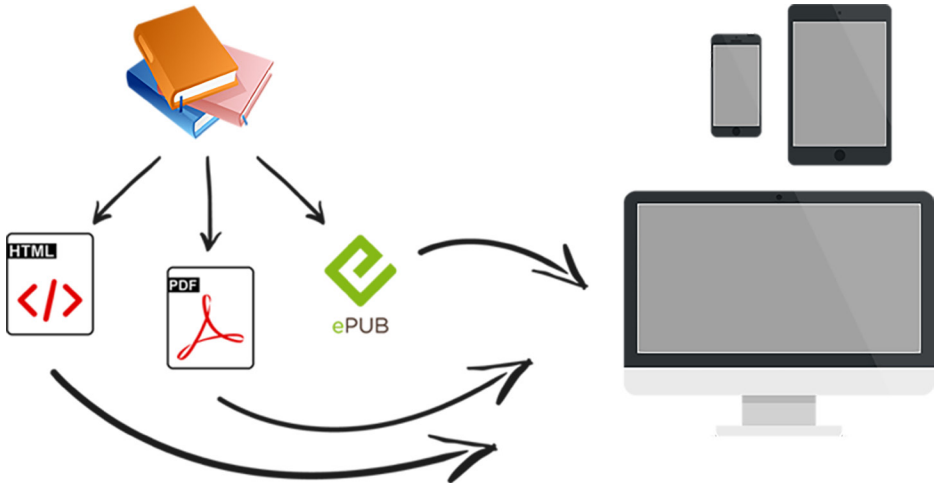


Figure 8 - Interoperability with all devices - HTML, PDF, ePUB.

Today's users do not necessarily want or need the entire eBook, so SciELO Books offers the user the flexibility of downloading only the relevant chapters or the entire book.

Interoperability and dissemination

Publishers join SciELO Books because it gives them tremendous visibility, brand recognition and access to the global marketing and distribution services of the SciELO Books operational framework.

The indexing performed by SciELO Books and the formats in which it publishes the books themselves are international standards that are totally interoperable with the world's systems and devices, and with SciELO e-journals. This allows SciELO Books to easily interoperate with its partners and to hot-link references from books to journals. The interoperability also permits users to freely read on any device they choose.

SciELO Books provides additional dissemination services to publishers through the traditional media, blogs, a Youtube channel, a Twitter feed <@SciELOBooks>, as well as through links to social networks for users to share the SciELO Books site with others.

Postings of SciELO Books in the media and events in which SciELO Books participates is available at <http://books.scielo.org/en/scielo-books-on-the-media/>.

The SciELO OPDS Catalog merits special consideration here. OPDS, an international standard, makes the full catalog of eBooks available from within a user's eReader application. The user can acquire any of the eBooks directly within an eReader application that has the OPDS option. The major advantage is that the user can acquire eBooks without leaving the eReader or go to another site.

Figure 9 - The SciELO Books OPDS Catalog.

Long term preservation

SciELO Books, along with SciELO e-journals, has partnered with the CLOCKSS Archive for the long term digital preservation of all SciELO content. This ensures that the scholarship published by SciELO, which is an important part of the scholarly communication flows of Latin America, Portugal, Spain and South Africa, will be preserved

by CLOCKSS for this generation and for those to come. Significant investments have been made in SciELO over the years by research agencies with the objective to increase the visibility, access and impact of research from emerging and developing countries. It is critical to all, and to researchers in particular, that the results of this investment be preserved for the long-term good of scholars worldwide. CLOCKSS is providing SciELO Books and SciELO e-journals with the solution.

SciELO Books production flows

The process by which book collections are defined and evaluated was described in previous sections of this chapter. This section describes the actual production of the eBook collections.

The teams and third parties that work on the production of the eBooks use the SciELO Methodology, described earlier. They are trained in its use and they produce an average of five new titles per week.

The production workflows of a book from the time it is approved follows the model outlined below:

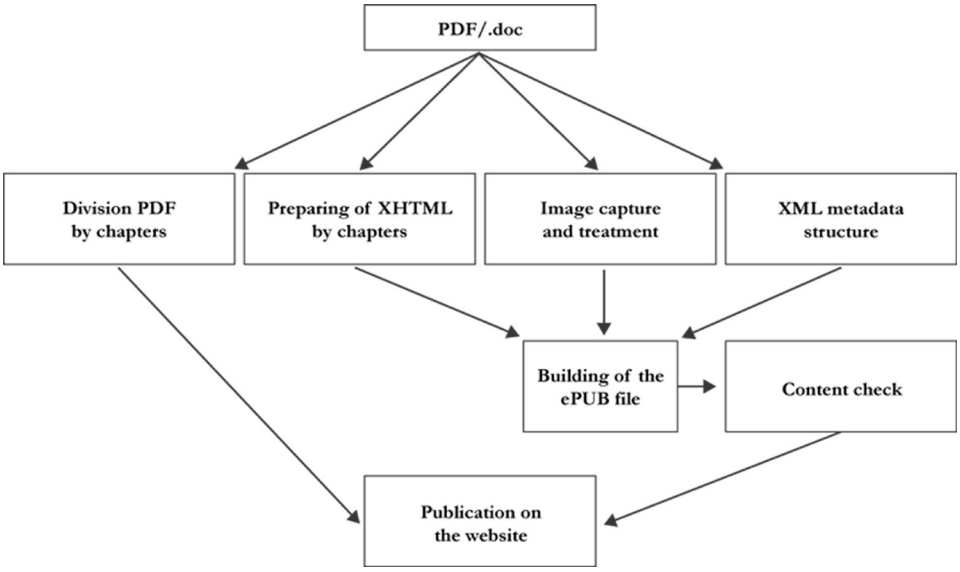


Figure 10 - SciELO Books publishing operational workflows once a book is approved.

All the books published by SciELO Books in ePUB format get an e-ISBN, in addition to a new cataloging record with information about the ePUB format used. The bibliographic references of the books published follow ISO standards and are displayed on the cover page of the PDF and ePUB formats of the books and in each of the chapters.

All books have a DOI from CrossRef <http://crossref.org/webDeposit/>.

Classification and classification tools

SciELO Books uses two classification systems in parallel, the DDC (Dewey Decimal Classification System) and the BISAC Subject Heading List. A DDC to BISAC crosswalk (mapping) tool is used to maintain classification compatibility in the assigning of a classification to a book.

The use of the DDC facilitates the indexing and interoperability with international indexers of information for the academic, education and public markets while the use of the BISAC Subject Heading List facilitates the same with international indexers in the book industry such as Kobo, Google and Amazon.

An international standard used by SciELO for metadata description is *ONIX (ONline Information eXchange) for Books*, based on XML. This standard allows the transfer of book industry information for the commercialization of eBooks. It is widely used in the eBook supply chain worldwide. This metadata standard facilitates the transfer of metadata information to the many indexing and retail partners of SciELO Books.

Quality control

All ePUB format books pass through a technical verification process that consists of checking for errors that might have occurred during the conversion of the books to the different formats.

The first step in the quality control process is the use of IDPF's ePUB validator (International Digital Publishing Forum <http://validator.idpf.org/>).

Issues such as split PDF files, size and quality of the book cover, compliance of the files and the diagrams with the methodology are also checked.

Errors also are also detected while testing an eBook file on a mobile device. This testing and verification is indispensable to validate that the ePUB format of the book is correct.

ePUB format

The ePUB format is an open standard for electronic books (eBooks) and other types of electronic publications. ePUB is developed and maintained by the IDPF - International Digital Publishing Forum. ePUB adjusts the display of the text of an eBook to the size of the screen, be it small or large, of the device being used to read the eBook.

SciELO Books uses ePUB as a complementary format to PDF. PDF displays the pages of an eBook exactly as they appear in print (called "page image"). ePUB complements the PDF format by making it possible for users to download and read ePUB format eBooks on the different screen sizes of the various eReader devices in the market.

SciELO Books currently uses ePUB version 3.0.

SciELO Books template

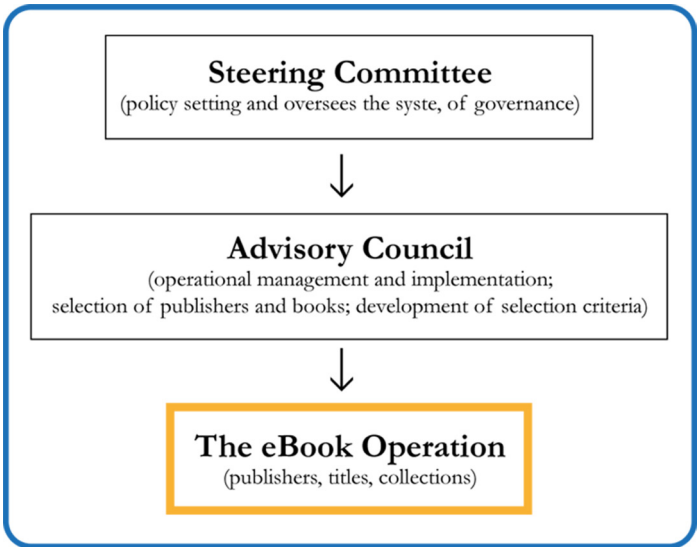
Conceptually SciELO Books can be described as follows: Pilot Project, Governance, Operations - Publishing, and Operational Framework. The following graphics provide a country with the conceptual map needed to successfully implement an operation similar to SciELO Books.

Pilot project elements

- Content - A founding group of academic publishers.
- A home - A coordinating and executing agency to implement SciELO Books.
- A method - A methodology and a technological platform.
- A technical infrastructure - The staff, software, hardware, systems and network structure required.
- A funding source - Secure funding for the pilot.

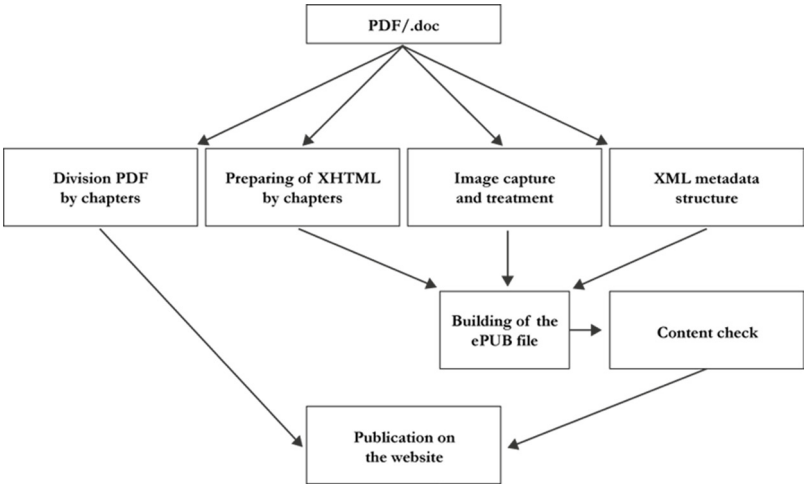
Governance

A governance system formed by two main bodies that advise and oversee the development and operation of the academic eBook operation.



Operations – publishing

An operational system to publish the books in electronic format.



Operational framework

An operational framework to promote the improvement of online publishing by the participating publishers; to broaden, strengthen and expand the visibility and availability of the book collections; to engage users via social media, to evaluate the usage and demand of the books and; to provide for long-term digital preservation for future generations and to protect the investment.

SciELO Books in numbers

Títulos, autores, downloads

513	321	4 550	2 102	25 859 739
titles available	Titles in open access	chapters in open access	authors	downloads

Seven publishers, two collections

eBooks available in:

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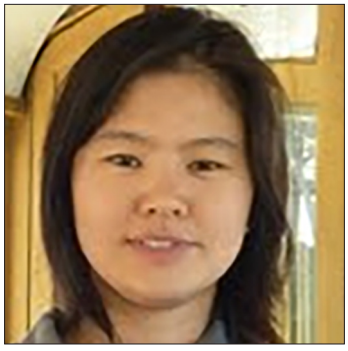

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