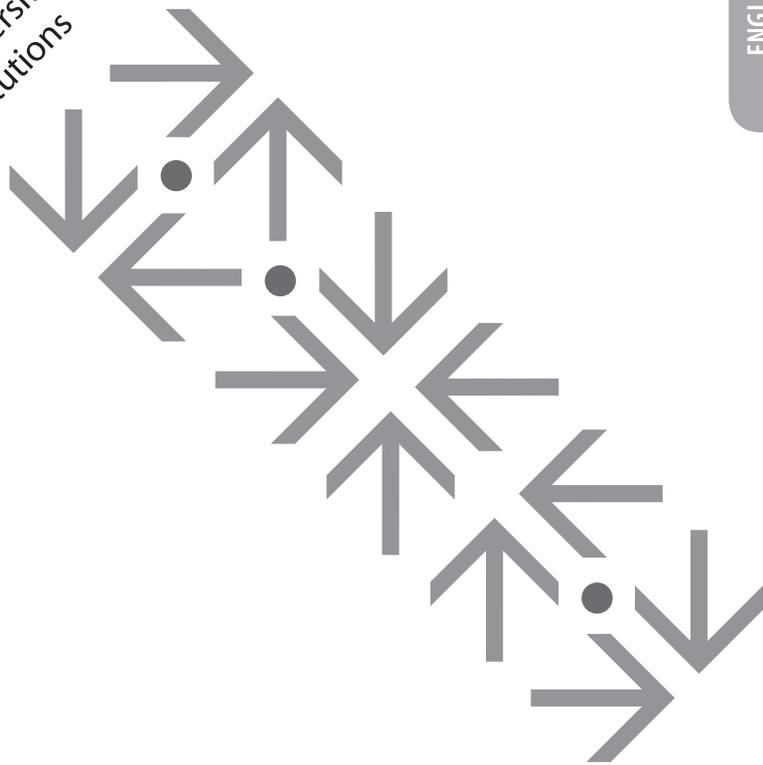


guidelines for the creation of
institutional repositories
at universities and higher education
institutions



378.1734 Alfa Network Babel Library

Guidelines for the creation of institutional repositories at universities and higher education organisations / Alfa Network Babel Library. Valparaiso : Columbus : Europe Aid Co-Operation Office : Babel Library, 2007.

30 p.

ISBN XXXXXXX

I.- INSTITUTIONAL REPOSITORIES

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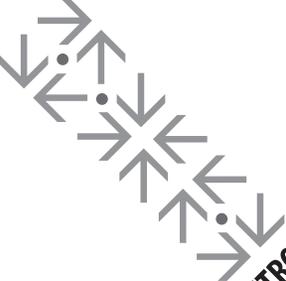
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INTRODUCTION

OBJECTIVES [IR]

The ALFA programme of the European Commission (Latin America Academic Training) promotes and supports cooperation activities between universities of both continents¹.

The universities who are members of the ALFA Network Babel Library² assume, as part of their mission, the search for excellence and educational quality. In the initial work proposal, it was determined, as one of the expected results, to write a document, as Guidelines, about *the development of services based on the use of new information and communication technology*.

The Institutional Repository (IR) is understood as an information system that collects, preserves, disseminates and provides access to the intellectual and academic output of the university community. Nowadays, the IR is a key tool of the scientific and academic policy of the university.

On the other hand, access to the full text of the digital learning objects makes the repository become a fundamental support tool for teaching and research, whilst at the same time multiplying the institution's visibility in the international community.

Within this scenario, it is the university libraries that must lead the implementation of the IRs to enhance the university's educational competitiveness, because of their experience in information management in all its forms and contact with knowledge.

This mission of knowledge management, which involves libraries in the development of the IR, has the following objectives:

- Maximize the visibility, use and impact of the scientific and academic output in the international community.
- Create feedback on research.
- Produce or provide storage for the electronic publications of the institution.
- Facilitate access to the academic and scientific information.

¹ Programa Alfa. América Latina – Formación Académica. http://ec.europa.eu/europeaid/projects/alfa/index_es.htm/ (Consulted on 29-04-2007).

² Proyecto Alfa Biblioteca de Babel. <http://www.columbus-web.com/es/partek/bibbabel.html> / (Consulted on 21-04-2007).

It is inferred from the aforementioned that these tasks also involve measuring and reporting about the impact of the scientific and academic output of the institution.

Thus, not only are the university libraries involved in the learning management of their institutions but also assuming a leading role in the growth and consolidation process of the knowledge society.

1. Alfa Network 'Babel Library' in the Context of the Institutional Repositories

We understand that today higher education institutions adopt the model of a learning organisation, an intelligent organisation, an organisation that manages knowledge.

Learning organisations are characterised by the constant stimulation of its members for them to increase their abilities, that is to say, to learn. These organisations are capable of transforming new technologies into new products in which the information is integrated, assimilated and generated.

The intelligent organisation is based on a shared management philosophy at all levels, which maintains constant internal feedback, that is to say, between the members of the organisation and the external environment.

As Nonaka (an organisation that manages knowledge) points out, it is considered that the information to which its individuals are exposed is potential knowledge. Thus, the cycle starts when the potential knowledge turns into tacit knowledge (the information within a context is combined with experience). The externalisation process of the implicit knowledge comprises the creation and classification of documents, and thus, explicit knowledge is created. The knowledge is understood, organised and spread so the members of the institution can maintain the cycle.

Thus, management of efficient information, knowledge and organisational learning appears as the main source of competitiveness. In fact, the knowledge that an organisation has is the result of a complex social network, hard for the competitors to understand, imitate or internalise and, therefore, the main competitive advantage of the organisation lies in this knowledge.

In this sense, university libraries play a fundamental role, making easier for the students, teachers and researchers to access the means and resources to discover and build knowledge. In the same way, the professional staff of these libraries acquire the function of a guide, in the sense of supporting the development of those competences that allow an effective and significant use of information and knowledge.

2. Institutional Repositories

2.1. The Purpose of Institutional Repositories

The institutions of higher education all over the world are experiencing the necessity of managing their education, research and resources in a more effective and open way. By making the research and scientific output easily available, they will support the development of new relationships between the academicians and both national and international research centres. This will facilitate:

- An economic stimulation and a social development.
- The development of a pedagogical environment rich in information, with a focus on the student.

The institutions of higher education will have to assume that the learning improvement is the key for the success of the Information Society.

2.2. What do we call an Institutional Repository?

In the simplest sense of the term, an Institutional Repository is an electronic archive of the scientific and scholarly output of an institution, stored in digital format, where search and recovery are allowed for its subsequent national or international use.

A repository contains mechanisms to import, identify, store, preserve, recover and export a set of digital objects, usually from a web portal. Those objects are described by labels ('metadata') that facilitate their recovery.

From a more conceptual point of view, the **IR** forms an authentic management system of contents, given that, apart from the documents themselves, the repository offers to the academic community a set of services for the management of that output.

The **IR** is a means of scientific communication, but it cannot be understood as a publication channel; it must be understood as a complement to the process of scientific publication formalised with peer review.

The intellectual collections include the research output (articles, theses, communications, etc.), teaching materials, and administrative documents as well as those documents generated by the institution, all in various formats like texts, presentations, audio-visual records and *e-learning* objects.

Until now, interest in IRs has mainly concentrated on the research output, since this constitutes an indicator of the institutions' performance at the time of obtaining funding. On occasions, research grants require as a condition that publications are open.

In the teaching field, the IR –which is usually integrated in the *e-learning* system– facilitates a change of paradigm in teaching and learning, contributing a pedagogical environment rich in information.

2.3. The Open Access movement

In the last few years, the *Open Access* (OA) movement has gained a lot of strength among the academic and scientific institutions. The OA supports the paradigm of the *open access and the self-archiving* of the publications.

The concept of *open access* in the academic publication field refers to the initiatives or projects that favour and promote the free and unrestricted access to the papers published by the scientific community. The terms "*free*" and "*open*" do not always mean the same. The first is synonym of gratuitous; however, the term "*open*" also includes the free access and always mentions the author's copyrights about his or her articles.

In the literature on this subject there are two definitions of *open access*, the one offered by the *Budapest Open Access Initiative*³ statement and the one by the *Bethesda Statement*⁴.

Budapest Open Access Initiative (BOAI) defines open access as:

"free availability on the public internet, permitting any users to read, download, copy, distribute and/or print, with the possibility to search or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself".

³ Budapest Open Access Initiative (2002). <http://www.soros.org/openaccess/read.shtml> / (Consulted on 20-04-2007).

⁴ Bethesda Statements on Open Access Publishing (2003). <http://www.earlham.edu/~peters/fos/bethesda.htm> / (Consulted on 23-04-2007).

In 2003 and 2004, other international statements or manifestations supporting the Open Access movement were produced: the position of the *Wellcome Trust* about *open access*⁵, the *Valparaíso Declaration*⁶, the *IFLA Statement on Open Access to Scholarly Literature and Research Documentation*⁷ and the *Washington D.C. Principles for Free Access to Science*⁸.

Within this framework, the **IRs** represent an important source of content, which materialises the expectations of access to scientific information. The articles published in commercial journals could also be uploaded to the institutional deposit and/or in other thematic repositories. For that, the journals must follow a policy called the green road.

The practice of auto-archiving, where an author uploads a copy of his or her article in an open site (while possibly still trying to publish the article in commercial journals), was established for the first time more than a decade ago. At first, this included the peer-review of the articles sent to journals –even the ones sent *online*– to allow comments and inform the colleagues about the importance of what was found.

The Open Access movement is especially important for the less industrialised countries, and in particular for those where English language has no pre-eminence. The printed journals published in these countries tend to suffer from diverse problems, from being irregular publications and having bad distribution to having poor national and international visibility.

The need for scientists to publish their discoveries in journals of high impact, in order to gain recognition, is limited by the fact that few journals of a language that is not English are indexed to the *ISI Web of Knowledge*⁹. On the other hand, these journals of high international recognition can be difficult to access, whether for economic or linguistic reasons. The research documents published in the **IRs** can be expected to have a greater national and international impact than the one obtained when these are published in a conventional printed journal.

⁵ Wellcome Trust Position Statement in Support of Open and Unrestricted Access to Published Research (2003). http://www.wellcome.ac.uk/doc_WTD002766.html / (Consulted on 23-04-2007).

⁶ The Valparaíso Declaration for Improved Scientific Communication in the Electronic Medium (2004). <https://mx2.arl.org/Lists/SPARC-OAForum/Message/519.html> / (Consulted on 23-04-2007).

⁷ IFLA Statement on Open Access to Scholarly Literature and Research Documentation (2004). <http://www.ifla.org/V/cdoc/open-access04.html> / (Consulted on 29-04-2007).

⁸ Washington D.C. Principles for Free Access to Science (2004). <http://www.dcpinciples.org/statement.pdf> / (Consulted on 18-04-2007).

⁹ ISI Web of Knowledge. <http://isiwebofknowledge.com> / (Consulted on 23-04-2007).

PROCESS

2.4. Information strategy

For any institution of higher education, an **IR** would be a central element of its information strategy, which includes and integrates the development of its libraries, Virtual Learning Environments, publishing programmes, registry and archive services, information management systems and communication networks. The creation and practical organisation of these systems and services requires a high level of support and planning, as well as a good level of technical and managerial competence, supported by proper training programs.

There are tangible benefits for these institutions, which may effectively develop information strategies and exploit systems for this purpose. The repositories help institutions to develop coordinated and coherent methods to capture and exploit their intellectual collections.

To manage the uploading of the contents to a digital repository allows institutions and their departments to increase their value. The **IRs** may even stimulate a cultural change in teaching and learning.

In the design and management process of the **IRs**, a series of rules, techniques and elements must be recognised and discussed in depth:

- Choose the software, including Open Source solutions compatible with international protocols.
- Acquire the contents and fix the quality control mechanisms.
- Manage the intellectual property rights.
- Adopt a metadata standard and incorporate other methodologies to give visibility to the contents.
- Acquire a management support for a sustainable archive.

The institution libraries combine, on one hand, involvement in the creation of knowledge, and, on the other, experience in collecting, organising, preserving and sharing information. Even though the library must not be the only department of the institution involved in the development of the repository, it must play a leading role, in collaboration with the academic departments and the information technology services.

2.5. Contents of the knowledge repositories

Various kinds of documents in digital format are stored in the knowledge repositories. They are the result of the research and teaching activities of teachers and researchers. They collect, preserve, disseminate and provide access to the output of university communities.

The **IR** can be created with different aims, which its own policy must clearly state; depending on that direction, it will be more or less restrictive regarding the kind of contents to store. Thus, we will find repositories that store:

CONTENTS

- All the scientific, artistic, teaching or management output of the institution, constituting a unique system of documentary management.
- Only the documents that will be on open access.
- Only documents that have been or will be published by formal channels.
- Some will include those which are property of the institution, although not created by it. Specific collections of games, pictures, etc.

2.5.1. Scientific output

CONTENTS

- Doctoral theses in the public domain.
- Doctoral theses read in the institution.
- Communications at congresses, posts, posters.
- Pre-prints and post-prints of papers published in journals.
- Audio-visual materials.
- Journals of the institution.
- Patents.
- Datasets.
- Software.

CONTENTS

2.5.2. Institutional and/or managing output

- Journals of institutional information published by the institution in any support.
- Regulations and Rules.
- Archive documents.
- Posts, posters, work documents, technical reports.
- Video recordings, events celebrated, etc.

2.5.3. Learning Objects

The concept of *learning objects* is now evolving into more dynamic, granular and re-usable realities, but there is difficulty in providing a precise definition. It is always about a material in electronic medium for the use in web-based environments, of educational content and with a training purpose that is not ephemeral.

As representatives of this typology, we can point to the following:

CONTENTS

- Study and exercises guides.
- Audio-visual material.
- Class notes.
- Simulators.
- Bibliography in full text.
- Presentations used in class.
- Online tests.
- Laboratory guides.
- Blogs.

2.6. Content management

Each institution must establish the repository policy for the learning and knowledge objects; this must be public and known by all the university community.

The policy will record all the commitments to be assumed, both by the institution and the authors. It will be advisable to look for a balance between the desirable and the possible, in order to guarantee the continuity of the new service. Some aspects to be taken into account in an **IR** management policy could be:

CONTENT MANAGEMENT

- Who are the possible authors?
- What incentives will be given to the authors to deposit material?
- What quality controls will be applied?
- Which is the commitment of the institution regarding the preservation of the material?
- How is the protection of the intellectual property guaranteed?
- What kinds of documents will form the repository?
- Apart from the authors, which other agents and units are involved in the uploading of documents?
- How will the workload of maintaining the IR be sustained?

The potential authors of the repository are all of those that generate the scientific or teaching output, totally or partially financed by the university, among which are worth mentioning:

AUTHORS

- Teaching or research personnel ascribed to the university that produces teaching or research-resulting material.
- Doctoral students who read their theses.
- Students who present their end-of-course investigation projects and works.
- Personnel of the institution who contribute internally produced documentation like reports or special studies.
- External authors that publish in the journals published by the institution.
- University publishing house.
- Teachers that support their subjects with the implementation of learning objects.

Each institution will define which their potential authors are, depending on the documents that it decides to include in the repository.

The policy of the repository will also consider what happens with their publications when a member of the community leaves the institution.

In the production of the repository, the following units inside the institution must be involved:

INVOLVED

- Libraries unit or service.
- Corresponding administrative units.
- Information technology / computing unit or service.

For orientation, the following basic flow is offered, which each institution will have to adjust and complete according to its managing structure. This model presupposes that the auto-archiving has been chosen.

- Phase of informative identification or accreditation and authentication of the agent.* The identification must be simple and fast, contrasting some personal information with the database of the own university, so as to recognize the agent and his or her profile. Identification data may be the user name, the passport number or any other unique personal identifier.
- Phase of legal and institutional information.* Before being able to upload the documents, the author must sign a writ in which they state knowing their rights and agree to follow the policy of the repository. The system will offer all the legal and institutional information in this regard. In some cases, this procedure could be completely digital.
- Uploading phase.* The most common practice nowadays consists in the auto-archiving of the output by the same author (teacher or researcher). However, the launch of a repository should be preceded by a significant initial effort to upload enough documents or objects to give credibility to the project and win supporters of the auto-archiving among the community.

Each institution must check if there is potential metadata available for that initial upload, coming either from an internal management database or commercial databases such as *Scopus* or *ISI Web of Knowledge*. In that case, it must evaluate the convenience of carrying out an automatic upload with a subsequent review of the registries, instead of a manual upload.

In the diagram of the process, the standardisation and quality control of the metadata must be established as a responsibility of the library.

In general, the steps for auto-archiving are:

- Complete the uploading authorisation form with some personal details.
- Identify the documentary collection or typology to which the documents that are going to be uploaded belong.
- Assign of the basic metadata such as authors, title, subject, summary, collection, etc.
- Add information regarding the number of indexes that will be uploaded, what the main index and annexes are.
- Decide format and index specification.
- Finally, upload the index and the annexes as indicated.

d) *Document evaluation phase.*

d.1) *Content evaluation.* Once the document is uploaded, its access is restricted to the Evaluation Committee accredited for that collection.

If the report is rejected, the author is contacted to make the proper corrections; if it is accepted, the document goes to the next phase.

This evaluation will be omitted for those works that have already been evaluated. The system will recognise them according to the documentary type specified.

d.2) *Evaluation of formal aspects.* The document will be evaluated whether it adjusts to the formal aspects defined by the institutional policy.

d.2.1) *Phase of metadata review.* Once the document is accepted, the library will proceed to review the metadata assigned by the author which will be finally completed to guarantee the relevance at the time of recovery.

d.2.2) *Phase of maintenance.* The Information Technology unit will take care of the set of tasks.

2.6.1. Software

It is necessary to mention briefly the problems associated to the necessary technologies, both to ensure the creation and maintenance of the repository, and to guarantee the access to and/or search of free information in the network.

The SCORM¹⁰ model, frequently used in the repositories of learning tools, provides a framework and a detailed implementation reference which

¹⁰ Shareable Content Object Referente Model (SCORM). <http://www.adlnet.gov/scorm/index.cfm> / (Consulted on 16-04-2007).

allows the use of the contents and the systems to communicate with other systems, thus obtaining the interoperability, the re-utilisation, durability and adaptability.

Regardless of the software chosen by the institution, for the implementation, it is necessary to have at least:

- An operating system.
- Corresponding administrative units.
- Information technology/ computing unit or service.

There are several initiatives to implement software adopted by the different institution to manage contents and LO [Learning Objects]. For example:

- a) *DSpace*¹¹ is a project from the Library of the Massachusetts Institute of Technology¹² and Hewlett Packard¹³ to preserve, collect, manage and make public the intellectual production of the institution. It was opened in 2002 under the BSD - Open Source licence (free and open code). It uses Dublin Core¹⁴ metadata and the Open Archives Initiative protocol¹⁵.
- b) *Biblioteca Agora* is a piece of software to manage learning objects developed by the Universidad de Barcelona (Spain)¹⁶. It responds to the Open Access initiative and allows the election of metadata.

2.6.1.1. Personalisation and integration in the information system

In this personalisation chapter it is necessary to include varied performance areas: personalisation of the interface, of the internal administration modules, of the information architecture, of the work flow, etc.

The interface personalisation tasks include all the system modules: search, visualisation and recovery screens, system administration screens and content uploading screens. Decisions on creating user profiles with different restrictions should be contemplated in the application design.

The definition of the IR architecture should consider if only one database is used or several, according to the collections, the definition of the categories, etc.

Also, the repository must be integrated in the global recovery system of the institution.

¹¹ DSpace. <http://dspace.mit.edu/> (Consulted on 20-04-2007).

¹² Massachusetts Institute of Technology (MIT). <http://web.mit.edu/> (Consulted on 20-04-2007).

¹³ Hewlett Packard (HP). <http://www.hp.com/> (Consulted on 20-04-2007).

¹⁴ Dublin Core Metadata Initiative (DC). <http://es.dublincore.org/> (Consulted on 18-04-2007).

¹⁵ Open Archives Initiative (OAI). <http://www.openarchives.org/> (Consulted on 18-04-2007).

¹⁶ Universitat de Barcelona. <http://www.ub.es/> (Consulted on 17-04-2007).

2.6.2. Quality control

Guaranteeing the quality of the contents of the repository is important to win the willingness of the authors and to achieve the intended outer institutional visibility. For this reason, the documents must be submitted to a formal and content analysis that guarantees their relevance in the repository.

In order to evaluate the formal aspects, the library and the administrative units will have institutional criteria as guidelines for their performance. These criteria should specify at least these aspects:

CRITERIA

- Accepted index format.
- Style guides.
- Annexes.

The content evaluation will be performed at different stages of the process, according to the kind of material to be introduced.

In the documents that have already been published in journals that have peer-review systems, or that have gone through an assessment board –as is the case of the theses or end-of-programme projects–, the quality control has been previously carried out upon the arrival of the repository and therefore, the value of its content will be considered as already guaranteed.

For the rest of the documents, the university will have to establish the formation of scientific committees supported by the university structure itself. They could be exclusively formed by members of the institution or include members of other institutions; thus, promoting the cooperation that is ideal as a basis to ensure scientific development.

2.6.3. Metadata creation

The creation of metadata facilitates retrieval from the collection. It is possible to apply different metadata schemes for the different types of contents existing in the repository; what is essential is consistency in their application. It is equally important that the metadata search engines (harvesters) are capable of recovering the contents of the repository.

The metadata were created to establish a semantic utility capable of operating and recovering the information existing in the network. They are more versatile than traditional standards and allow the objects to be

DISTRIBUTION

understood, shared and used effectively by all kinds of users from time to time.

For content management, two main categories of metadata can be defined:

a) Descriptive: They describe and identify the information resources for their later search and recovery, as well as the location in the case of a web environment. *MARC*¹⁷ and *Dublin Core* (DC) formats are found in this category.

b) Structural: They facilitate navigation and presentation of the electronic resources, providing information about their internal structure, as well as the relationship and union between the different materials forming the digital object. *SGML*¹⁸, *XML*¹⁹, *EAD*²⁰ are examples of this classification.

2.6.4. Intellectual property management

In the age of knowledge, the library must play a leading role in the management and consolidation of the scientific content and distribution of information in the global interactive environments.

In the current framework there are three mechanisms to access the information produced:

- The creation of free journals, which means changing the mentality of the authors, who will have to assume the costs derived from the publication through the creation of this line of business within the research budget. The initiative of Creative Commons is very useful and important for this purpose.
- The incorporation of traditional strategies to current possibilities, thinking for example in the levy times, special licences for underdeveloped countries, etc.
- The introduction of Open Access initiatives, especially regarding the autofile.

It will be necessary to turn to the legal services of the institution to provide advice about aspects that will have to be borne in mind when designing IR.

¹⁷ Normas MARC. <http://www.loc.gov/marc/marcspa.html/> (Consulted on 18-04-2007)

¹⁸ Standard Generalised Mark-up Languages (SGML). <http://xml.coverpages.org/sgml.html/> (Consulted on 20-04-2007).

¹⁹ Extensible Mark-up Language (XML). <http://www.w3.org/XML/> (Consulted on 20-04-2007).

²⁰ Encoded Archival Description (EAD). <http://www.loc.gov/ead/ead.htm/> (Consulted on 20-04-2007).

The following aspects should be considered:

1. The kind of document to be included.
2. The legal rights of the document.
3. Authorisations to make the contents public.
4. Restrictions to be applied on the information.

They will basically find two situations: non-published works (non-edited doctoral theses, etc.) and published works (journal articles, communications from conferences, contributions to monographs, etc.).

In the first case, it will be necessary that the author expresses his or her consent in some way to include his or her document in the **IR** and to grant his or her authorisation to communicate publicly his or her work.

Regarding scientific articles, communications, etc, most of the journals also allow their authors to publish the article through their personal website or the institution web page. So it is established in the new transference models of use of rights and authors are only required to include the web address of the original publication. An example of this flexible policy is *Elsevier*²¹ publishing house.

The *Berlin Declaration*²² points out that the contributions of open access must comply with two conditions:

²¹ Elsevier. <http://www.elsevier.com/> (Consulted on 16-04-2007).

²² Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities. <http://oa.mpg.de/openaccess-berlin/berlindeclaration.html> / (Consulted on 22-04-2007).

CONTRIBUTIONS OF OPEN ACCESS

1. The author(s) and right holder(s) of such contributions grant(s) to all users a free, irrevocable, worldwide, right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship (community standards, will continue to provide the mechanism for enforcement of proper attribution and responsible use of the published work, as they do now), as well as the right to make small numbers of printed copies for their personal use.
2. A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in an appropriate standard electronic format is deposited (and thus published) in at least one online repository using suitable technical standards (such as the Open Archive definitions) that is supported and maintained by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, inter operability, and long-term archiving.

ABOUT INTELLECTUAL PROPERTY

From the Open Access movement, the Creative Commons Foundation²³ was created with the objective of making scientific information available for the international community, without the usual copyrights restrictions, provided that the copyright has not already been transferred to a publisher. It is only necessary that the author or right holder grants a Creative Commons authorisation for the institution to be able to make the information available for all users.

At present, among the trends about intellectual property that **IR** follow to establish their autofile policies, there are:

- Project SHERPA²⁴ (Securing a Hybrid Environment for Research Preservation and Access). Finished in 2006, it helps to create the institutional repositories, including, apart from the intellectual property, standards, quality control, management policies, metadata, etc.
- Green road and golden road. The first is when the author puts his article in a digital file of his institution (in this case, the institution pays the costs). In the second, the author or the institution pays the journal to put the article in open access (i.e., free for the reader). This road would be the pay-per-publish road.

2.7. Scientific policy

The university must play a leadership role in its surroundings; that is why it uses knowledge as an asset to the service of the established socio-economic objectives, a resource that, properly managed, allows performing a leading role in its social context.

The university must optimise the performance of its knowledge, be aware of its intellectual capital, and start the necessary communication flows in order to allow the movement of its knowledge in such a way that its social impact is increased and strengthened.

In this context, the institutions must empower research and educational innovation within a framework of total quality management. One aspect within knowledge management is to be able to establish processes that allow knowledge to be visualised and mobilised.

²³ Creative Commons. <http://creativecommons.org/> (Consulted on 22-04-2007).

²⁴ Securing a Hybrid Environment for Research Preservation and Access (Sherpa). <http://www.sherpa.ac.uk/> (Consulted on 20-04-2007).

2.8. Marketing and promotion

The implementation of these new systems requires to make the users aware and to motivate them to achieve their potential in the university community. It is necessary to encourage the academic communities to contribute material; this is the most frequent problem faced by those who implement **IRs**. A continuous and important promotion campaign must be based on a committed institutional policy.

Some measures that are proving to be efficient are:

PROMOTION

- A well-designed repository portal, with the well-defined policy and with efficient didactic material.
- Actions by the university authorities to promote the autofile in the repository: Order and reward formula.
- Publication of search and citation statistics of the material stored in the **IR**.

Another marketing tool for the **IR** is external promotion; in order to do so, it is worth remembering to register of the repository in the corresponding records to guarantee their investigation by the search engines (harvesters).

2.9. Benefits and improvement of learning

The repository will allow scientists, students and personnel of the institution, as well as the rest of society:

BENEFITS

- Create and share knowledge.
- Build personal and collective learning models.
- Facilitate organisational learning.
- Provide a storage and mutual exchange platform for the information produced in the institution in all knowledge areas.
- Collect and preserve all the scientific, academic and corporate production of the institutions.
- Facilitate the access to the content of the repository from the different existing learning platforms.
- Maximise the visibility of the scientific, academic and institutional production.
- Maximise the impact of the scientific production of the institutions on society.
- Increase the public service value of the institution.
- Be of use as tangible indicator of a university of quality.
- Facilitate the transference of knowledge into the productive area.
- Promote the creation of electronic publications.

BENEFITS

2.9.1. Added value services

- Provide researchers, teachers, students and personnel of the institution with auto-editing and auto-archiving tools and instruments to register their scientific, teaching and learning works.
- Communicate and disseminate the intellectual results to the scientific community.
- Identify, attract and incorporate the documents produced by the researchers and academics of the institution spread through different sources and resources.
- Preserve the scientific, academic and institutional information of the institution for the future.
- Create and develop scientific electronic communities.
- Disseminate the uploaded information in a selective way.
- Establish measures regarding the impact of the published information.
- Promote the pre-publication (pre-print).
- Create forums.
- Elaborate and publish use statistics of documents.

2.9.2. Benefits for the institution

- Maximize the visibility, use and impact of the scientific and academic output in the international community.
- Produce new publications at a lower cost.
- Support the initiatives of their scientists and academics in research and pedagogy.

2.9.3. Benefits for scientists and academics

- Facilitate access to the scientific information.
- Increase their audience.
- Increase the impact of the teaching and research work they carry out.

2.9.4. Benefits for the students

- Provide them with the tools and instruments they need to learn, study and research.
- Provide them with coherent access to the materials they need to learn and study.
- Acquire skills in knowledge management.
- Achieve better academic results and make them more competitive.

2.9.5 - Benefits for the productive sector

- Facilitate the contact with scientists and specialists of the institutions in order to achieve a better transference of the research results.

2.9.6 - Benefits that will contribute to society

- Maximise the performance of the investment made in the repository, because publications will be more and better used.
- Maximise global scientific understanding.

3. Expected results

The purpose of these guidelines is to offer a guide to justify the convenience of an **IR** and to help in the start-up process.

It is time to give a final look at the expected results to ascertain the justification of the start-up.

RESULTS

- By providing the university community with a space to store the information produced, there is a contribution to an improvement of personal and collective learning.
- By preserving the scientific, academic and corporative production of the institution, its historic memory is guaranteed.
- By integrating the access to the content of the repository from the virtual learning platform, teaching is facilitated.
- By maximising the visibility of the scientific, academic and institutional production, the impact of the university is empowered.
- By showing the own production, the performance of the institution is evaluated and the scientific policy is facilitated.
- By disseminating the produced science, knowledge is transferred into the productive area.
- By providing teachers with this auto-archiving tool, the communication with their colleagues and students is facilitated.
- By becoming integrated into broader networks, by using interoperable technologies, there is feedback for research.

4. As a Conclusion

The Information and Communication Technology (ICT) perform an essential role in improving the access to education and the learning quality. In fact, the use of this technology has been one the driving forces towards the new knowledge society, as it has radically changed the transmission and acquisition processes of knowledge, causing their exponential growth. Clearly in order to materialise this model, substantial changes must be encouraged in the duties of teachers and students. These changes imply the adapting of teaching methodologies and learning objectives, innovation of teaching functions and techniques, institutionalisation of curricular support and personalised attention, as well as the preparation of guides and learning objects.

The scientific articles, doctoral theses, didactic materials, academic and institutional information and other types of documents that higher education institutions produce need a new type of management to describe and analyse them, organise and present them. Thus, the users could consult them and obtain the maximum benefit from them.

Organising this chaos implies the presentation of information in a coherent structure and elaborated according to the current development of knowledge. In order to do so, it is necessary to know in depth what information might be available, to select the pertinent resources and to enable the proper communication channels in the different areas.

Currently, the information processing includes learning and research supported by technology, (a) as a process focused on the student, the teacher and the investigator, (b) involving all members of the university community, as well as the resources available for learning and research, (c) supported simultaneously on several language forms, (d) where the construction of knowledge happens more openly, integrated and multi-sensory.

The psychological principles of the *American Psychological Association*²⁵ about learning focused on the learner, are aimed at helping students to build and to represent their knowledge significantly, creating challenging learning environments and levels that help the students to relate background information with new information, reaching complex learning objectives and building thinking and reasoning strategies. They also emphasise the increase of curiosity and intrinsic motivation, strengthening social interaction and interpersonal relationships, acknowledging individual differences in learning and establishing learning and research standards and objectives that are relatively high and challenging. These principles are implicit in libraries, when assuming the function of creating the proper conditions to guide, treat, store and provide visibility to the materials produced for teaching and research.

²⁵ American Psychological Association (APA). <http://www.apa.org/> (Consulted on 22-04-2007).

Thus, the library becomes the necessary scaffolding that holds and disseminates the scientific and academic output of the institution. In the Vygotskian sense, the library is the constructivist laboratory for teachers and investigators, without forgetting students, to build their own meanings so others may know them.

Therefore, if in these environments we can strengthen research and learning development, increase the effective work time, increase visibility of science, explore or articulate ideas, motivate the students in an intrinsic and extrinsic way, facilitate the proper information resources so that the ideas occur, increase the responsibility in the process, in short, become facilitators of their learning and investigation process, then it is the responsibility of the libraries to generate the proper conditions to allow this fundamental transition for the future of higher education towards a society of knowledge.

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