# ELECTRONIC SYSTEM FOR JOURNAL PUBLISHING (SEER)

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The present work describes the adaptation to Portuguese of the Open Journal Systems (OJS), a software applied to the administration of the editorial process of electronic journals, developed by the Public Knowledge Project (PKP), of the University of British Columbia, Canada. The customization resulted in the **ELECTRONIC JOURNAL PUBLISHING SYSTEM** (SEER), which has become part of the Brazilian Digital Library (BDB) project of *the Instituto Brasileiro de Informação em Ciência e Tecnologia* (IBICT/MCT). One of IBICT's main goals to develop systems based on the Open Archives Initiative, promoting free, democratic, and open access to cientific and tecnological production in Brazil.

**Keywords:** customization; Electronic Journal Publishing Systems; i18n; information systems; internationlization; OJS; Open Access; Open Journal Systems; Open Source; SEER; translation; utf-8

## INTRODUCTION

The system for cientific publication continues to be an important instrument for the cientific communities.

Scientists still depend on scholarly journals for reporting research results, obtaining information and as reference sources. Also, the number of articles published per scientist, the amount of reading and the indicators of usefulness and value are virtually unchanged [1].

Previously processed in an almost completely manual method and published in paper, cientific publications have improved the publishing processes and making available their issues on the Internet. Certainly, new information technologies have created the necessary means for the growing development of electronic cientific journals.

[…] by the early 1990s, electronic journals finally emerged. Today, almost two-thirds of scientific journals are available both electronically and in print, and there are more than 1,000 electronic-only peer-reviewed journals [1].

Nonetheless, the always increasing difficulties to obtain fundings that help maintain a publication system have pushed scientific editors to search solutions favoring what is called Open Access. This new paradigm emphasizes free access to information, democratic access to content.

When pinpointing the many advantages of using systems based on *Open Access* philosophy, Willinsky reports that, according to a few estimates, 10 to 20% of online journals (on the Internet or digital) offer free access to their content [2].

This seems to be the international trend that is increasing amongst the cientific editorial environment. In Brazil, even though there is funding for journal publications, it cannot contemplate all of the national journals. The choice for an instrument that automates the editorial process using standards and technology based on open acess philosophy becomes the alternative solution to the lack of budget appropriation. Furthermore, it stimulates the democratization of information access, making content available and favors interoperability with service providers that tend to both national and international cientific communities.

The world of *Open Access* offers a variety of support systems for the publication and dissemination of woldwide cientific production. An example of such systems is the Open Journal Systems – OJS (http://www.pkp.ubc.ca/ojs/), a free tool applied to the management of the publication process of electronic journals, developed by the Public Knowledge Project (PKP), of the University of British Columbia.

This tool contemplates most of the essential characteristics necessary to the automation of the editorial process of the national cientific journals. Targeting a profound analysis of this system, the editorial process of the journal *Ciência da Informação* – published by the Brazilian Institute for Information in Science and Technology (IBICT) – was applied to OJS. The analysis resulted in the development of the Electronic System for Journal Publishing (Sistema Eletrônico de Editoração de Revistas – SEER).

The SEER is one of the many projects of IBICT/MCT's Brazilian Digital Library Implantation Program (Programa de Implantação da Biblioteca Digital Brasileira - BDB), with the objective of developing systems based on the *Open Archives Initiative*, promoting free and democratic access to cientific and technological production of the nation.

## ANALYSIS OF OJS AND DEVELOPMENT OF SEER

Published by IBICT/MCT since 1972, in print and digital formats, the journal *Ciência da Informação,* used as corpus of this research, possesses a version available on the Internet since 1996. Until this date, despite the exchange of messages between editors, reviewers and authors being made through electronic mail, *Ciência da Informação* does not possess an integrated publishing system. Taking into account this semi-automated situation, the journal was chosen as a tool to provide adequate analysis of OJS and the development of SEER. The test consisted of simulating a complete electronic publishing of the journal´s latest issue of 2003.

After the installation of OJS version 1.1.5, translation of content files, and correction of a few tags, symbols and uppercases, *Ciência da Informação* was input to the system. At this stage, it was necessary to define de design of pages (logo, cover and external links) and the editorial language. All the layout options available in OJS were tested offline, from the first draft papers to their final output in HTML and PDF formats.

The editorial policy of the journal had to be adapted to the system to follow the automatic reviewing process, pre-selection of papers and decisions regarding contributions to be published on the journal. It was observed that the traditional proceedings of the journal had become more systematic as the work was carried on. Following the developers instructions, a few changes were made to the system respecting part of the original editorial process. Following are the editorial criteria altered in the system:

1. Permanent and non-permanent sections of the journal;
2. Definition of all online tasks to be appointed to editorial team members;

3. Submission and forwarding method of papers;

4. Customization of e-mail messages;

5. Number of reviewers per article (two reviewers and six members of the editorial committee)

6. Double blind review (omission of author and reviewer names);

7. Complete record of all transactions occurred for each paper submitted;

8. Offer of alert service to receive content of each issue, developing an equivalent to a subscriber list;

The first activity with the editorial team was the enrollment of reviewers. The work allowed the update in a single data base of the information of several journal reviewers. The team felt the need for a search system (with a search filter by subject matter or area of interest) that could make the editors job easier when assigning papers for review.

The enrollment module did not allow the inclusion of two of the types of reviewers previously existent in *Ciência da Informação*, which are: external consultant and member of the editorial committee. The solution was to alter the standard e-mail and the comments communication among those involved in the editorial process. Also, the system did not allow a reviewer to make more than one review per submission received. This is a specific characteristic of *Ciência da Informação*, and perhaps of other cientific journals as well. A member of the editorial committee may be assigned to review an article as a reviewer, and later in the process be responsible for defining which articles will be in the journal´s issue.

The translation of the 32 standard e-mails, with the objective of automating the information about the status of the editorial process, was made considering that a few of them would not be used during the simulation. The translated standard e-mails not used by the journal were the following:

1. "Job accepted" message from Section Editor to General Editor (e-mails 26 and 32)

2. "Proofreading" request message from General Editor to Author (e-mails 20, 21 e 24)

The next step was the enrollment of authors without inclusion of an e-mail address to prevent the actual communication during the testing phase. The submission included 32 papers, 24 of them being recommended by reviewers and only 16 approved by the editorial committee. The option "withdrawn by author" was included in the "rejected/accepted/pending" options list. It was also suggested the inclusion of the option "abstain" in the event of a reviewer or member of the committee not be willing to manifest a position regarding the availability to review a paper.

The submission of the 32 papers in the system with the respective inclusion of their metadata, as well as the offline communication with authors in the process was a job fullfilled by the the editorial team coordinator, following the steps defined in the editorial flowchart of the publication in paper (Fig. 1). The copyediting was not contemplated in this testing, for it is usually a job for an external company. However, by the 2004 first issue, the copyediting process will become a responsibility of IBICT/MCT, avoiding further requests for external assistance in this matter.

The three types of submissions were tested: articles, experience reports and editorials. The option allowing the editor´s choice of writing the editorial was confirmed.

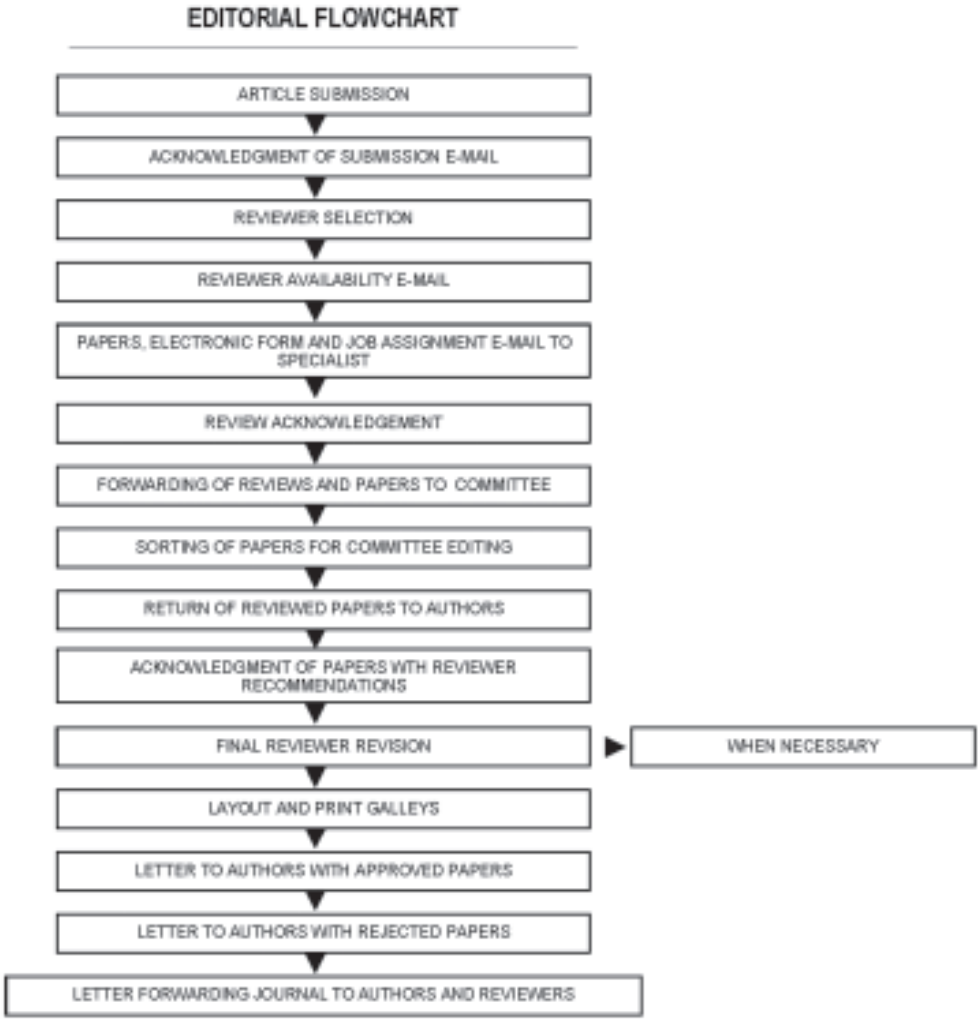


**FIGURE 1 - EDITORIAL FLOW CHART FOR THE JOURNAL *CIÊNCIA DA INFORMAÇÃO***

A list of items that require special attention when reviewing submitted papers was included in the "comments" option to be filled by reviewers. These items are, therefore, available automatically to be filled by reviewers. Another change to the system was made regarding the combined inclusion of reviews by members of the editorial committee and reviewers, aiming at providing the general editor with improved understanding and assistance before he making the final decision.

The system allows the evaluation to be made separately by article and the reviews to be sent at any given time of the process (Fig. 2). This feature is an advantage in relation to the previous traditional model, which expected all papers and reviews to be sent by the reviewer in a single e-mail.

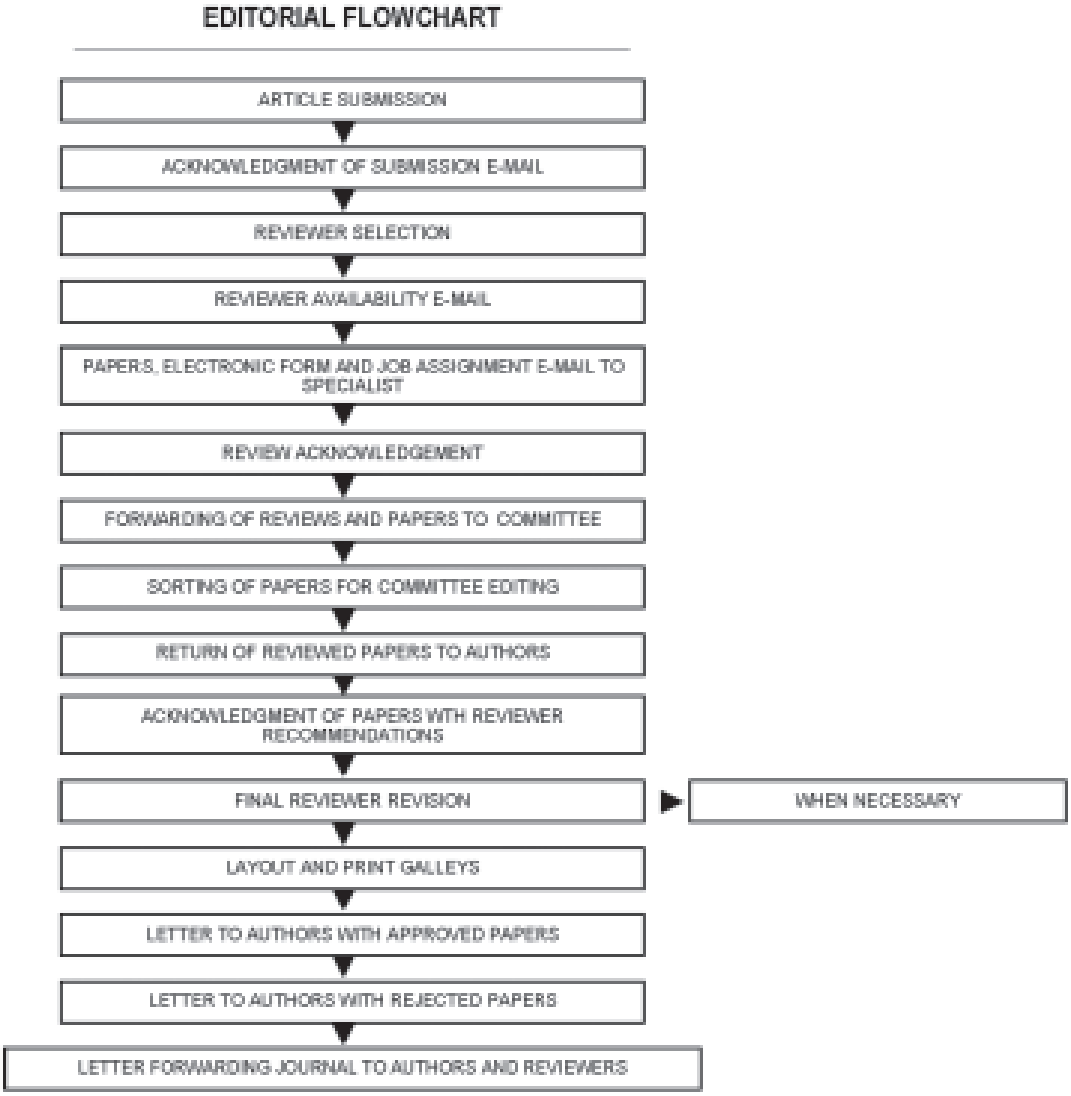


**FIGURE 2 - EDITORIAL FLOW CHART FOR THE SEER-CI.INF.**

The test with *Ciência da Informação* did not use the complete functionality of OJS, for some of them were not part of the editorial process of the journal. The functionalities not analysed are the following:

- Forum;
- Reader comments;
- Reviewer Committee;
- Entrusted Articles;
- Observance of assigned task deadlines;
- Filing and long-term preservation of digital documents.

According to Willinsky, the forum and the inclusion of reader comments are not available in any other electronic publishing system to date. Nonetheless, the IBICT/MCT team intends to analyse the complete functionalities, which will offer a product more suited in the supervision and integration of all SEER users [3].

Considering SEER a new technology, it shall be introduced in the organizational environment and integrated to the production processes of the journal, through special and unique assimilation mechanisms. With the final version of the journal´s first issue, all the functional modules of the system will be submitted to approval by the members of the editorial committee.

The fact that IBICT/MCT´s development and customization team was not responsible for the original code of the system, made it face great challenges during the adaptation and translation processes. To minimize obstacles, a difficult and lengthy learning process was set off, not only of the workings of the system, but of the programming methods of the Public Knowledge Project (PKP) team as well. This effort led to a deep understanding of the system, which came to benefit the PKP team with information exchange and improvement and new feature suggestions for the next version of OJS. The concern with possible migration problems, result of the promise of an imminent new release, limited the amount of significant changes made to the system in terms of source code.

To solve problems of this nature, integration between the working teams is the keyword. Once a final version is launched, authors and users alike should make modifications to the system. However, a control of these modifications or an integrated teamwork becomes the fundamental key to the integrity of the system, or a division of it into multiple systems with different source codes but with equal functionality will occur. This is the new paradigm created by the use of open source systems. A tool that allowed the integration of teams was the forum for the OJS community, created by the PKP (http://www.pkp.ubc.ca/support/forum/). It enables a wider and more permanent dialog among developers as well as relieves them from answering similar questions which come up frequently.

Changes to the system involved the translation of original files in English, the adaptation in the instalation source code to allow the correct choice of language, and easier translation into other languages. To accomplish this, an external file was included, with a more comprehensive structure for non-programmers, which simplified the adaptation to other languages. Another customization by IBICT/MCT was the development of a date function, which printed dates in multiple formats and languages. However, this customization was not implemented, for it would be a risk factor in the event of the release of a new version. The solution was to forward the significant modifications to the PKP developers, so that they would be responsible for implementing the new functionalities to the next version. According to Kevin Jamieson, programmer for the PKP team and the forum administrators for OJS, a native PHP function, *strftime* (http://ca3.php.net/strftime), will be used to implement dates in multiple formats and languages.

Fixes were made to the original code to allow the correct visualization of variables in Portuguese, where the order was inverted. The concern with a high quality translation was a fundamental factor for IBICT/MCT. As a public institution, the organization´s image requires extreme care. This concern delayed the release of *Ciência da Informação* using OJS, as well as the availability of the Portuguese version to the scientific community. To achieve high quality, a few additional variables had to be created in the translation files and their orders inverted, as well as indications of language were created to reach the goal set. The images used in the author submission steps is an example of the problems faced.


**FIGURE 3 – AUTHOR SUBMISSION STEPS TRANSLATED INTO PORTUGUESE**

The use of images with type is a risk factor for multilingual systems. The need to recreate those images according to the language may encounter several barriers, such as unavailable fonts, lack of template files for editing, or even the difficulty in finding someone capable for the task. Programming Languages, such as Perl, PHP and Java are capable of creating dynamic images; however, the length of text may alter image design, as well as the page and system graphic design, conveying an amateurish look to the system.

Other difficulties encountered during translation were the fact that the standard e-mails, an important feature of OJS, used variables in their contents. Those variables were declared, but the use within the body of the messages was not common to IBICT/MCT´s team:

- Example of variables used in e-mails

define('TITLE_OF_ARTICLE', 'Title of Article');

define('USERNAME_OF_AUTHOR', 'Username of Author');

define('NAME_OF_JOURNAL', 'Name of Journal');

- E-mail message example

define('DEFAULT_STANDARD_EMAIL_BODY_1', '[Name of Author]:'."\n\n".'Thank you for your submission of the article "[Title of Article]." With the online journal management system that we are using, you will be able to track its progress through the editorial process by logging in at the following Webpage:'."\n\n".'[Name of Journal] URL: [Journal URL]'."\n".'Username: [Username of Author]'."\n".'Password: [Password of Author]'."\n\n".'If you have any questions, please contact me. Thank you for considering this journal as a venue for your work.'."\n\n".'[Editorial Contact Signature]');

- Help comments in section “standard email administration”

define(‘HELP_STANDARD_EMAIL_EDIT’, ‘Note:<br />
<br />
· The Standard Email can be edited here so that it comes up in its revised
form each time it is to be used, and it can also be edited and added to each time it is sent, with comments that personalize it for each recipient.<br />
<br />
· Items in square brackets (e.g., [Name of Journal]) will be replaced with the
appropriate information when the email is sent. You can change the position of these items in the message but their wording should not be altered. <br />
· You can revert to OJS\’s default email by pressing the Default button.’);

According to the instruction in OJS, the variables used in the messages were translated, but the items inside the brackets in the message body were not. This caused great havoc during testing, since messages were received without the correct values, especially because the messages are inserted into the database at the time of installation and may be altered at any given time in the administration of OJS. This modifies the content in the database but not the translation files.

Other fixes made to OJS were:

1. Inclusion of code to print existing variables in translation files but hardcoded in the source code. Implementing internationalization in the original language the system was created makes it difficult to detect such details, since the variables and what is on the screen share the same visual content. Without a method for testing and viewing errors during development, some may not be translated. A solution may be the use of a different language, or template, which would allow the details to appear more easily.

2. Correction and visual standardization of help screens to show scrollbars, for the content in Portuguese exceeded the fixed viewing area. Another paradigm of open source is globalization, in other words, its internationalization and use in multiple languages. Foreseeing such problems is extremelyl difficult, even when using a visually flexible system such as OJS.

3. Design of standard masthead and standard images for system distribution in Portuguese. As part of the concern with the institutional image of IBICT/MCT, showing that the customized version is different from the original is important.

4. Change in code to hide the name of authors to reviewers. A bug in the system, corrected by the PKP team also, that allowed reviewers to view authors’ names.

5. Recreation of images in Portuguese for the article submission steps. This is an ongoing discussion with the PKP team, for these images could easily be small tables or other HTML tag with text and style sheets, which would ease the translation process and eliminate the use of unecessary images.

6. Translation of the system from OJS to SEER.

7. Substitution of the original ISO 8859-1 character set to UTF-8. In a few HTML pages of the system, the existing variable in the translation file was not being used, having instead

a hardcoded character set. This caused an error in the character set of the Web browser, unable to display accented characters, a characteristic of Portuguese, Spanish and French.

The character set is an important factor in the development of a multilingual system, for its incorrect use will transform the translation process, customization and implementation of different languages into an ordeal. According to the W3C, the use of UTF-8 is the most adequate choice for character representation in any language, especially for Web based systems.

Note that UTF-8 can be used for all languages and is the recommended charset on the Internet. Support for it is rapidly increasing [4].

The Web can be considered a single application, all parts of which must work together. To be a world wide web, these parts must work for every country, language, and culture. Internationalization is important to ensure that users worldwide can equally benefit from Web technology [4].

Some of the advantages cited depend on the functionality planned for the system. The current and future insertion of the system in the communities should be considered. Thus, the use of UTF-8 is highly advantageous, as it allows the use of one unique character set for the entire system – regardless of the language – and the display of multiple languages at the same time. With this feature, a Web form is able to receive content in another language without hassle [5].

UTF-8 and UTF-16 are both Unicode encodings. Since support for Unicode is currently limited to UTF-8 in many user agents, UTF-8 is usually the appropriate Unicode encoding. However, as user agent support for UTF-16 expands, UTF-16 will become an increasingly viable alternative.

Although there are other multi-script encodings (such as ISO-2022 and GB18030), Unicode generally provides the best combination of user agent and script support [5].

Performing a complete installation, including all the types of users and completing a full paper submission, as well as all the editorial process steps with dummy information are fundamental procedures for anyone interested in using OJS and SEER. This allows a real understanding of the complexity of the system, knowledge of the necessary people involved in the editorial process and specific knowledge for each task.

With the purpose of generating suggestions of improvement for OJS, IBICT/MCT hosted a workshop with Professor Piotr Trzesniak, Vice-president of ABEC (Brazilian Association of Cientific Editors), to perform a presentation and training of the system. Important issues arose directly related to the digital preservation of documents, agility and ease of maintenance of the server and the system itself. It was proposed the development of a mechanism or publishing environment separate from the administration, editing and submission. In other words, when publishing the journal, the server would receive – preferably with the ability to send to multiple servers for backup and preservation – only the content to be read by the user, separating it from the administration. This feature would also make it easier to develop a journal administration module, allowing to publish multiple journals with a single installation.

Another important issue concerned the file structure. The system should export only the final files and images of the articles, without sending any superfluous files such as editor and reviewer versions, or backup files. The existence of different file folders for final files and working files would be advisable (editor version, supplementary files, and others). With the current structure, the system imposes a more difficult task to the layout editor when creating the HTML output of the articles. The images are sent to an article images folder, while the HTML article output is sent to an article folder. Ultimately, the system does not allow adding multiple languages for the article metadata, a fundamental feature for Brazilian editors and authors, and an important functionality

for a multilingual system. These issues are being contemplated by the PKP team, for the next full release of the system in April 2004.

## CONCLUSION

The Brazilian Institute for Information in Science and Technology (IBICT/MCT), a public institution at the *avant garde* of information technology research, constantly seeks, analyzes and implements low-cost and fast solutions to solve cientific community´s issues. To find systems of that nature, specific to the targeted audience and language, is a very difficult task. The customization and implementation of such systems to the specific community needs are imperative steps to the success, effectiveness and efficiency of the implementation. To work with open source systems that follow the *Open Archives Initiative* and *Open Source* philosophy is the most appropriate path to follow, especially when dealing with public institutions. There are numerous advantages in this approach. These systems allow modifications to the source code, according to specific needs, they reduce significantly the cost in development and qualified work force for those needs is found with a mild effort. To these advantages more may be added, such as the requirements of the *Open Source* community in maintaining a high quality and integrity of systems, the possibility of distributed development, promoting means for integration and dialog between users and developers. In sum, the efforts target technological improvements to the systems instead of economical profit.

The adaptation of OJS by IBICT/MCT was conducted as described above. It was a combined effort with the PKP development team, hopefully providing the cientific community with a tool for electronic publishing of uttermost quality, tailored and allowing modifications to the specific needs of the final user.

The concern in maintaining the integrity of the system, conducting a customization and translation of high quality and providing useful feedback to the developers constitutes the uniqueness of the project that allows the system to be even more competitive. However, not being responsible for the original source code was a major complexity factor, for the institution became, in a large degree, at the whims of the original group. Also, changes made locally may make it difficult, almost impossible, to upgrade to new versions of the system, and the learning curve may be higher and longer than having a local development team designing the system. The cost of labor, schedules and deadlines as well as available budget must be taken into account and compared to the difficulties with learning foreign codes and methods and the dependency on external developers. Thus, IBICT/MCT will be including the country once more amongst the *Open Source* and *Open Access* communities.

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