Institutional Repositories Located at Universities: An Analysis of the Cuban Experience

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Abstract

This study examines the administration of seven institutional repositories belonging to Cuban institutions of higher education. A description of the administrative practices of the sample is provided. The RECOLECTA guide has been used as a basis for evaluation of the repositories. The results show that institutional repositories promote the movement for open access to scientific output from Cuban universities. The development of the legal and political aspects of the institutional repositories studied is deficient. In addition, it became evident that the repositories in the sample must increase their capacity for interoperability, exploration, access, and information exchange.

Introduction

Ever since the term first appeared, different scientific disciplines have offered various definitions of the institutional repository (Russell 2011; Naseehath 2015; Idiegbeyan-Ose et al. 2016). This paper uses a definition based on Crow's work with the Scholarly Publishing and Academic Resources Coalition (SPARC): "An institutional repository is a digital collection that captures and preserves the intellectual production of one or several universities" (Crow 2002).

Lynch and Lippencott (2005) and Suber (2006) classify repositories as either institutional or disciplinary (associated with a specific academic community). The contents of institutional repositories include academic publications prior to or after printing (EPrints), doctoral dissertations and master's theses, learning materials, audio, video, data, and other intellectual products from the university.

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The main objectives of institutional repositories, and consequently their development, will focus on the accumulation, preservation, and dissemination of academic research results in a fully accessible way. In recent years, internal diversification has begun to take place in more than a few institutions, as indicated by Jones, Andrew, and MacColl (2006), who point out that a majority of nondoctoral donors began to plan repositories and to implement their plans for the purpose of supporting the academic communication process. However, for several years, the emphasis was on collecting teaching materials and student work, to the detriment of collecting research. Several factors condition this reality, some of which still exist, such as problems related to resource availability, limited budgets, limited personnel, and limited technology. As a result, alternative strategies have been created to provide sustainable institutional repository initiatives.

Institutions of higher learning are producing digital content with ever-increasing diligence. Interest in capturing and preserving digital content is growing because digital content is considered to constitute part of the intellectual assets of the university. Institutional repository projects should be understood within the framework of the actions of the knowledge-management system. Therefore, the focus must be clearly defined, beginning with procedures and progressing through the technological platform itself.

The development of institutional repositories has gone hand-in-hand with the open access movement. This initiative seeks to increase free access to scientific production, and it has a growing impact on an international scale. The close relationship between these two agendas is observable in the increased numbers of institutional repositories and themed indexed repositories in the Registry of Open Access Repositories (ROAR) (http://roar.eprints.org/) and Directory of Open Access Repositories (OpenDOAR) registries (http://www.opendoar.org). Growth has been such that, as Aguillo (2008, 40) explains, "repositories have already reached a critical mass so as to be considered appropriate instruments for describing and evaluating scientific activity."

The number of Cuban university-level institutions that have developed institutional repositories has increased in the last decade (Cano Inclán et al. 2015; Ochoa Agüero, Pérez Águila, y Bles Portú 2015; Zacca González, Martínez Hernández, y Diego Olite 2012). Research by Flores Cuesta and Sánchez Tarragó (2007) suggests principles for the construction of institutional repositories in Cuba. In addition, an initial policy proposal for Cuban higher education repository development does exists ("Política para el Desarrollo del Sistema de Repositorios Digitales en la Red de Bibliotecas Universitaria del Ministerio de Educación Superior" 2017). Fortunately, the advances made during the creation of institutional repositories of higher education in Cuba have contributed to a lessening of the

"dispersion, incompleteness, and unjustified duplication of the documentary universe that constitutes the scientific production" of the university (Martí-Lahera, del Toro Iglesias, y Gutiérrez Medina 2016, 33).

Syntactic and structural interoperability are important aspects of the evaluation of repositories. Syntactic interoperability is the capacity of information systems to read data sourced from other systems and to obtain a compatible representation. This includes the use of structures, languages, and metalanguages, together with standardized metadata models, such as OAI-DC (Open Archives Initiative-Dublin Core), MARC 21, ETD-MS, MODS, and others (Gómez-Dueñas 2009). Structural interoperability refers to common logic models and the capacity of systems to communicate and interact in heterogeneous environments. This includes the definition and correct use of specialized protocols such as OAI-PMH (Open Archives Initiative Protocol for Metadata Harvesting) (Leiva-Medero et al. 2017).

In Cuba, institutional repositories have made it possible for the intellectual production of universities to enjoy increased visibility, both internationally and domestically. While improved visibility is one of the main goals of the current institutional repository initiatives, the repositories have changed significantly since the appearance of the first projects about two decades ago. A full understanding of the phenomena requires close analysis, beginning with a theoretical approach and continuing to results.

To achieve this goal, the primary objective of this study is to describe current practices in institutional repositories associated with higher education in Cuba, which will enable the identification of the strengths and weaknesses of domestic initiatives, as well as provide warnings regarding the current challenges being faced as efforts are made to maintain their sustainability.

Institutional Structure

The first Cuban library was established in 1846 at the Royal and Pontifical University of San Gerónimo of Havana (Díaz Llanillo 1996). This library has remained active in spite of the changes in the name of the university, known today as the University of Havana; changes in location; and the profound educational reforms that it has undergone. The development of university libraries was limited to the University of Havana until 1945. Then other universities were established, and university libraries appeared in other provinces. González Santos and Matos Hidalgo (2012) state that university libraries entered a period of decentralized growth in 1959. The administration of Cuban university education was divided among several government ministries after the triumph of the Revolution. The responsibility for setting national policies was assigned to the Ministry of Higher Education when it was founded in 1976 (de Armas Urquiza y Espí Lacomba 2004). This same ministry established a uniform administrative methodology for all the university library networks. The development of

university teaching required the creation of national information systems and university library networks in each of these ministries. Library networks extended to all provinces. The network structure was affected by the overall university unification initiative that was begun in 2013 (Saborido Loidi 2017). Today, the university library network is made up of twenty-four central libraries and seventy school and research-center libraries (de Cárdenas Cristia 2016, 110).

Method

This article relied on three data and information sources:

- The Latin American institutional repository data offered by LA Referencia (the Federated Network of Institutional Repositories of Scientific Publications), OpenDOAR, and ROAR
- Information on the state of Cuban institutional repositories available from their own websites
- Published reports on the development of these repositories

LA Referencia, OpenDOAR, and ROAR were used to perform the analysis of the current state of Latin American institutional repositories. Institutional repositories for higher learning in Cuban have been described based on each one of their websites and their working documents. The data available from OpenDOAR and ROAR were also used for this purpose.

RECOLECTA, sponsored by the Spanish Foundation for Science and Technology and the Spanish Network of University Libraries, was the basis for the methodology used in describing the repositories studied. RECOLECTA stands for Recolector de Ciencia Abierta, or Open Science Collector. It provides a guide for the evaluation of institutional repositories (Azorín Millaruelo et al. 2017). This methodology was adapted for Cuba.

RECOLECTA uses OpenAIRE (Open Access Infrastructure for Research in Europe) directives for validating the metadata of publications and the implementation of OAI-PMH. This guide for analyzing repositories is made up of eight sections. Because data were not available, this study did not apply criteria related to security, authenticity, and data integrity. For this same reason, not all of the indicators in the remaining sections could be applied. The OpenAIRE validation tool was used to evaluate interoperability (see https://www.openaire.eu/validator/welcome). Tables 1–7 contain the sections and indicators used.

Findings

Latin America, Open Access, and Institutional Repositories

The Inter-American Development Bank, in order to solve problems related to visibility and access to the region, proposed the construction and maintenance of LA Referencia. It was created to warehouse, share, and

provide visibility for and access to Latin American scientific production. In order to achieve this, a strategic consensus and agreement framework were established (Cecatto 2013).

Table 1. Visibility

Indicator	Criteria
Presence in national and international directories	Registered in ROAR and OpenDOAR
Presence in national and international aggregators	Included in at least one of the following aggregators: Google Scholar, OpenAIRE, LA Referencia, or Bielefeld Academic Search Engine (BASE)
Existence of a normalized proper name in directories and aggregators	Always appears in directories and aggregators with the same name, and has a proper name
Existence of a user-friendly and safe URL	User-friendly URL consisting of the web server alone, HTTPS protocol, and URL includes the repository name

Table 2. Policies

Indicator	Criteria
Existence of a mission statement and list of repository objectives	Existence of a public access statement; easy access to the repository from the home page; statement of objectives, scope, and uses
Public access document on the deposits in repository	Establishment of at least the following: who many deposit documents, what may be deposited, and what formats are acceptable
Public access document on how the contents are preserved	Easy access to the repository from the home page; commitment to make the content available on a permanent basis and preservation procedures to guarantee access
Public policy on the reuse of metadata	Specification of the type of Creative Commons license used for the metadata
Visible contact and support information	Evaluation of the existence of various contact methods (social media, email, telephone, etc.) in order for authors to receive telephone and/or in-person assistance
Institutional open access policy	Visible statement of commitment to open access

Table 3. Legal Matters

Indicator	Criteria
Guarantee that access to content is free, for at least viewing and downloading	Facilitation of author compliance with current regulations Documentation available to help author determine whether or not the document may be archived Author acknowledgement that the deposit does not infringe on any intellectual property rights Author permission for nonexclusive distribution Inclusion of information on author rights in the metadata available in the repository

Table 4. Descriptive Publication Metadata

Indicator	Criteria
Use of standardized metadata models and interoperability protocols	Use of the OAI-PMH protocol Use of the OAI-DC metadata format
Compliance with metadata rules and the use of language controllers for tagging of the material	Existence in all registries of the following fields: title, author, description, publication type, publication date, and format Use of the terminology specified in the directives of OpenAIRE 3.0 in the data field for publication type If an organizational system is used, existence of a topic-specific normalized classification or thesaurus

Table 5. Interoperability Level

Indicator	Criteria
Syntactic interoperability status	No detection of errors by the OpenAIRE validator
Structural interoperability status	No detection of errors by the OpenAIRE validator
Integration with other information systems at the same institution	Ability to import and export metadata and/or full texts of the contents from research information-management systems, editing platforms, e-learning platforms, library catalogs, etc.

Table 6. Statistics

Indicator	Criteria
Data available to the public	Access and downloads Individually for each document
Statistics available to the public	Visible; annual statistics for at least the following: content evolution, downloads, and the number of open access items available

Table 7. Added-Value Services and Functionality

Indicator	Criteria
Social media links	A link exists from the item page for social media sharing
Repository integration with reference-management systems	Ability to export quotations to different platforms or reference-management systems (Mendeley, Refworks, Zotero, etc.)
Ability to view and export metadata in various formats	Ability to view and export the metadata of an item in different metadata formats
Notification services	Some type of notification service
Information provided	Frequently Asked Questions; other resources for research, such as other repositories, scientific journals, etc.

This network is composed of nine countries: Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Mexico, and Peru. LA Referencia was consulted on July 5, 2017, and at that time it included 1,916,892 documents. Of these, 70 percent were validated. This indicates that 1,338,121 documents comply with OAI-PMH in their descriptions. The most common documents are articles (55 percent), master's theses (33 percent), and doctoral dissertations (11 percent).

LA Referencia has developed directives for harvesting procedures (LA Referencia 2016, 3). These directives are based on OpenAIRE version 3.0 (2015). The OpenAIRE directives (2015) provide orientation for repository administrators for the definition of local data-management policies. Today they are considered to be an international standard for repository metadata models.

The international directories differ in the total count of Latin American repositories: OpenDOAR reports 365, and ROAR reports 503. Both networks indicate the same five Latin American countries as having the largest number of repositories: Brazil (99 in OpenDOAR and 144 in ROAR), Columbia (45 and 61), Argentina (45 and 43), Peru (49 and 43), and Mexico (32 and 36). ROAR shows 9 repositories in Cuba (technically 11, but two of them are included twice, the EcuRed Virtual Library and the International Repository of the University of the Hotel Industry and Tourism of Camagüey).

Table 8 provides information on the most common categories in the Cuban repositories indexed in ROAR and OpenDOAR, which are those dedicated to the production of research results that go beyond the simple inclusion of theses. In addition, data obtained from OpenDOAR indicates that Cuba has only 10 registered institutional repositories. Of the documents registered in OpenDOAR, 90 percent are also indexed in OpenROAR. No Cuban repository publishes research data. Only final reports are published. As far as themes, the distribution indicates that multidisciplinary repositories are the most frequent type.

Institutional Repositories in Cuban Higher Education

In the case of institutional repositories associated with higher education in Cuba, as seen in table 8, those indexed in OpenDOAR and ROAR make up 70 percent and 78 percent, respectively.

Cuba has a National Commission for the Development of Open Access. It was created in 2009 to encourage open access in Cuba (Casate and Senso Ruiz 2013). However, the rate of progress associated with institutional repositories in higher education has been slow. Among the pioneers in the development and implementation of institutional repositories for dissertations in Cuba are the Repository of Biomedical and Health Sciences Doctoral Theses, known informally as BVS-Tesis for its sponsor the Virtual Health Library (Biblioteca Virtual de Salud), and the University of

Table 8. Cuban Institutional Repositories Indexed in OpenDOAR and ROAR, by Content Type

Repository / Institution	Time Span	Number of Records	Document Type	Subject	Software	Directories and Aggregators
DSpace@UCLV / The Central University of Las Villas, Ministry of Higher Education	1999–2017	7201	Dissertations, articles, books, monographs, conferences, registries, patents, preprints	Multidisciplinary	DSpace	OpenDOAR, OpenROAR
Scriptorium / University of Havana, Ministry of Higher Education	1800–2016	2759	Doctoral dissertations, master's theses, specialization projects	Multidisciplinary	DSpace	OpenDOAR, OpenROAR
Scientific Electronic Library Online – Cuba / National Center for Medical Science Information (INFOMED), Ministry of Public Health	1993– 2017	2287	Journal articles	Health, medicine	SciELO (Scientific Electronic Library Online)	OpenDOAR, OpenROAR
RedUniv Library, open access / Ministry of Higher Education	2002–2017	2712	Articles, references, conferences, dissertations, books, learning objects, multimedia	Multidisciplinary	Calibre	OpenDOAR
ALMA / University of Pinar del Río, Ministry of Higher Education	1991–2017	2013	Dissertations, articles, books, book chapters, conferences	Multidisciplinary	DSpace	OpenDOAR, OpenROAR
ReDIUC / University of Camagüey, Ministry of Higher Education	2000–2017	979	Dissertations, journal articles, books, patents, conference proceedings	Multidisciplinary	DSpace	OpenDOAR
Electronic Repository of the Institute of Tropical Geography / Ministry of Science, Technology and the Environment	1938–2018	713	Articles, references, books	Geography, regional studies	DSpace	OpenDOAR, OpenROAR
Repository of Biomedical and Health Sciences Doctoral Theses (BVS-Tesis) / National Center for Medical Science Information (INFOMED), Ministry of Public Health	1989–2017	558	Theses	Biomedicine, health sciences	CWIS (Collection Workflow Integration System)	OpenDOAR, OpenROAR
Institutional Repository of the School of the Hotel Industry and Tourism of Camagüey / Ministry of Tourism	2002–2013	286	Articles, conferences, dissertations, books	Business and economics, education	DSpace	OpenDOAR, OpenROAR

Havana Scriptorium. Although these pioneers were created prior to the increase in the number of institutional repositories in Cuba, and progress has been made, important details remain to be resolved.

In recent years the project Strengthening the Role of ICT in Cuban Universities for the Development of Society received funding from the Flemish Interuniversity Council (VLIR). This has encouraged the creation of electronic repositories in several Cuban universities: the Central University of Las Villas (UCLV), the University of Camagüey, the University of Pinar del Río (UPR), the University of Holguín (UHO), the University of Informatics Sciences (UCI), and the University of Oriente. Of these six Cuban universities, only two (UCLV and UPR) have their repositories accessible outside Cuba since 2015. As of this writing, although references to documents exist, repositories at UHO, UCI, and the Technological University of Havana (CUJAE) are offline. CUJAE's repository was not among those initiated as part of the Flemish project.

This project has influenced the choice of DSpace as the platform most frequently used by institutions of higher education under the auspices of the Cuban Ministry of Education. Cano Inclán et al. (2015) report:

> In this project, the repositories are set up using the DSpace platform. In addition, norms have been established to include numerous types of research documents: doctoral dissertations, master's theses, specialization projects, diploma-level theses, and diploma-level projects. This is in addition to patents, learning materials, scientific articles, university monographs, books, book chapters, presentations made to scientific conferences, final and partial research reports, scientific publications produced by universities, technical guidelines, CENDA software records, and other products. (326)

As far as a clear mandate for self-archiving the scientific products generated by the members of the institution, something that should guarantee that the majority of work will be placed in the repository, self-archiving is still not widely practiced (see table 9).

Various criteria are used for organizing content. Most of the repositories use more than one criterion to create first-level organizational groups. As a result, groups are found that correspond to administrative entities, academic-development trajectories, document types, and thematic categories. Generally, these repositories are characterized by a large number of groups.

This is the case everywhere except in BVS-Tesis and the Scriptorium, which structure content in a way that corresponds to uniform hierarchical criteria. In BVS-Tesis, the underlying framework is thematic, and the hierarchy of terms moves from the general to the specific. In the Scriptorium, given that the University of Havana is the oldest institution of higher education in the country and the fifth oldest in Latin America, academic theses are organized into three "communities": nineteenth, twentieth, and twenty-first century. Within each century, theses are further organized by

Table 9. Categorization of Cuban Higher Education Institutional Repositories

	Number of Communities	Self-Archiving	Categorization Criteria
BVS-Tesis	Not applicable	Yes	Academic pathways; subject/ academic discipline; doctoral specialization
Scriptorium	3	No	Chronological structure based on academic trajectories and knowledge areas
DSpace@UCLV	66	No	Organizational structure based on document type, except for theses; theses: based on the academic pathways
ALMA	4	No	Postgraduate academic pathways; organizational structure based on document type, except for theses
ReDIUC	6	No	Organizational structure
CUJAE repository	1	No	Academic pathways; subject/ academic discipline
UM repository	21	No	Academic pathways; subject/ academic discipline; date

thesis type ("subcommunity"), which corresponds to the various academic trajectories within higher education. Within these, there are three additional knowledge categories, called "collections."

The mission statements and objectives of the repositories were reviewed, and all of the repositories stated that they exist to increase visibility, to create links with society, and to preserve the scientific and academic patrimony of their institutions. Figure 1 indicates where each repository stands on each of several criteria.

The following observations were made regarding the visibility indicator:

1. The UM and CUJAE repositories do not use proper names.
2. BVS-Tesis does not have a formal abbreviated name or an official acronym. Its URL is the user-friendly tesis.sld.cu, although the name is not included.
3. ALMA, the proper name of the repository of the University of Pinar del Río, is not included in the registries of OpenDOAR, ROAR, or in the OpenAIRE request.
4. BVS-Tesis is the most visible of the sample, appearing in OpenDOAR, ROAR, Open AIRE, BASE, and Google Scholar.
5. Only the Scriptorium has a secure HTTPS web protocol.
6. The Scriptorium and BVS-Tesis provide information on document deposits.
7. The work teams at the Scriptorium, DSpace@UCLV, and BVS-Tesis have held scientific workshops to encourage an open access culture in their communities.

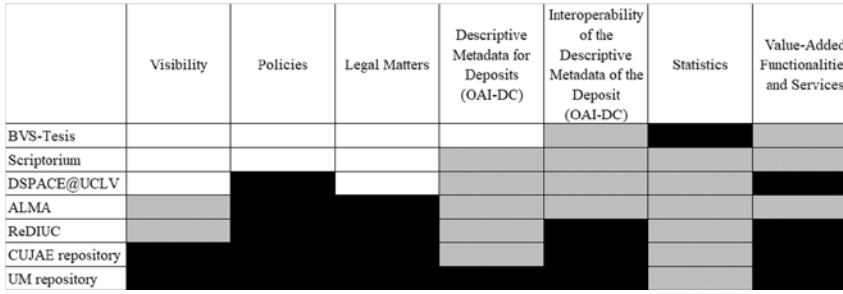

Figure 1. Evaluation of Cuban Repositories Based on RECOLECTA Methodology. Key: White, compliant with all indicator criteria. Grey, compliant with at least one of the indicator criteria. Black, compliant with none of the criteria.

8. The Scriptorium stands out for its use of social networks to advertise and promote use of their resource.
9. All of the repositories offer open access to more than 75 percent of their full texts.

The following observations were made regarding the descriptive publication metadata:

1. All but the UM repository use OAI-DC and fulfill the obligatory requirements of the OpenAIRE 3.0 directives.
2. ALMA and the UM repository do not assign document types according to the types listed under the OpenAIRE 3.0 directives.
3. Only BVS-Tesis uses a controlled vocabulary set, the Medline Thesaurus (Medical Subject Headings, MeSH).

Verification of OAI-PMH use indicates the following regarding interoperability:

1. The only repository registered with OpenAIRE is BVS-Tesis.
2. The validation tests were unsuccessful for the repositories that are not registered with OpenAIRE.
3. Errors exist in the manner in which OAI-DC is used, and insufficient compliance exists with the OAI-PMH in the Scriptorium, ALMA, and DSpace@UCLV.
4. In the cases of ReDUIC and the CUJAE repository, it was not possible to perform the validation tests because server communication failed during several validation attempts.
5. The thesis repository of the University of Matanzas was excluded from the analysis because it uses neither OAI-PMH or OAI-DC.
6. No repository achieves integration with other information systems at the same university.

Regarding the statistics, we found the following:

1. No repository provides public access to data or individualized downloads for each item held. ReDUIC and ALMA have activated the statistics functionality per item and per authenticated user.
2. BVS-Tesis is the only one that does not provide statistics on the evolution of content.
3. None of the repositories offers annualized download statistics or the number of items available in open access.
4. Only ALMA provides statistics on the total number of full-text documents.

Regarding added-value services and functionalities, the following observations were made:

1. None of the repositories comply with the parameters associated with social media, bibliographic management, or multischema metadata.
2. BVS-Tesis and the Scriptorium each have a help section that goes beyond technical support. The Scriptorium help section includes a list of FAQs.
3. The BVS-Tesis offers no kind of notification service.
4. BVS-Tesis, ALMA, and the Scriptorium offer external links to scientific information resources.

The analysis above affirms that most of the repositories are not yet ready to be included in aggregators, directories, or federated networks.

Conclusions

The number of Cuban institutions of higher education moving forward with the development of institutional repositories has increased from the first decade of the twenty-first century until now. The results show that institutional repositories promote the movement for open access to scientific output from Cuban universities. However, they are still not integrated into the open data movement. In addition, the topic of licenses and policies has not been fully developed. Unfortunately, this study has not yet provided full development of some topics, such as how to implement long-term electronic preservation and the standardization of metadata by means of validation mechanisms.

Certainly, institutional repositories associated with higher education in Cuba have not yet reached their maximum potential. The following value-added approaches are awaiting action:

1. The ability to export and manage bibliographic citations
2. Implementation of architecture recommendations so as to guarantee interoperability
3. Indexing of repositories by major search engines, portals, and data harvesters
4. Improvements to the collection and publication of statistics regarding use of content

5. Implementation of the use of terminology lists
6. Implementation of the directives created by LA Referencia and OpenAIRE

Speed of change must be considered, particularly when creating mechanisms for ensuring metadata quality, as a way of guaranteeing interoperability and inclusion in harvesting repositories. Implementation of a national policy is necessary.

The low frequency of appearance of Cuban work in scientific journals may reflect the low level of progress made in the articulation of policies, quality indicators, and the development of value-added services. Little is shared regarding best practices in the national sphere using formal scientific communication channels, in spite of the significant interest of the scientific community in promoting institutional repository projects.

Another of the significant deficiencies in the institutional repositories analyzed is the absence of appropriate metrics for authors, platform managers, and university administrators, which is to say, those associated with use and social impact. Significant interest in evaluating the development of these initiatives has permitted an accelerated increase of new indicators that allow the measurement not only of volume, access, and use of the information from quantitative perspectives but also the impact of the information in terms of views, social development, and economic effects, and alternative metrics based on the online activity of users of institutional repositories.

For Cuban institutional repositories, the most important challenge ahead will involve implementation of improvements in the collection and publication of statistics beyond the use of the content metrics. This refers specifically to the inclusion of citation-related data, demographics, the nature or context of use, and other positive systems such as Altmetrics to obtain alternative approaches to measurement. This will allow the knowledge gaps that result from traditional metrics to be filled.

References

Aguillo, Isidro F. 2008. "Métrica de Repositorios y Evaluación de la Investigación." *Anuario ThinkEPI* 3: 40–41.

Azorín Millaruelo, Cristina, Isabel Bernal Martínez, Rafaela Cívico Martín, Amparo Cózar Santiago, Catalina Guzmán Pérez, Marina Losada Yáñez, José Carlos Morillo Moreno, Brigit Nonó Rius, Rosa Padrós Cuxart, y Jordi Prats Prat. 2017. *Guía para la Evaluación de Repositorios Institucionales de Investigación.* Madrid, España: Fundación Española para la Ciencia y la Tecnología / Recolecta. https://recolecta.fecyt.es/sites/default/files/contenido/documentos/2017GuiaEvaluacionRecolectaFECYT.pdf.

Cano Inclán, Anisley, Raiza Ana de Dios Arias, Ognara García, y Floriselda Cuesta Rodríguez. 2015. "Los Repositorios Institucionales: Situación Actual a Nivel Internacional, Latinoamericano y en Cuba." *Revista Cubana de Información en Ciencias de la Salud* 26 (4): 314–29. http://www.medigraphic.com/cgi-bin/new/resumen.cgi?IDARTICULO=61278.

Casate, Ricardo, and José Antonio Senso Ruiz. 2013. "The Landscape of Open Access Journals in Cuba: The Strategy and Model for its Development." In *Open Access and Digital Libraries*, edited by Lynne M. Rudasill and Maria Elena Dorta-Duque, 89–111. Berlin, Germany: De Gruyter Saur.

Cecatto, Alejandro. 2013. "América Latina pasa la Primera Página en Acceso Abierto." LA Referencia, Santiago de Chile. https://docplayer.es/10658220-America-latina-pasa-la-primera-pagina-en-acceso-abierto.html.

Crow, Raym. 2002. *The Case for Institutional Repositories: A SPARC Position Paper*. Washington, DC: Scholarly Publishing and Academic Resources Coalition. https://pdfs.semanticscholar.org/da92/25f01aced7586efb7ea8f82406371374b06f.pdf.

de Armas Urquiza, Roberto, y Nora Espí Lacomba. 2004. "El Sistema de Educación Superior de la República de Cuba." Conferencia de Tuning América Latina/Programa Alfa-Comisión Europea, el 2-5 noviembre 2004, la Universidad de Deusto, Bilbao. http://tuning.unideusto.org/tuningal/images/stories/presentaciones/cuba_doc.pdf.

de Cárdenas Cristia, Ariane. D. 2016. "Propuesta de un Modelo de Evaluación para Bibliotecas Universitarias en Cuba." Tesis de doctorado, Facultad de Comunicación y Documentación, Universidad de Granada; Facultad de Comunicación, Universidad de La Habana.

Díaz Llanillo, Esther. 1996. *Historia de la Biblioteca Central "Rubén Martínez Villena" de la Universidad de la Habana*. La Habana, Cuba: Editorial Universidad de la Habana.

Flores Cuesta, Gilda, y Nancy Sánchez Tarragó. 2007. "Los Repositorios Institucionales: Análisis de la Situación Internacional y Principios Generales para Cuba." *Acimed* 16 (6). http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1024-94352007001200006.

Gómez-Dueñas, Laureano Felipe. 2009. *Modelos de Interoperabilidad en Bibliotecas Digitales y Repositorios Documentales: Caso Biblioteca Digital Colombiana-BDCOL*. http://eprints.rclis.org/14878.

González Santos, C. Odalys, y Iliana Matos Hidalgo. 2012. "La Biblioteca Universitaria en Cuba, Periodización de su Desarrollo y Tendencias Actuales." *ACIMED* 23 (1): 59–72.

Idiegbeyan-Ose, J., G. Ifijeh, J. Iwu-James, and J. Ilogho. 2016. "Management of Institutional Repositories (IR) in Developing Countries." In *E-Discovery Tools and Applications in Modern Libraries*, edited by Egbert de Smet and Sangeeta Dhamdheere, 306–31. Hershey, PA: Information Science Reference, an imprint of IGI Global.

Jones, Richard E., Theo Andrew, and John MacColl. 2006. *The Institutional Repository*. Oxford: Chandos.

LA Referencia. 2016. "Metadatos y Políticas de Cosecha Interoperables para los Nodos Nacionales." Novembro 04, 2016. http://www.lareferencia.info/joomla/pt/recursos/directrices-metadatos/4-metadatos-y-politicas-de-cosecha-interoperables-para-los-nodos-nacionales.

Leiva-Mederos, Amed, Jose A. Senso, Yusniel Hidalgo-Delgado, and Pedro Hipola. 2017. "Working Framework of Semantic Interoperability for CRIS with Heterogeneous Data Sources." *Journal of Documentation* 73 (3): 481–99.

Lynch, Clifford A., and Joan K. Lippincott. 2005. "Institutional Repository Deployment in the United States as of Early 2005." *D-lib Magazine* 11 (9): 1–11.

Martí-Lahera, Yohannis, Grisel del Toro Iglesias, y Yaneivys Gutiérrez Medina. 2016. "Visibilidad y Accesibilidad al Patrimonio Documental de la Universidad de La Habana: Repositorio Institucional SCRIPTORIUM." *Bibliotecas. Anales de Investigación* 12 (1): 30–40. http://eprints.rclis.org/30456/.

Naseehath, S. 2015. "Open Access Initiatives and Institutional Repositories: An Overview." In *Handbook of Research on Inventive Digital Tools for Collection Management and Development in Modern Libraries*, edited by S. Thanuskodi, 208–28. Hershey, PA: Information Science Reference, an imprint of IGI Global.

Ochoa Agüero, Alexander, Dalier Pérez Águila, y Yali Bles Portú. 2015. "Repositorio Institucional de Contenido Educativo de la Escuela Latinoamericana de Medicina." *Panorama Cuba y Salud* 10 (2): 2–9.

OpenAIRE. 2015. "OpenAIRE Guidelines for Literature Repositories." OpenAire Guidelines. https://guidelines.openaire.eu/en/latest/literature/index.html.

"Política para el Desarrollo del Sistema de Repositorios Digitales en la Red de Bibliotecas Universitaria del Ministerio de Educación Superior." 2017. Working Paper, Universidad Central "Marta Abreu" de Las Villas.

Russell, Isabel G. 2011. "Visibility of Academic Resources: A Critical Review of the Role of Institutional Repositories and Open Access." *Investigación Bibliotecológica* 25 (53): 159–81.

Saborido Loidi, José R. 2017. "Integración de la Educación Superior para el Desarrollo." Conferencia inédita presentada en el Congreso Internacional Pedagogía, el 30 enero al 3 febrero de 2017 en La Habana, Cuba.

Suber, Peter. 2006. "Open Access in the United States." In *Open Access: Key Strategic, Technical and Economic Aspects,* edited by Neil Jacobs, 149–233. Oxford: Chandos.

Zacca González, Grisel, Gisela Martínez Hernández, y Francisca Diego Olite. 2012. "Repositorio de Recursos Educativos de la Universidad Virtual de Salud de Cuba." *ACIMED* 23 (2): 201–9.

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