

An Overview Of The Development Of Open Access Journals And Repositories In Mexico

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Abstract

It has been noted that one of the potential benefits of Open Access is the increase in visibility for research output from less developed countries. However little is known about the development of OA journals and repositories in these regions. This paper presents an exploratory overview of the situation in Mexico, one of the leading countries in terms of scientific output in Latin America. To conduct the overview we focused on OA journals and repositories already in place and in development. It was particularly hard to locate information and our results do not intend to be exhaustive. We identified 72 Mexican OA journals using DOAJ. Of these journals 45 are from REDALyC which we identified as a key project in OA journal development in Mexico. Using OpenDOAR and ROAR, ten Mexican repositories were identified. These were reviewed and classified. We found a large variation between repositories in terms of size, degree of development and type. The more advanced repositories were well developed in terms of content and developing added on services. We also found inter-institutional groups working on advanced OAI tools. We also did a case study of 3R, a repository development project at one of the countries leading universities. This included interviews with two repository managers. The main challenges we found were lack of institutional buy in, staffing and policy development. The OA movement has not yet permeated the academic research environment. However, there are important working groups and projects that could collaborate and coordinate in order to lobby university authorities, national bodies and funders.

Keywords: repositories, developing countries, Open Access, Open Access journals, institutional repository

1. Introduction

This paper presents an overview of the Open Access movement in Mexico and the current OA journal and repository landscape. Although the importance of Open Access and repository building for developing countries by increasing visibility of under represented research has been noted [1-3], more work is required on the current situation [4]. The main objective of this paper is to present an introductory overview which will hopefully promote further discussion and contributions on this subject. We do not intend to present an exhaustive overview, as information regarding this subject is not easily available. First we look at the general trends in scientific output and publishing from Mexico in order to contextualize the discussion in particular with regard to other Latin American countries. This is followed by a broad discussion on the general awareness of Open Access in the country and a more detailed look at OA journals and repository development in place and in development. We present a case study of repository development at the National Autonomous University of Mexico (Universidad Nacional Autónoma de México- UNAM), in order to discuss key issues faced. In addition two interviews were conducted with repository managers to gather their views on repository development in Mexico. In particular the lack of policy development at a national and institutional level is addressed. Finally we look at the opportunities and challenges for Open Access in the country as well as the importance of international collaboration and other proposals to further the development of OA journals and repositories both in Mexico and in Latin America.

2. General trends in scientific output and publishing

In terms of scientific output and publishing, Mexico is an important country in Latin America and could act as a one of leading players in the development of OA journals and repositories in the region. Mexico's contribution to the global research output as measured by the ISI database is around 0.75%, second only to Brazil. Fifteen journals are included within the ISI [5]. It is particularly important to note that the UNAM, Mexico's national university, is the biggest contributor to the country's research output with over forty percent of the country's research produced at this institution.

We present a case study of the UNAM's repository project in order to determine in more detail, particular issues and challenges in repository development. It is worth noting that the UNAM website is ranked number 59 in the Webometrics Ranking of World Universities [6], and although not all of it can be considered research output, it is clear that there is already a considerable base of material published online. Considering the size of the UNAM it could hopefully act as a key player in discussions and policy development in the country in collaboration with other institutions and national bodies.

Both Mexico and Brazil have a relative low amount of citations for the number of articles published [5]. Increasing the visibility of Mexican research output is an important concern and the development of OA journals and repositories could contribute to this. In this sense, Brazil has been leading the way with the creation of SciELO (Scientific Electronic Library Online). This project is discussed further in the paper.

As with other countries in the Latin American region, Mexico has a fairly low investment in science and technology development compared to Europe, Asia and the USA and Canada [7]. Mexico invests about 0.46% of its GDP compared to around 2% for most developed countries. From 1997 onwards however, Mexico has had a relatively steady investment in comparison to other countries possibly due to its recent stable economy. More than half the funding for research and development in universities and other research institutes comes from the public sector [7]. This could be a key issue when discussing mandates for self-deposit when receiving public funding for research.

3. General awareness of OA in Mexico

It is difficult to gauge the level of knowledge about OA in Mexico but there is little evidence of a generalized national awareness. However, a number of events and projects were found that suggest a growing momentum towards more widespread recognition. A few Mexican institutions are signatories of the Budapest and Berlin initiatives. In 2006 the UNAM organized the 5th International Conference on University Libraries (Conferencia internacional sobre bibliotecas universitarias) with the theme 'Open Access: an alternative access to scientific information'. This was a two-day conference on the subject with a wide array of international and national speakers. Unfortunately it is not clear if any concrete policies or projects were developed as a result.

At a national level the Open Network of Digital Libraries (Red Abierta de Bibliotecas Digitales-RABID) together with the University Consortium for the Development of the Internet (Corporación Universitaria para el Desarrollo del Internet- CUDI) has worked for several years on interconnectivity of resources and services between Mexican digital libraries. Their work has focused mainly on Open Access journals and electronic theses, promoting their use using OAI-PMH. No mention of institutional repositories was found on their website [8] but this information may well be documented elsewhere or currently in development. Fourteen Mexican higher education institutions currently collaborate in RABID and they have developed a number of resource discovery tools such as: the OA-Hermes, developed by the UNAM, which is an OAI harvester for selected quality assured Open Access resources; and VOAI and XOAI developed by the Universidad de las Américas- UDLA, which are federated tools for sharing resources.

The national body for Science and Technology, CONACyT has not apparently issued any public statement about Open Access. However, they have funded RedALyC (Red de Revistas Científicas de América Latina, el Caribe, España y Portugal) which is a large database of full text Open Access journals for Latin America, the Caribbean, Spain and Portugal, developed by the Universidad Autónoma del Estado de México-UAEM. This project will be discussed further in the next section.

In general, although we found little evidence of an elevated awareness of OA in Mexico, we did find several concrete examples of institutions working on a number of projects that could positively influence further awareness. It is clear that more work needs to be done on this area though, in particular with national bodies in order to promote OA at more national level and involving many more institutions.

3. OA journals and OA repositories in place and in development.

The following projects related to OA journals and repositories that we mention do not intend to be exhaustive. As the OA movement in Mexico is still relatively young, it was difficult to discover what projects

are in development and in place and there may be important initiatives that we have missed. It is hoped that this paper will indeed be an opportunity to promote discussion in order to gather further information and bring together key players.

3.1 OA Journals

We used the Directory of Open Access Journals- DOAJ to perform a search using the term 'Mexico' and it produced 72 journal results. 50 of these journals have DOAJ content and more interestingly, all but five of these journals are from RedALyC. As mentioned in the previous section RedALyC is the most notable development in terms of OA journals. It currently offers 512 journals and over 81,000 full text articles. The site contains a section dedicated to Open Access, describing its development and the Budapest initiative. RedALyC works under the banner 'Science that cannot be seen does not exist' and its main objectives are to develop a common information space for Latin America, the Caribbean, Spain and Portugal, strengthen the quality of the publications of the region, act as a showcase for the regions quality research output and promote a more inclusive information society.

We also used Latindex, an online registry of Latin American journals and found that of the 483 registered Mexican online publications, 238 are available freely. This of course, is not strictly OA but it does show that a wide range of material is already publicly available. It is not known if these journals support metadata harvesting but further work in this area could increase OA availability.

A well-known Latin American journal publication project is SciELO (Scientific Electronic Library Online), originally developed in Brazil and which has now been expanded to eleven countries. Full text articles are marked up in XML using the SciELO markup methodology and in recent years an OAI interface has been included. As well as the SciELO portals by country there are also two subject portals on Public Health and Social Sciences. Although Mexico has participated in the Public Health portal for some time now, the national site was only recently launched with twenty-one full text journals. Most of the other country portals have been developed with strong support from national research councils or similar bodies. The development of SciELO Mexico could possibly have been done more effectively with similar support. It is currently developed by the UNAM and now that proof of concept has been proved it will hopefully receive more attention.

3.2 Repository development

Repositories have become increasingly important in the academic world [9-11] and can contribute to the development of Open Access. In 2004, ROAR (Registry of Open Access Repositories) registered around 200 repositories worldwide. This figure is currently over 1,000 with OpenDOAR (Directory of Open Access Repositories) recently reaching a similar number. However, the coverage of repositories on a global scale is patchy, with a small number of countries leading the way with most of their academic organizations developing an institutional repository plus a number of subject or national repositories [12-14], whilst other countries will have none or only a few. For example, the Netherlands, Norway, Germany indicate one hundred percent coverage of universities with an institutional repository [13], whilst other countries such as Zimbabwe, Mexico, Argentina and others, register only a few repositories in the whole country. In these cases it would be reasonable to expect that is not representative of the total number of academic organizations considering the size of the country.

In Latin America, Brazil has been leading in repository development with 26 repositories registered in OpenDOAR (55 in ROAR). In order to look at repository development in Mexico the browse by country function was used for OpenDOAR and ROAR. Five Mexican repositories were found in the former and eight in the latter. Two duplicates were eliminated leaving a total of eleven repositories for the whole country. This is actually quite a small number of repositories considering the size and academic importance of Mexico within Latin America. The repositories were reviewed and classified. Definition of repositories varies considerably and in order to classify we used the Heery and Anderson typological model [15] by describing repositories according to functionality, coverage, content type and user group.

Despite there only being ten Mexican repositories a wide range of types were found. We found two national subject repositories, one theses, two institutional, two departmental, one subject, one catalogue, one regional and one unidentified as shown in Table 1. It is clear that repositories in Mexico are still in embryonic stage and there appears to be no coherent trends in developments. However, it is possible that there are currently a number of repositories in development that have not been registered in ROAR or picked up by OpenDOAR, so this number may not reflect the total figure. Of the eleven repositories inspected, three repositories were over five years old, two unknown and six had been registered in ROAR in the past two or three years but it was unclear how long they had been in development. There was no evident relationship between age and number of items. Two had less than 100 items, three between 1000 and 5000 items, whilst two were very large. Of the large repositories, one repository had over 200,000 items but on closer inspection was functioning as a library catalogue rather than a repository. The other has over 80,000 full-text article journals. Four repository sizes

were unknown as they had not been successfully harvested by ROAR and there was no indication on their homepages, which is unfortunate as this information would be valuable.

NAME	INSTITUTION	TYPE	ITEMS
Acervo Digital del Instituto de Biología de la UNAM	UNAM	Institutional	3074
Acervo General de la biblioteca	ITESO	Catalogue	213500
Árboles de la UNAM: Instituto de Biología	UNAM	Subject	unknown
Biblioteca del IBUNAM	UNAM	Institutional	unknown
Colección de Tesis Digitales	UDLA	Theses	2773
Documentacion en Ciencias de la Comunicacion	ITESO-CONACyT	National subject repository	4510
DSpace en Publicaciones Digitales	UNAM	Departmental	unknown
Gobierno del Estado Chiapas	State government	Not found	85
Publications of the Interactive and Cooperative Technologies Lab	UDLA	Departmental	76
Redalyc	UAEM	Regional	81249
SciELO México	UNAM	National repository	Unknown

Table 1. Mexican repositories by type and number of items

In order to examine repository development in Mexico in more detail we took the Network of University Repositories (Red de Repositorios Universitarios- 3R) currently being developed at the UNAM, as a case study. This project has been particularly well documented [16] and both authors are involved making access to information, experiences, interviews, documentation and development easier. Additionally it provides an important case study as it is a large, highly centralized and productive national university, currently producing over fifty percent of the country's total research output. This was followed by interviews with two UNAM based repository managers in order to gain a deeper understanding of repository development, content ingestion work flows, depositing behaviour, content typology, resource usage monitoring, dissemination. These interviews were compared to similar ones done with repository managers in the UK to discover points of convergence and differences.

3R began in 2005 as part of a larger university funding scheme specifically designed to encourage interdisciplinary projects within the UNAM. A steering group was set up with members from Computing Services, the Library, Biology Institute and the Centre for Applied Sciences and Development. Two full time people were hired, one software engineer and one repository developer in order to work the project. The objectives were to investigate the solutions and design of a university repository.

Initial steps were to diagnose the current state of repository development or digital collections at the UNAM. The UNAM has a particularly impressive web presence, appearing in place number 59 in the World's Universities' Ranking on the Web with only UK, USA, Canadian, Swiss, Finland, Norway and Australian universities above it. Attempting to go through the domain www.unam.mx methodologically was not possible due to a lack of consistency in ordering and sub domain assignment [16]. It was considered more practical to collect recommendations from the expert committee and colleagues who worked in the production of digital resources and were well acquainted with the numerous projects that had been developed in the UNAM over the past.

We did not find a repository in a strictly defined sense or any information system with OAI-PMH interoperability. However, a large amount of digital collections, publication listings, image databases and others, covering a very large scope of material both in type and subject were found. These were organized and collected in such a fashion that they could easily be repurposed as repositories. It was clear from this work that repositories could answer an obvious need for digital object management and distribution. We found little or no evidence of coordination between the different working groups.

This was followed by the development of a conceptual model in which it was decided that a federated system formed by a set of university repositories would best answer the UNAM's wide and large digital management and distribution needs. A minimum framework of policies would need to be developed at a global university level with a clear framework on roles and responsibilities in three key areas: collection and material management, depositing and usage. Each local university repository would define at a local level: collection structure, types and formats of accepted items, revision and approval procedures and access policies.

Following an extensive revision of available repository development literature it is clear that the most difficult aspects in repository development and functioning are workflow processes, development and practical implementation of policies and content ingestion. We set up four prototype repositories in order to work on the

technological aspects, but more importantly the development of policies, both global and local. Workshops were organized in order to gather different future repository managers together. The main objective was to arrive at global basic policies and to work out local and particular repository policies depending on local needs and requirements.

These workshops were also targeted at examining and understanding the breadth and volume of the digital materials that we could expect. Acquiring a critical mass of digital materials is an important consideration. It was decided that the four prototype repositories would serve as a benchmark for this before discussing mandates and other forms of acquiring content. It was considered that an appropriate infrastructure should be in place together with implemented workflow processes before we took this step. We hope that this project can serve as a proof of concept before talking to higher university authorities.

Additionally it has become clear that the strength of a repository also lies in the services that can be built on top making them more useful for academics and encouraging them to use it. For example, generating publications lists for homepages, research assessment examinations or internal university reporting. The Biology Institute university repository (IB-UR) at the UNAM has done extensive work on developing services for their existing institutional repository. One interesting example is connecting the OAI-PMH repository that contains mainly eprints to another digital repository that holds information about biological collections using the Darwin Core metadata classification system. It is now possible for the user to consult information about a particular specimen within the biological collection and then automatically check all related images and articles held within the institutional repository. A future expert database will also be connected allowing the user to look not only at the research publications about a particular specimen produced by the Institute but also contact information for prominent researchers in that field. This type of work between OAI-PMH and Darwin Core has not been done before and could be a useful contribution to the field.

As part of the research into the current situation of repositories, interviews with two repository managers were conducted, one with the manager of a national learning object repository and the other with the IB repository manager. These interviews were compared to interviews done with six UK repository managers on similar themes. From these interviews it was clear that the Mexican repositories are in a less developed stage in terms of institutional buy in, content acquisition and staffing. Mexican repositories are still a fairly recent and are usually being developed within a department alongside numerous other projects. In the case of UK repositories one important step has been to hire full time staff to run the repository although in most cases this was a fairly recent development (within the last year).

Mexican repositories were only just beginning to acquire content for the repository, although notably the IB repository as mentioned before, is already working on added on services and other content ingestion systems. According to the repository manager this is one of the advantages of developing a repository at this later stage as software systems for running repositories are now fairly stable, allowing them to focus on new technological developments.

4. Policy development

As mentioned previously no national or even institutional policies on Open Access or repositories were found. There is still no full recognition of their importance either from university authorities or the national science council. This is a big difference from UK, where especially JISC funded projects such as TARDIS, SHERPA and others have been important motors for repository development. In addition, discussions about Open Access have reached research council level, which is not the case in Mexico.

It appears, however, from the previous overview that the current scenario in Mexico is ripe for these types of discussions to take place. National government organizations such as CONACyT together with national collaborative academic organizations such as RABID and individual institutions developing projects such as 3R at UNAM are in a position to provide a platform to develop and promote Open Access in Mexico. Coordination and cooperation are key issues in order to ensure that OA journal and repositories projects can be pushed forward.

5. International collaboration

As the level of repository development at Mexican universities is still in very early stages it would be fruitful to consider building on international expertise to further their development. The repository at the IB is a good example of using stable software solutions in order to spring board development to more advanced stages quite rapidly.

Successful international collaboration projects, such as SciELO and RedALyC, have demonstrated the effectiveness of cooperation for OA journal creation. In addition, Mexican experiences and technology could be used to contribute towards development of OA projects in other Latin American countries.

6. Conclusions

The Open Access movement has not permeated Mexico's academic research environment as it has to the extent of other countries, in particular in relation to more developed countries. However, a few important OA journals and repository projects were found although information regarding OA is still rather scattered and has not been formalized yet in consolidated OA working groups.

It appears that Mexico has focused more on the development of OA journals than it has on repository building. Notable projects such as RedALyC are positive indicators that OA journals can be effectively built. It is clear that institutional collaboration and recognition in terms of funding are key elements for these types of endeavours to succeed.

There is definitely a need for academic digital content management solutions within Mexican universities as noted in the great amount of digital content found for example in the UNAM. There appears to be an important trend towards repository building in Mexico although it is lagging behind in terms of development. However, the mature state of software development would allow Mexican universities to catch up. The few repositories that do exist are mostly still in an embryonic stage or were developed as prototypes and then abandoned or discontinued.

One of the most important aspects would be to work towards making university administrators and national policy makers more aware of the need to promote, fund and develop OA journals and repositories. Although repositories are still not ubiquitous in all developed countries academic institutions their importance is acknowledged and discussed at policy-making level. This is key step that must be taken in Mexico.

Consolidated working groups such as RABID can play an important role in promoting OA within the country. National funding bodies and research councils must be lobbied if OA is to be promoted. Although Mexico is a subscribed to the Open Access movement more concrete steps should be taken towards implementing it. Gathering experiences from repositories and OA journals already in place within Mexico could help towards developing an important body of literature in Spanish allowing us to build a framework so that universities can work in conjunction in order to bring OA to the attention of a larger group of people in particular university authorities, national policy makers and funders.

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