

**Institutional Digital Repository for scientific  
production at Universidad Central "Marta Abreu" de  
Las Villas - Cuba**

*Dépôt numérique institutionnel pour la production scientifique de  
l'Université Centrale "Marta Abreu" de Las Villas - Cuba*

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**Abstract :** DSpace@UCLV is the first of several digital repositories developed by the Universidad Central "Marta Abreu" de Las Villas to socialize, preserve and increase the visibility of the scientific and academic productivity. It has been organized in 66 communities according to the departments and research centers structure of the university. A metadata set from the Dublin Core Qualified was defined for the documents description in accordance with the type of documents that this repository will store and with the Metadata Export Guidelines released by OpenAIRE. Its visual interface is "responsive" through the use of Mirage 2, making possible the access through the use of mobile devices. This platform has been operational since September 2015 and can be accessed through the URL: <http://dspace.uclv.edu.cu>. At this moment Dspace@UCLV is storing more than 5700 thesis. The operation of this repository is supported by an institutional policy approved by the university's board.

**Keywords :** Repositories, Digital Repositories, Open Access, Scientific Production, Universidad Central "Marta Abreu" de Las Villas

## Introduction

Digital Institutional Repositories (DIR) are tools derived from the initiative of OA, it allows the management and the dissemination of electronic resources produced by members of a community. (Vidal-Ledo *and al.*, 2013, Torres Salinas *and al.*, 2016). The first repository was called *arXiv* and was developed for pre-prints exchange at University of Los Alamos, following the proposal made by the physicist Paul Ginsparg. (Torres Salinas *and al.*, 2016, Melero, 2014)

Recognizing the opportunities offered by the OA and also by the participation of the Universidad Central "Marta Abreu" de Las Villas (UCLV) in the international project: Network of University Cooperation "*Strengthening the role of ICT in Cuban universities for the development of society*", sponsored by the Flemish Interuniversity Council (VLIR), the UCLV has been chosen to develop an Institutional Digital Repositories System (IDRS). (Machado Rivero *and al.*, 2016)

DSpace@UCLV it's the first repository implemented at UCLV which is designed to store, preserve and disseminate the scientific production of this university. It is one of the components of the IDRS that UCLV plans to have operating between 2016 and 2017. (Machado Rivero *and al.*, 2016)

The development of this platform has been achieved thanks to the availability of three main elements namely, Technological infrastructure, Human Resources and Institutional Policy.

## Technological Infrastructure

The internal network of UCLV is one of the most important among Cuban universities with servers capable of storing large volumes of information and supporting dissimilar platforms and multiple repositories at the same time. UCLV also have one of the most modern data centers in Cuba.

This university has increased the connectivity between the national and international environment expanding their bandwidth and ensuring accessibility to services and also to the repositories interoperability with other tools and systems available on the Internet.

### **Human Resources**

The UCLV has been reported as one of the Cuban universities renowned for its scientific production and international visibility (Arencibia Jorge, 2010, Arencibia-Jorge *and al.*, 2013b, Arencibia-Jorge *and al.*, 2013a) Since 2016, the center of Cuban higher education has been known for its large number of careers, combining specialties from different scientific profiles. All of this promotes a constant productivity in many scientific areas.

The institution has a University's Library, with a trained staff for the management of the DIR (56 specialists and 43 technicians, including 4 PhD and 15 MSc). This entity is reflected in the institutional policy as IDRS Coordinator, as it often happens in the digital repositories of various universities. (Terezinha Elisabeth and Tomael, 2011).

### **Institutional policy**

The institutional policy for digital repositories development was approved by the UCLV board in 2015, defining the roles of departments involved in the development of the IDRS and laid the legal foundation for the operation of these services in line with existing legislation on copyright and intellectual property. (Terezinha Elisabeth and Tomael, 2011).

The proposed policy was drawn up by the University Library, having as legal basis documents like: the Copyright Law, the Libraries Act of Cuba Republic and other applicable laws related to copyright and ownership industrial. (República De Cuba. Asamblea Nacional Del Poder Popular, 1977, República De Cuba. Consejo De Estado, 2010, República De Cuba. Ministerio De Cultura, 2003).

### **DSpace platform**

DSpace@UCLV was developed using DSpace (version 5.1), the open source software most used worldwide for this purpose. (Ochoa Agüero *and al.*, 2011, Cano-Inclán *and al.*, 2015, Machado Rivero and al., 2016) Using equal or superior versions to Dspace v5 allows for the possibility to use Mirage 2, which enables visual interfaces to be "responsive", and allows inquiry through mobile devices which are one of the most current trends in consulting on line information services. (Nieto and Lorenzo, 2014).

### **Structure of communities, sub-communities and collections**

DSpace@UCLV boasts more than 60 communities, of which 3 are designed to accommodate Bachelor, Masters and PhD theses; while the remaining are aimed at the various teaching departments and research centers in UCLV.

### **Workflow at DSpace@UCLV**

Digital documents stored at university library are loaded to the system by the library staff. The scientific production of departments is deposited using the self-archiving method by authors. Library staff also play an important role controlling the metadata quality suggested by authors during the submission. (Machado Rivero and al., 2016).

Running queries to the LDAP server from UCL the repository allows rapid identification of personnel belonging to the university community. Moreover, DSpace executes the users' managing and roles assigned to them within the platform (community and collections manager, metadata editors and reviewers, etc.).

### **Metadata model**

A set of metadata for each document type was approved (table 1) as part of the policy, using extended Dublin Core (Temesio, 2013, Anibaldi *and al.*, 2015, Da Matta Vegi *and al.*, 2013, Arnold-Jenda, 2013, Gregory and Williams, 2014), allowing comply with international standards established for the description as well as interoperability with other system using the OAI-PMH protocol (Open Archives Initiative-protocol for Metadata Harvesting). (Babini *and al.*, 2010, Ochoa Agüero and al., 2011, Terezinha Elisabeth and Tomael, 2011, Mayo-Guerra and Castillo-Ascencio, 2015, Ochoa-Agüero *and al.*, 2015) Although, metadata set was defined according to the Metadata Export Guide lines released by Open AIRE. (Artini *and al.*, 2015).

**Table 1. Metadata set defined for each document typology store at Dspace@UCLV.**

<b>Thesis</b>			
<b>Fields</b>	<b>Dublin Core Metadata</b>	<b>Mandatory</b>	<b>Optional</b>
<i>Document type</i>	dc.type	X	
<i>Language</i>	dc.language.iso	X	
<i>Authors</i>	dc.contributor.author	X	
<i>Thesis's Advisors</i>	dc.contributor.advisor	X	
<i>Thesis Title</i>	dc.title	X	
<i>Thesis's Sponsor</i>	dc.description.sponsorship		X
<i>Thesis Alternative title</i>	dc.title.alternative		X
<i>City</i>	dc.coverage.spatial	X	
<i>University and Department</i>	dc.publisher	X	
<i>Defense Date</i>	dc.date.issued	X	
<i>Abstract</i>	dc.description.abstract	X	
<i>ISBN</i>	dc.identifier.isbn		X
<i>DOI</i>	dc.identifier.doi		X
<i>Keywords</i>	dc.subject.		
<i>Controlled terms (taken by librarians from international treasuries or other controlled vocabulary)</i>	dc.subject.other	X	
<i>Use License</i>	dc.rights.license	X	
<i>Rights holder</i>	dc.rights.holder	X	
<i>Bibliographic Reference</i>	dc.identifier.citation	X	

<b>Journal Article</b>			
<b>Fields</b>	<b>Dublin Core Metadata</b>	<b>Mandatory</b>	<b>Optional</b>
<i>Document type</i>	dc.type	X	
<i>Language</i>	dc.language.iso	X	
<i>Author</i>	dc.contributor.author	X	
<i>Title</i>	dc.title	X	
<i>Alternative title</i>	dc.title.alternative		X
<i>ARXIV</i>	dc.identifier.arxiv		X
<i>PMID</i>	dc.identifier.pmid		X
<i>DOI</i>	dc.identifier.doi		X
<i>Journal title</i>	dc.source.journal	X	
<i>Publisher</i>	dc.publisher	X	
<i>Journal Volume</i>	dc.source.volume		X
<i>Journal Issue</i>	dc.source.issue		X
<i>Article start page</i>	dc.source.initialpage		X
<i>Article end page</i>	dc.source.endpage		X
<i>Publication date</i>	dc.date.issued	X	
<i>Abstract</i>	dc.description.abstract	X	
<i>Keywords</i>	dc.subject	X	
<i>Controlled terms (taken by librarians from international treasuries or other controlled vocabulary)</i>	dc.subject.other	X	
<i>Use License</i>	dc.rights.license	X	
<i>Rights Holder</i>	dc.rights.holder		X
<i>Sponsor</i>	dc.description.sponsorship	X	
<i>Publication level</i>	dc.type.group	X	

<i>ISSN</i>	dc.identifier.issn		X
<i>EISSN</i>	dc.,identifier.eissn		X
<i>Bibliographic Reference</i>	dc.identifier.citation	X	
<b>Paper presented in a Conference</b>			
<b>Field</b>	<b>Dublin Core Metadata</b>	<b>Mandatory</b>	<b>Optional</b>
<i>Document type</i>	dc.type	X	
<i>Language</i>	dc.language.iso	X	
<i>Authors</i>	dc.contributor.author	X	
<i>Document title</i>	dc.title		X
<i>Document Alternative title</i>	dc.titlealternative		X
<i>Conference name</i>	dc.source.conferencetitle	X	
<i>Conference editors</i>	dc.source.editor		X
<i>SourceTitle</i>	dc.source.title		X
<i>Publication level</i>	dc.type.group	X	
<i>Conference location</i>	dc.coverage.spatial	X	
<i>Publication date</i>	dc.date.issued	X	
<i>Publisher</i>	dc.publisher	X	
<i>Start page</i>	dc.source.initialpage		X
<i>End page</i>	dc.source.endpage		X
<i>Keywords</i>	dc.subject	X	
<i>Controlled terms (taken by librarians from international treasuries or other controlled vocabulary)</i>	dc.subject.other	X	
<i>Abstract</i>	dc.description.abstract	X	

<i>Use License</i>	dc.rights.license	X	
<i>Rights Holder</i>	dc.rights.holder	X	
<i>Sponsor</i>	dc.description.sponsorship		X
<i>ISSN</i>	dc.identifier.issn		X
<i>EISSN</i>	dc.identifier.eissn		X
<i>DOI</i>	dc.identifier.doi		X
<i>ISBN</i>	dc.identifier.isbn		X
<i>EISBN</i>	dc.identifier.eisbn		X
<i>Bibliographic reference</i>	dc.identifier.citation	X	
<b>Books</b>			
<b>Fields</b>	<b>Dublin Core Metadata</b>	<b>Mandatory</b>	<b>Optional</b>
<i>Document type</i>	dc.type	X	
<i>Language</i>	dc.language.iso	X	
<i>Authors</i>	dc.contributor.author	X	
<i>Editors</i>	dc.contributor.editor		X
<i>Book Title</i>	dc.title	X	
<i>Book Alternative Title</i>	dc.title.alternative		X
<i>Place of Publication</i>	dc.coverage.spatial	X	
<i>Publisher</i>	dc.publisher	X	
<i>Publication Date</i>	dc.date.issued	X	
<i>Keywords</i>	dc.subject	X	
<i>Controlled terms (taken by librarians from international treasuries or other controlled vocabulary)</i>	dc.subject.other	X	



<i>Use License</i>	dc.rights.license	X	
<i>Rights Holder</i>	dc.rights.holder	X	
<i>Sponsors</i>	dc.description.sponsorship		X
<i>ISSN</i>	dc.identifier.issn		X
<i>EISSN</i>	dc.identifier.eissn		X
<i>DOI</i>	dc.identifier.doi		X
<i>ISBN</i>	dc.identifier.isbn		X
<i>EISBN</i>	dc.identifier.eisbn		X
<i>Bibliographic Reference</i>	dc.identifier.citation		X
<b>Book Section</b>			
<b>Field</b>	<b>Dublin Core Metadata</b>	<b>Mandatory</b>	<b>Optional</b>
<i>Document type</i>	dc.type	X	
<i>Language</i>	dc.language.iso	X	
<i>Chapter's Authors</i>	dc.contributor.author	X	
<i>Chapter Title</i>	dc.title	X	
<i>Chapter Alternative Title</i>	dc.title.alternative		X
<i>Book Authors</i>	dc.source.author		X
<i>Book Editor</i>	dc.source.editor		X
<i>Book Title</i>	dc.source.title	X	
<i>Place Published</i>	dc.coverage.spatial	X	
<i>Publisher</i>	dc.publisher	X	
<i>Publication Date</i>	dc.date.issued	X	
<i>Initial page</i>	dc.source.initialpage		X
<i>End page</i>	dc.source.endpage		X
<i>Keywords</i>	dc.subject	X	
<i>Controlled terms</i>	dc.subject.other	X	

<i>(taken by librarians from international treasuries or other controlled vocabulary)</i>			
<i>Use License</i>	dc.rights.license	X	
<i>Rights Holder</i>	dc.rights.holder	X	
<i>Sponsor</i>	dc.description.sponsorship		X
<i>ISSN</i>	dc.identifier.issn		X
<i>EISSN</i>	dc.identifier.eissn		X
<i>DOI</i>	dc.identifier.doi		X
<i>ISBN</i>	dc.identifier.isbn		X
<i>EISBN</i>	dc.identifier.eisbn		X
<i>Bibliographic Reference</i>	dc.identifier.citation		X

### Search and retrieval interface

The implemented interface is user friendly, providing the various search options (author, title, date, and topics) or performing the same following the structure of communities, sub-collections, collections and documents.

Once users choose a document, the system displays an interface in which user can view the summary of the document, data about authors, date of preparation or publication of the item. It also displays the cover page of the document, the URI of the item within repository including metadata, allowing users to determine the relevancy of the given document to their interests.

### Interoperability with other repositories

As stated above, DSpace uses the OAI-PMH (Babini and al., 2010, Ochoa Agüero and al., 2011, Terezinha Elisabeth and Tomael, 2011, Ochoa-Agüero and al., 2015), the same protocol that will be used in the rest of the DIR will integrate the IDRS at UCLV. Other OA platforms like Open Journal System, Open Monography Press and Open Conference System are being used to develop the IDRS at UCLV. A

main search engine metadata will reap each DRI, allowing the access to all in a one user's interface. (Machado Rivero and al., 2016)

At this moment, Dspace@UCLV is being indexed by Google Scholar and IDRS coordinator at UCLV which has initiate it registration on OpenDoar and the Ranking Web of Repositories.

### **Interoperability with other national institutions**

As mentioned in the introduction, UCLV is takes part in an international project, in association with the Universidad de Pinar del Rio (UPR), Universidad de las Ciencias Informaticas (UCI), Universidad de Camaguey (UC) and Universidad de Holguin (UHo). (Cano-Inclán and al., 2015) Although not part of the same program, Universidad de Oriente (UO) has joined the initiative of the mentioned entities.

One of the common goals of this group of universities is the development of digital repositories. Once this goal is reached then it will be possible to increase the access and availability of information sources for students, professors and researchers. (Machado Rivero and al., 2016)

In order to facilitate the interoperability, this group of universities will use the same set of metadata (table 1), and also will follow the Metadata Export Guide lines released by Open AIRE. (Artini and al., 2015) Other repositories that can interoperate, once the DIR is operating within these centers, are those of INFOMED and CITMA (Ochoa-Agüero and al., 2015), as well as others that will operate following the basis of the OAI-PMH.

### **Impact of the SRDI at UCLV**

The implementation of this network of repositories not only increases the visibility of the academic and scientific production of UCLV, but also will impact over the dynamic of the educational process. (Molina-Piñeiro *and al.*, 2015, Ochoa Agüero and al., 2011) Access to sources and information resources that once were only found in person in the library will be increased.

The maintenance and development of these platforms, as well as the exploitation of their full potential, allows the implementation of knowledge and skills that many students receive as part of their training. It will create a space for the emergence of student scientific groups, which under the guidance of specialists will continue promoting the quality of these systems and services.

### **Impact of the Digital Repository Network in Cuban Open Access and Repository Movement**

In 2009, the Cuban National Commission was created for Open Access Developed, with aims to enhance the AOM in the country. (Casate Fernández and Senso, 2013).

The period 2009 – 2014 shows a slow growth characterized by the development of the Doctoral Thesis Repository by INFOMED and a few initiatives with international visibility like: EcuRed, Digital Repository of the Tropical Geography Institute, *Scriptorium* (Digital Repository of the University of La Havana).

A group of professionals from the six universities (specialized on information management and informatics) has been organized and trained. They have been working through the network, creating open access policies for this kind of institutions, implementing DR and their interoperability, developing new functionalities to solve the Cuban OAM needs and the issues they probably will find doing so. Other organizations not taking part of the project have received trainings by this team and are implementing initiatives related to DR. Also, the Cuban High Education are taking the experiences and good practices of this network to implement to the rest of the universities. One of the further results of this group's to organize a Dspace Cuban Community, which can work with the international developers in order to increase the impact of OAM.

Dspace@UCLV and DR from UPR are available for users in Cuba and out the country, DR from the rest of the network will be available at the end of 2016.

### **Conclusions**

Open Access is a viable option for accessing and sharing information resources for countries whose financial resources don't allow the access to large and expensive international databases.

Dspace@UCLV is a platform that allows the socialization of information and knowledge generated within the Universidad Central "Marta Abreu" de Las Villas.

UCLV currently has the necessary scientific productivity, technological and human resources to implement its Institutional Digital Repositories System, and thus disseminate all scientific and academic productivity.

The activities of the International project: Network of University Cooperation "Strengthening the role of ICT in Cuban universities for the development of society", sponsored by the Flemish Interuniversity Council (VLIR) from Belgium provide a great opportunity to organize and improve the development the Cuban Open Access Movement.

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