



The School of
Salamanca

A Digital Collection of
Sources and a Dictionary
of its Juridical-Political
Language

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Visibility and Digital Accessibility of the School of Salamanca in a Linked Open- Data Environment

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Abstract

This paper raises the bibliographic and technological approach to increasing visibility and accessibility of the work of the School of Salamanca in the current technological state of the web. The objective is to avoid the cultural effect of not acting in this field, for which authors draw an analogy with Plantin's privilege in 16th-Century Spanish printing. The Virtual Library of the School of Salamanca is described as a Linked Open-Data resource about the authors of this school and their digitized works, in which the relationships between authors and concepts are crucial. For this purpose, different properties of the DBpedia ontology are used, and the descriptions of the authors are systematically linked to other Linked Open-Data resources. All descriptions (authors, works and concepts) are offered in Europeana Data Model and MARC 21. Also discussed are the advantages of Wikipedia and Wikidata in increasing visibility.

A summary of this text was presented at the international conference organized by the Max Planck Institute for the History of European Law: "The School of Salamanca: A Case of Global Knowledge Production?", held in Buenos Aires from 24th to 26th October 2018.

Keywords

- | | |
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| Group 1 | Discipline categories: General - Bibliographical |
| Group 2 | Geographical categories: Iberia |
| Group 3 | Chronological categories: 16th century; 17th century |
| Group 4 | Digital and Virtual Libraries, Linked Open Data, Semantic enrichment, Wikidata. |

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1 Introduction: the effects of the web

Access to information has changed radically since Tim Berners-Lee presented his proposal¹ to CERN in 1989 to create what is now known as the World Wide Web. Some have compared the arrival of the web with the birth of printing, but, in our opinion, it is much more than that. Perhaps the cultural sociologist Peter Burke has best interpreted the transformations of knowledge due to the state of production in his two works entitled: "*A Social History of Knowledge: From Gutenberg to Diderot*" (2002) and "*A Social History of Knowledge. Volume II: From the Encyclopédie to Wikipedia*" (2012)². Nonetheless, however good the summary, it is impossible to give a detailed account of this phenomenon.

The following analogy illustrates this question. Plato set out his thinking orally, and this was later transcribed onto parchment. Eighteen centuries later, Plato's thinking is reproduced throughout Europe in thousands of incunabula, and his philosophical production became consolidated in all schools of philosophy, and even throughout society, first in the Western world and then globally, thanks to Gutenberg's invention. On the web, however, his works have achieved a level of dissemination unimaginable for Plato when he was sharing his teachings in the Academy³. It should be said that, in his day, Plato complained about the spreading of his thoughts through the sale of books and called it a way of degrading his philosophy⁴.

Through Google, it is possible to access countless documents on Plato in Spanish and an even larger number if the search is made in English, German, or other languages, this quite apart from including such periphrases as "disciple of Socrates", the "author of the myth of the Cavern", the "founder of the Academy", et cetera. If we transfer that same search to WorldCat⁵, we can access thousands of editions⁶. In other words, Plato's works were copied in a multitude of manuscripts and then through printing, obtaining an

¹ Berners-Lee, *Information Management: A Proposal*.

² Burke, *A Social History of Knowledge: From Gutenberg to Diderot*.

Burke, *A Social History of Knowledge. Volume II: From the Encyclopédie to Wikipedia*.

³ *Stanford Encyclopedia of Philosophy*.

⁴ This idea about the book trade is discussed by Popper in *A World of Propensities*

⁵ WorldCat is the world's largest network of libraries both in content and services.

⁶ As of 10th March 2019, the number of Plato's works in WorldCat is 9,548, in 28,938 publications in 25 languages and 481,430 library holdings.

extremely wide dissemination, but, in the latter years of the 20th century and now in the 21st, thanks to the web, it has reached its maximum extension. By way of example, Plato is referenced in 184 Wikipedias and forms part of the category *1000 articles each Wikipedia should have*⁷.

2 The Polymath Virtual Library

In the 1980s, the Spanish businessman Ignacio Hernando de Larramendi (1921-2001) had the idea of applying information technologies to the dissemination of Spain's intellectual contribution to the world. The web did not exist at the time. To do so, he created a foundation called MAPFRE América, from which -- apart from publishing 250 monographs on the occasion of the Fifth Centenary of the Discovery of America⁸ -- he launched a series of processes to scan historical archives related to the Discovery, analogously to the project for the Archivo General de Indias. Specifically, the project was to scan the archival holdings of the Archivo de la Nobleza which has ended up being spun off from the Archivo Histórico Nacional. He subsequently created the Instituto Tavera, later renamed the Fundación Tavera, and finally, the Fundación MAPFRE Tavera. The primary sources produced by these initiatives were extremely important, first in printed format and subsequently on CD-ROM. Some of the series making up the "*Clásicos Tavera*" collection coincided with the period we are referring to at the moment.

On the other hand, Xavier Agenjo, one of the authors of this communication, who had been a Department Head for the Union Catalogue of Bibliographical Heritage and Head of the Computing Coordination Unit at the National Library of Spain, and subsequent director of the Menéndez Pelayo Library, began to develop a strategy which, building on a concept of Marcelino Menéndez Pelayo's, finally gave rise to the Polymath Virtual Library project⁹. Marcelino Menéndez Pelayo said that his library was the only one of his

⁷List of articles every Wikipedia should have.

⁸Fundación Ignacio Larramendi. Proyectos. Available at: <http://www.larramendi.es/fundacion/ignacio-larramendi/proyectos/>.

⁹Biblioteca Virtual de Polígrafos. Available at: <http://www.larramendi.es/es/inicio/inicio.do>.

works with which he was not dissatisfied, and it is evident that there is an extremely clear correlation between Menéndez Pelayo's publications and the shelves in his library.

Between them, then, Larramendi and Agenjo conceived of¹⁰ the Polymath Virtual Library as being able to include all the works of Menéndez Pelayo, both his complete published bibliography and also his library. Menéndez Pelayo held the School of Salamanca in great esteem, as can be seen in the Menéndez Pelayo Virtual Library,¹¹ which is the core of the Polymath Virtual Library. In this way, Menéndez Pelayo's works devoted to the School of Salamanca and its most outstanding members, together with the works collected by him in his library at Santander, were made ready for the web thanks to the Polymath Virtual Library project (see Fig.1). In fact, the first publication on the Polymath Virtual Library was entitled Menéndez Pelayo Virtual Library, in direct correlation with the Miguel de Cervantes Virtual Library created in that same year, 1999, but with far fewer resources¹².

¹⁰ Agenjo, "Ignacio Hernando de Larramendi, 'in memoriam'".

¹¹ Biblioteca Virtual de Menéndez Pelayo. Available at:
<http://www.larramendi.es/menendezpelayo/es/micrositios/inicio.do>.

¹² Agenjo, Hernández, "La digitalización de la Biblioteca de Menéndez Pelayo".

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BIBLIOTECA VIRTUAL DE POLÍGRAFOS

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Está en: Inicio Búsqueda de obras

Bibliotecas virtuales temáticas y de autor

Polígrafos y polígrafistas	Ignacio Hernando de Larramendi	Marcelino Menéndez Pelayo	Viajes científicos ilustrados	Cervantes, maestro universal
Francisco Sánchez, el Escéptico	Escuela de Salamanca 3.0	La ciencia y la técnica en la empresa americana	Antigua Escuela de Traductores de Toledo	Autores visigóticos y mozárabes

Figure 1 Main page of the Polymath Virtual Library site
[<http://www.larramendi.es/es/inicio/inicio.do>]

In summary, the idea of the Polymath Virtual Library was to take a step forward, in this case a virtual step, in the bibliography of Menéndez Pelayo and to transfer Menéndez Pelayo's Library onto the web. The first results were obtained in 1999, now 20 years ago, with the publication of the complete works of Marcelino Menéndez Pelayo, his correspondence and the bibliography on this author prepared by Labandeira, Herrera and Escribano, in the CD-ROM entitled "*Menéndez Pelayo Digital*"¹³.

¹³ Menéndez Pelayo, "Menéndez Pelayo digital [Recurso electrónico]". See also the review by Bueno, "Menéndez Pelayo Digital". Available at: <http://www.filosofia.org/aut/mmp/mmp005.htm>.

Unfortunately, the initial project was interrupted owing to the lack of facilities provided to the director of the Menéndez Pelayo Library when it came to the digitization of the Library, despite being able to call on a variety of support such as the project financed by the European Union for "Contemporary Virtual Archives in XML (COVAX, 1999-2000)"¹⁴, coordinated by the Residencia de Estudiantes, and with the assistance of the Fundación MAPFRE, the Fundación Santillana and the Fundación Marcelino Botín. Never has the project had more external supporters nor more internal obstacles, ultimately preventing it from taking off or leaving its mark on the web. At the present time, neither is the catalogue of the Menéndez Pelayo Library available on the web nor has even a minimal portion of his works been digitized, a scandalously incomprehensible situation in the second decade of the 21st century.

On the other hand, the Fundación Ignacio Larramendi did transform its initial idea into the Polymath Virtual Library, which was implemented through specialized software¹⁵ developed by the DIGIBÍS company, set up for the purpose by Ignacio Hernando de Larramendi.

2.1 The School of Salamanca Virtual Library

The Polymath Virtual Library is structured around numerous sub-projects devoted to different eras of Spanish philosophy and thinking, each one forming a distinct micro-site. The first of these sub-projects, also referred to as thematic virtual libraries, was devoted to the School of Salamanca, published on the web in 2010¹⁶. Special mention should be made of the fact that the project has received the generous support of the Fundación MAPFRE.

¹⁴ Hernández, et al., "XML for libraries, archives, and museums: The project COVAX".

¹⁵ DIGIBIB for Libraries, developed by DIGIBÍS. Available at: <http://www.digibis.com/en/software/digibib>.

¹⁶ Agenjo, Hernández, Juez, "La Escuela de Salamanca considerada desde el punto de vista de la web semántica y la información en la red".

The School of Salamanca Virtual Library comprises 20 authors. This choice of authors, like any other, is debatable; specialists would probably add a few more and discard others.

From a computing perspective and, particularly, a data model, the School of Salamanca Virtual Library represented a very important step forward building on "*Marcelino Menéndez Pelayo Digital*", although, when it first opened, it did not yet have its own microsite nor any of the other features that have been gradually added to the Polymath Virtual Library. In fact, coinciding with the Eighth Centenary of the University of Salamanca, the Fundación Ignacio Larramendi and DIGIBÍS have remodelled this virtual library, particularly in terms of its semantic content (see Fig. 2). The new version of the website of the Virtual Library of the School of Salamanca was presented publicly on 4th October 2018 in the *Aula Francisco de Vitoria* of the University of Salamanca, the presentation being attended by the Rector of the University, the President of the Fundación MAPFRE and the President of the Fundación Ignacio Larramendi¹⁷.

¹⁷ Presentada la Biblioteca Virtual de la Escuela de Salamanca 3.0 en la USAL. Available at <http://www.larramendi.es/fundacion/presentada-la-biblioteca-virtual-de-la-escuela-de-salamanca-3-0-en-la-usal-2/>.

BIBLIOTECA VIRTUAL DE LA
ESCUELA DE SALAMANCA 3.0

Presentaciones Introducción Nota a esta edición digital Consulta Polígrafos Polígrafistas Enlaces recomendados

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Búsqueda de obras

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800 AÑOS UNIVERSIDAD DE SALAMANCA

- Presentación del rector de la Universidad de Salamanca
- Presentación de la Fundación MAPFRE
- Presentación de la Fundación Ignacio Larramendi

Figure 2 School of Salamanca Virtual Library 3.0
[http://www.larramendi.es/esc_sal/es/micrositios/inicio.do]

The Library provides readers with a stockpile of digitized works by the members of the School of Salamanca accessible on the web. The fundamental sources for obtaining the metadata from these works were Hispana¹⁸, the Spanish digital aggregator that already brings together more than 8.3 million records, and Europeana¹⁹, the European Union's digital library with over 58 million records. The purpose of this project is for readers of, let us say, Francisco de Vitoria, to be able to access the works themselves in order to eliminate the temptation to quote them second hand.

In addition, each author, each polymath, has an individual bio-bibliographical study drafted by renowned specialists. At the present time, these studies are available for

¹⁸ Hispana. Available at <http://hispana.mcu.es>.

¹⁹ Europeana. Available at: <https://www.europeana.eu>.

Francisco de Vitoria, Juan Ginés de Sepúlveda, Martín de Azpilcueta, Domingo de Soto, Melchor Cano, Diego de Covarrubias, Luis de León, Domingo Báñez and Juan de Mariana. In order to facilitate accessibility, all these studies²⁰ have been published in the formats (PDF, EPUB and MOBI) most widely used on various mobile reading devices. Each publication is also identified with a DOI.

All of the contents of the Polymath Virtual Library and, therefore, all of the contents of the School of Salamanca Virtual Library have the greatest visibility, as they are provided with an OAI-PMH repository²¹ that enables their bibliographical records to be collected by Hispana²² and Europeana²³, as well as through OAIster to form part of WorldCat. For example, the study devoted to Juan de Mariana, written by Mario Crespo²⁴, can be consulted on the Polymath Virtual Library, on Hispana, on Europeana and on WorldCat (see Fig. 3 to 6).

²⁰ "Biblioteca Virtual de la Escuela de Salamanca 3.0. Polígrafistas", in *Biblioteca Virtual de Polígrafos*. Available at: <https://bit.ly/2UtNHNx>.

²¹ Biblioteca Virtual de Polígrafos. Repositorio OAI-PMH. <http://www.larramendi.es/es/inicio/oai.do>.

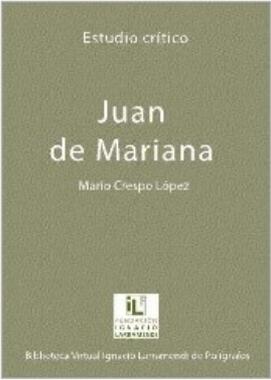
²² Biblioteca Virtual de Polígrafos' record in Hispana. <http://hispana.mcu.es/es/comunidades/registro.do?id=1466>.

²³ Fundación Ignacio Larramendi as Europeana Provider. <https://www.europeana.eu/portal/en/search?f%5B%5B%5D=Fundaci%C3%B3n+Ignacio+Larramendi>.

²⁴ Crespo, *El Padre Juan de Mariana: Aproximación a su vida y obra*.

El Padre Juan de Mariana : Aproximación a su vida y obra

Formato: [MARC XML](#) [MODS](#) [BIBTeX](#) [Enlace persistente](#)
[JISC](#) [METS](#) [WFO](#) [RDF](#)



Estudio crítico
Juan de Mariana
Mario Crespo López
Fundación Ignacio Larramendi
Biblioteca Virtual Ignacio Larramendi de Parígrafos

El Padre Juan de Mariana : Aproximación a su vida y obra (2009) - Crespo, Mario, 1975-. El Padre Juan de Mariana. Aproximación a su vida y obra. Español [PDF](#) [EPUB](#) [MOBI](#)

Sección: Estudios sobre polígrafos encargados por FIL

Título: El Padre Juan de Mariana : Aproximación a su vida y obra / Mario Crespo López

Autor: Crespo, Mario, 1975- [ID](#)
[El Padre Juan de Mariana. Aproximación a su vida y obra] [Todas las ediciones](#)

Características de edición: . Español

Publicación, Producción, Distribución, etc.: Publicación: Madrid : Fundación Ignacio Larramendi, 2009
Producción: Madrid : Digibís, S.L., 2009

Descripción física: 3 recursos en línea

Tipo de contenido: texto

Tipo de medio: ordenador

Tipo de soporte: recurso en línea

Materia / geográfico: Mariana, Juan de, 1536-1624 [ID](#)

Autores secundarios: Fundación Ignacio Larramendi, Editor [ID](#)
Digibís, S.L., Productor [ID](#)

Números normalizados: <http://dx.doi.org/10.18558/FIL010>

Tipo de publicación: [Libros](#)

[PDF](#) Libro electrónico.pdf
[EPUB](#) Libro electrónico.epub
[MOBI](#) Libro electrónico.mobi

Figure 3 Study of Juan de Mariana by Mario Crespo
 {<http://www.larramendi.es/bib/FIL20100005668>}

The screenshot shows the Hispana website interface. At the top, there are logos for the Spanish Government, Ministry of Education, Culture and Sports, and the Secretary of State for Culture. Navigation tabs include 'Inicio', 'Presentación', and 'Búsqueda'. The main header features the word 'HISPANA' in large orange letters, accompanied by various cultural icons. Below the header, the 'Datos de registro' section is visible, showing a dropdown menu set to 'Ficha' and buttons for 'Aplicar' and 'Exportar'. The record title is 'El Padre Juan de Mariana : Aproximación a su vida y obra'. A list of metadata fields follows, including 'Claves', 'Lengua', 'Autor', 'Editor', 'Otros colaboradores', 'Derechos', 'Fecha', 'Tipo del recurso', 'Formato', and 'Identificador del recurso'. The footer contains copyright information for the Ministerio de Educación, Cultura y Deporte and several international standards logos like RDF, SRU, and WAI-AA.

Datos de registro

Formato:

El Padre Juan de Mariana : Aproximación a su vida y obra
 (Bibliotecas Virtuales FHL. Registros bibliográficos)

Título: El Padre Juan de Mariana : Aproximación a su vida y obra
Claves: Mariana, Juan de, 1536-1624
Lengua: spa
Autor: Crespo, Mario, 1975-
Editor: Fundación Ignacio Larramendi
Otros colaboradores: Fundación Ignacio Larramendi, Editor
 Digibis, S.L., Productor
Derechos: Creative Commons - Attribution, ShareAlike (BY-SA)
Fecha: 2009
Tipo del recurso: book
Formato: recurso en línea
 application/pdf
 application/epub+zip
 application/x-mobipocket-ebook
Identificador del recurso: <http://www.larramendi.es/es/consulta/registro.do?id=1868>
http://www.larramendi.es/es/catalogo_imagenes/grupo.do?path=1000602
http://www.larramendi.es/es/catalogo_imagenes/grupo.do?path=1023090
http://www.larramendi.es/es/catalogo_imagenes/grupo.do?path=1023091

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*Figure 4 Study of Juan de Mariana by Mario Crespo in Hispana
 {<http://hispana.mcu.es/es/registros/registro.do?idBib=21707544&tipoRegistro=MTD>}*


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Título **El Padre Juan de Mariana : Aproximación a su vida y obra | Crespo, Mario, 1975-**

Personas
Creador: Crespo, Mario, 1975-
Contribuidor:
<http://hispana.mcu.es/lod/oai:larramendi.es:1868#ent2> ,
<http://hispana.mcu.es/lod/oai:larramendi.es:1868#ent4>
Materia: Mariana, Juan de, 1536-1624

Clasificaciones
Tipo: Libros
Técnica: recurso en línea

Propiedades
Idioma: spa

Tiempo
Fecha: 2009, 21-st, 21st, 21st century
Periodo: Early 21st century

Procedencia
Editor:
 Fundación Ignacio Larramendi, <http://hispana.mcu.es/lod/oai:larramendi.es:1868#ent2>
Identificador: oai:larramendi.es:1868
Proveedor De Datos: Fundación Ignacio Larramendi
Proveedor: Hispana
País Proveedor : Spain

Figure 5 Study of Juan de Mariana by Mario Crespo in Europeana[<https://bit.ly/2UbWEiA>]



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 Calificar este material: ☆☆☆☆☆


El Padre Juan de Mariana : Aproximación a su vida y obra

Autor: Fundación Ignacio Larramendi, Editor; Digibis, S.L., Productor; Crespo, Mario, 1975-
 [El Padre Juan de Mariana. Aproximación a su vida y obra]

Editorial: Fundación Ignacio Larramendi Fundación Ignacio Larramendi Fundación Ignacio Larramendi 2009

Edición/Formato:  Material de archivo descargable : Español (spa)

Calificación: ★★★★★ basada en 1 calificación/es 
 0 con reseñas - [Ser el primero.](#)

Temas [Mariana, Juan de, 1536-1624](#)

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Figure 6 Study of Juan de Mariana by Mario Crespo in WorldCat
 [http://www.worldcat.org/oclc/7355446169]

Nonetheless, similar but much more powerful projects, such as Gallica, have dissipated some of our hopefulness. Thus, in the month of May, 2018, the French library published an information resource entitled "*Pensée politique de la Renaissance et du XVIIe siècle*"²⁵, in which it chooses Bartolomé de las Casas as the Spanish political thinker and, specifically, two editions the titles of which are anything but misleading²⁶. It is, however, also true that its section "*Pensée politique de l'âge classique*"²⁷ includes works by Juan de Mariana and Francisco Suárez. In any case, the imprint of the School of Salamanca is practically invisible in the digital mainstream. It is evident that, despite the amount of effort made by the Fundación Ignacio Larramendi and the Polymath Virtual Library, it is extremely difficult to combat the power of the Bibliothèque nationale de France, whose digital reputation will always be much greater than our own. On this subject, we will draw some analogies with Plantin's privilege.

3 Plantin's privilege and its analogy with the digital world

It may sound strange to appeal here to Plantin's privilege but, in our opinion, fitting. It will be recalled that the Spanish Realm had printing works in all of its territories during the 16th century²⁸, some of which prospered, while others faded away²⁹. During the 16th century, the quality of printing in Spain itself, though not in the Spanish Realms as a whole, reached its apex in the "*Biblia Polígloa*".

²⁵ "Pensée politique de la Renaissance et du XVIIe siècle", in *Gallica*. Available at <https://gallica.bnf.fr/html/und/droit-economie/pensee-politique-du-xvii-siecle>.

²⁶ *Tyrannies et cruautéz des Espagnols, perpetrees és Indes occidentales... par l'evesque Don Frere Barthelemy de Las Casas ou Casaus...*, 1579. *Le miroir de la cruelle et horrible tyrannie espagnole perpétrée au Pays-Bas par le tyran duc de Albe et aultres...*, 1620.

²⁷ "Pensée politique de l'âge classique", in *Gallica*. Available at <https://gallica.bnf.fr/html/und/droit-economie/pensee-politique-de-lage-classique>.

²⁸ Labandeira, *La imprenta en España: compilación de repertorios clásicos*.

²⁹ The bibliography on printing in the 16th century is, of course, very copious, but the Fermín de los Reyes's article, "El proyecto 'Tipobibliografía española'" is recommended, as well as, in general, any of the works of Julián Martín Abad, whose "La imprenta en Alcalá de Henares (1502 - 1600)" is a model of some repute.

However, one of the outcomes of the Council of Trent (1545-1563) turned out to be a disaster for Spanish printers, albeit not for printing works in the rest of the Empire. The clauses agreed upon at Trent included one that provided for the total renewal of liturgical printed works; it seemed likely to be an extremely profitable business for Spanish printers, but this was not the case. Plantin, who was, of course, a printer, or rather came from a family of printers, obtained the royal grant to print all liturgical works on his presses. As a result, the books that came from Antwerp were stored in a building which was later given the name "Casa del Nuevo Rezado" (House of New Prayer)³⁰.

It is difficult to grasp the gravity of the situation. Spanish printing works were deprived of their main publishing business, liturgical books. An analogy may give an idea of what this represented: in Spain: all the main publishing houses in the 20th and 21st centuries have one very important line of business -- school textbooks. Between 2012 and 2016, this sector represented between 12.35 and 14.53 per cent of all publications in Spanish³¹. Just imagine the tremendous repercussions that would ensue if a hypothetical ministerial decision were to allocate the printing of all those textbooks to a publishing house outside Spain.

The effect of Plantin's privilege was even greater. It is estimated that the percentage of liturgical printing came to around two thirds of the national publishing output. In our opinion, however, not all of the data available in the "*Tipobibliografía Española*" (Spanish Typobibliography) project³² have been explored or exploited yet, nor those in the Spanish Union Catalogue of Bibliographic Heritage³³. A quick consultation in this catalogue will dispel any doubt. It is possible that the Bibliographical Heritage Virtual Library³⁴, Hispana and Europeana, as well as an updating of the Union Catalogue of Bibliographic Heritage just mentioned, might represent progress in this research strategy.

³⁰ Ponce de León, "El Nuevo Rezado, Sede de la Real Academia de la Historia aportaciones sobre su origen, historia y situación presente".

³¹ 2012 (12,77%), 2013 (14,53%), 2014 (12, 35%), 2015 (14,20%), 2016 (12,65 %). Source: *Panorámica de la edición española de libros 2016: Análisis sectorial del libro*.

³² Reyes Gómez, "El proyecto "Tipobibliografía española".

³³ Catálogo Colectivo del Patrimonio Bibliográfico Español. Available at: <http://catalogos.mecd.es/CCPB/ccpbopac/>.

³⁴ Biblioteca Virtual de Patrimonio Bibliográfico. Available at: <http://bvpb.mcu.es>.

In other words, 16th century printed works, including works of authors from the School of Salamanca, were affected by the disastrous effects of Plantin's privilege. What is more, it is not just that the Spanish publishing industry lost a great deal of its impetus, but rather that this impetus was not recovered until the 18th century. If we compare, for example, the works printed in Alcalá in the 16th and 17th centuries, it is possible to see an extremely steep decline. Precisely the monograph that Julián Martín Abad³⁵ published in the 17th century, after his *"La imprenta en Alcalá de Henares (1502-1600)"*, describes this decline with a surfeit of evidence. In the first 10 years of the 17th century, Maestro Correa lamented that it was not possible to find Greek fonts in Spain and recalled the times of the *"Biblia Políglota"*. Although it is true that the master of Spanish typobibliographers, Jaime Moll³⁶, demonstrated that the Hieronymite monks in El Escorial were able to print books throughout that period of the so-called privilege, this was no more than a drop in the ocean. If there is one work that symbolizes this issue, it is the *"Biblia Regia"* commissioned from Arias Montano, for which he had to travel to Antwerp, since it could not be printed in Spain. Checking the dates of the *"Biblia Políglota"* from Alcalá (1520) and the *"Biblia Regia"* from Antwerp (1568-1572), in other words from Brocar to Plantin, it is possible to see the decline of the publishing business in Spain over half a century, though, as has already been mentioned, this did not affect the whole of the Spanish realms.

It is no less curious that Arias Montano was accused of heterodox practices by none other than Fray Luis de León, a very unfamiliar concept for modern ears, where his role as a victim is so well known. Arias Montano's defender was a member of that School of Salamanca, Juan de Mariana, and, following his intervention, Arias Montano was absolved of the accusation. The power of accusation is very notable in the 16th century, since, as has been seen, Arias Montano had been commissioned by none other than King Philip II to carry out the publication of the *"Biblia Regia"*. It seems, however, that Arias Montano did indeed hold some heterodox opinions, as he was a member of a small enlightened conventicle. It is certainly striking that the *"Biblia Regia"* and the equally

³⁵ Martín Abad, "La imprenta en Alcalá de Henares (1502-1600)"

³⁶ Moll, "Plantino, los Junta y el 'Privilegio' del Nuevo Rezado". Moll, *Problemas bibliográficos del libro del Siglo de Oro*. This work by Jaime Moll is a model of bibliographic precision and historical analysis, and we must refer to it when dealing with these issues.

royal Library at El Escorial monastery should have been commissioned from an intellectual such as Benito Arias Montano, in whom certain small heterodox beliefs could be detected.

The printed works of the School of Salamanca, but also *"Don Quixote"*, the *"Soledades"*, and the *"Política de Dios"*³⁷, the biggest bestseller of what we would now call non-fiction in the 17th century, are evidence that the materiality of the works or the strength of the printers was very poor when it came to opposing the ideas that took their place in the 17th century, coming mainly from the extremely good printing works of France, England, Italy, Germany, the Netherlands et cetera.

Readers might perhaps feel that we have overreached ourselves too much on this issue of Plantin's privilege, but we believe that it is a stroke in favour of our thesis that visibility and digital accessibility of the authors and works of the School of Salamanca must be sustained on high-quality digital platforms so that the efforts for the digital dissemination of the School of Salamanca, and the works written by those authors do not suffer the same fate.

4 The implementation of the School of Salamanca Virtual Library

The School of Salamanca Virtual Library was first made public on the web in 2010, using DIGIBÍS software. In that same year, a communication was presented to the IFLA conference in Puerto Rico with the title *"Data aggregation and dissemination of Authority Records through Linked Open Data"*³⁸. That communication created a great deal of interest and was published with some minor changes in *"Cataloging & Classification Quarterly"*³⁹ the following year. Also in 2011, on its site dedicated to

³⁷ Quevedo, *Política de Dios, Gobierno de Christo*, ed. de James O. Crosby. Crosby made a critical edition of the *"Política de Dios"* that is a model in its genre. In this case, which is quite rare in Hispanicism, it is an ecdotic not Neolachmannian, but is part of the English tradition of Elizabethan editions. Compare this edition of Crosby's *"Política de Dios"* with Fernando Lázaro Carreter's *"La vida del Buscón"*.

³⁸ Agenjo, Hernandez, Viedma "Data aggregation and dissemination of Authority Records through Linked Open Data"

³⁹ Agenjo, Hernandez, Viedma, "Data Aggregation and Dissemination of Authority Records through Linked Open Data in a European Context"

monitoring the project, EuropeanaPro, Europeana published the "*Virtual Library of Francisco Sánchez, the Sceptic*" (2011), a project that followed that of the School of Salamanca, as a case study⁴⁰ for the Europeana Data Model (EDM). As previously noted, some of these theories and practices came from the Contemporary Virtual Archives in XML (COVAX, 1999-2000) project financed by the European Union and coordinated by the Fundación Residencia de Estudiantes, whose partners included the Menéndez Pelayo Library.

The case study presented dealt with the application of Linked Open-Data philosophy and technology to relate authors, concepts and digital objects. The "Virtual Library of Francisco Sánchez", as it was devoted to a single author, enabled the use of Linked Open Data, of Europeana Data Model and the conclusions of the "*W3C-Library Linked Data Incubator Group Final Report*" (2011)⁴¹ to be presented very clearly.

Succinctly, it was an attempt to illustrate how scepticism was accepted in Europe after the translation of the "*Outlines of Pyrrhonism*" by Sextus Empiricus (1562), and what connection with that concept authors such as Montaigne, Descartes, Francisco Sánchez and Gómez Pereira had. It should be noted that Montaigne had a Hispanic ancestor. In fact, his great grandmother was from Calatayud, and he also had family ties to Francisco Sánchez who, although he had been born in Tuy, made his name in Toulouse. When Descartes informed le Père Mersenne, as was his custom, of the draft of his "*Discourse on the Method*", the letter he received in response praised the work but wondered whether those new theories, apart from being inspired by Pyrrho, might also be inspired by Francisco Sánchez and Gómez Pereira, thus indicating that Mersenne was perfectly familiar with the works of the Spanish writers. Descartes' reply was clear: he was not familiar with the works themselves, but he knew of their refutation through the work of King Philip II's doctor, Francisco Valles, the so-called "divine Valles", specifically his work "*De Sacra Philosophia*". The influence of Spanish authors in France at that time is a chapter in the history of philosophy and ideas and, of course, that influence has to be

⁴⁰ Agenjo, Hernández, "The Polymath Virtual Library and EDM" in *Europeana Pro*. Available at: <https://pro.europeana.eu/page/polymath-edm>.

⁴¹ *W3C Library Linked Data Incubator Group. Library Linked Data Incubator Group Final Report*, 25th October 2011. Available at: <http://www.w3.org/2005/Incubator/lld/> (retrieved on 10th March 2019). The Spanish translation of all the documents, including the Use Cases, can be found at <https://bit.ly/2z1rCQe>.

represented in the digital setting through a virtual library. It must, furthermore, not be forgotten that Montaigne translated the work of Ramón Sibiuda into French and then included it in his *"Essais"*.

For this purpose, it is necessary to have authority records available crafted in accordance with bibliographical rules, but enriched with links to different reference repertoires, catalogues and databases on the web, known in Linked Open-Data terminology as value vocabularies. The same can be said for the works of an author and his or her bibliography which must be well described in the Virtual Library and associated with a digital copy of the work. This copy or digital version must also be described in a standardized way, and, lastly but no less importantly, it is necessary to establish links among authors and between authors and concepts. For this purpose, the Virtual Library of Francisco Sánchez the Sceptic, and the Polymath Virtual Library, to which it belongs, and the School of Salamanca Virtual Library make use of MARC 21 format encoding -- particularly the use of tags facilitating the identification of relationships and interconnections between persons and concepts, as well as between bibliographic descriptions and digital versions.

This model fits in very well with the ontology of the Europeana Data Model,⁴² and, since the Polymath Virtual Library is fitted with an OAI-PMH repository fed dynamically and transparently and subsequently collected by Hispana, then by Europeana, and, in turn, by OAIster to feed into the WorldCat, its widest dissemination is guaranteed.

4.1 Librarianship criteria

As indicated above, the Polymath Virtual Library was defined from its outset as a library project that should be present on the web and arranged in such a way as to make use of the advantages of information technology. As a library-based project, it must comply with specific standards for the exchange of bibliographic information.

For some decades now, the world library community has been adopting a series of standards with the aim of establishing rules for bibliographical descriptions and the system for encoding them in order to facilitate the computerized exchange of

⁴² Europeana. *Definition of the Europeana Data Model v5.2.8.*

bibliographic and authority records. This type of standardization and exchange has, in the main, been taking place very successfully on an international scale for decades. In other words, the School of Salamanca Virtual Library is being born into a setting already endowed with well-developed and well-established specific standards.

In this context, the Polymath Virtual Library, of which the School of Salamanca Virtual Library forms part, begins its operation using this combination of cataloguing rules and the MARC 21 format. We shall not detail here the evolution of these rules in recent years, particularly with respect to the description model with the publication and application of the "*Resource: description and Access (RDA)*" standard, which has involved the adaptation of library cataloguing rules to the web and the multiplication of electronic resources, especially online.

Furthermore, between the end of the last century and the first decade of this present one, the emergence of digitization projects for library materials has transformed the document-access panorama to the point where the vast majority of users around the world find it much easier to have access to a digital copy on the web than to the original physical document. It is often indicated that one of the weaknesses of memory institutions on the web is that of setting up closed silos of information, but it must be acknowledged that, overall, the accessibility provided by the web and the creation of electronic resources for that web are much greater than can be provided by brick and mortar libraries. Just imagine the notable difference that exists between identifying the bibliographic production of the School of Salamanca through the primary and secondary documents available in physical libraries and performing the same task on the web. We should not like this statement to be understood as a criticism of libraries -- far from it -- because the very existence of digital libraries is only possible because they have seen how convenient it is to have their collections present on the web as well.

In this way, the initial intentions of the Polymath Virtual Library to digitize the work of the authors making up the Library were soon altered by the existence of these works once they were uploaded onto the web. The scanning of the documents by the polymaths themselves became a secondary goal, only necessary where it was impossible to locate any digital copy. By way of example, the Polymath Virtual Library offers revised bibliographical descriptions of 581 works digitized by the Bayerische Staatsbibliothek.

In consequence, these circumstances required a deeper analysis of the reuse of the metadata and digital copies generated by a multitude of institutions and available on the web.

4.2 Bibliographical criteria: authors as the central axis

The Polymath Virtual Library, as the heir of the Menéndez Pelayo Library, is not only a library project, but rather is essentially a bibliographical project. As such, the manager and administrator of the Library is also a user, and, for this reason, there is a direct relationship between the user's tasks and the functional requirements that need to be put into practice. To state it more clearly, the structure of the Polymath Virtual Library has been developed bearing in mind the needs of web users in general, not necessarily a specialist, although specialists may be in the majority. Since the start of this project, the selection of the authors who would be forming part of the Polymath Virtual Library has been crucial and, therefore, also crucial for the School of Salamanca Virtual Library.

The authors of the School of Salamanca belong to a group created after they existed physically, each with a specific intellectual link to the University of Salamanca as part of their curriculum. This simple relationship of a group belonging to a university institution exceeded the expressive potential of the MARC 21 format and current cataloguing rules. In this way, the Fundación Ignacio Larramendi realized it was extremely useful to adopt, as soon as possible, the new RDA ("*Resource: description and access*") descriptive model, which did enable a specific relationship to be established between the various authors and the University, as well as with the School, while, at the same time, maintaining a coding system still permitting the records to be interchanged.

Similarly, and part of the fruit of this bibliographical project, other intellectual relationships such as intellectual influence, opposition or others were revealed to be of great interest and could not be swept away under the traditional "See also". It was logical to think that, if, overall, the aim of the Polymath Virtual Library was to demonstrate the influence that these authors had on universal culture, it was also necessary to show the influences among the polymaths or between these and other authors, or other relationships that might be of interest.

Two questions arise from this consideration: how can these relationships be expressed in a standardized way for the web? And how can access to information based on the authors and their relationships be improved? Traditional authority records might be the pivot around which to revolve the School of Salamanca Virtual Library information if other data were added and other features were included to enable this role to be carried out while, at the same time, preserving the library's function of controlling access points.

The aspiration was for the authority records to be able to generate encyclopaedia-like visualizations (see Fig. 7) that would provide users with contextual information, with a much more usable display, and, at the same time, they would sustain a defined and limited network of relationships between authors. In short, authority records would obligatorily have a series of elements that, although potentially included in the MARC format, were rarely filled in at libraries -- not even in the most important ones.

Figure 7 Visualization of Francisco de Vitoria's Authority Record
[<http://www.larramendi.es/aut/POLI20090019539>]

For this reason, the Fundación Ignacio Larramendi already presented a project in 2004 to draw up an ontology of polymaths. The project, entitled "Ontology and Semantic Web of Polymaths", obtained financing from the Spanish Ministry of Science, Innovation and Universities. It must be remembered that, at that time, the idea of a Semantic Web was beginning to spread, but the idea of Linked Open Data had not yet been formulated; this would happen in 2006 with the publication by Tim Berners-Lee of his seminal article "*Design issues*"⁴³.

The evolution of the MARC format itself enabled the introduction of semantic aspects into the relationships among authors, with the ability to express these either as literal strings (e.g. "influenced by") or as codes. The relationships that appear most frequently are those of influence (influenced, or was influenced by), opposition, personal ties or friendships, master-student relationships, and blood ties. The ontology of DBpedia⁴⁴ was chosen to encode these relationships, as this presented the great advantage of having a wide variety of properties and a public frame of reference undergoing constant maintenance.

The project we have just mentioned allowed the Fundación Ignacio Larramendi to keep a record of the most appropriate relationships and the ontology with which these relationships should be expressed and aligned, namely DBpedia. Within the framework of the Semantic Web and Linked Open Data, the ontology, the network, is formed of classes and properties (objects and attributes) with which to describe any aspect of reality in computer terms. It should be said that the choice of model for representing the data, its capacity to represent classes and properties, is crucial for the interoperability of a virtual or digital library on the Semantic Web and that, in recent years, there have been more than a few ontologies that have arisen and then disappeared from the web.

⁴³ Berners-Lee, *Design issues: Linked data* (2006).

⁴⁴ The DBpedia Ontology. Available at: <https://wiki.dbpedia.org/services-resources/ontology>.

The example below, taken from the authority record for Francisco de Vitoria, shows the encoding of the influence relationship on Martín de Azpilcueta in MARC 21 format, expressed using a property taken from the DBpedia Ontology.

```
500 1      |$0|POLI20090013544|$a|Azpilcueta, Martín de|$d|1492-1586|$4|
          |http://dbpedia.org/ontology/influenced|$i|Influye en|$w|i
```

The implementation of RDA for cataloguing bibliographical resources also made it possible to encode other properties of authors in accordance with the MARC 21 format thanks to the new fields added. Using these additional fields on the authority records for the polymaths, the Fundación Ignacio Larramendi included the dates and place of birth and death, the occupation and field of activity, relationships with different groups, entities and institutions, languages used by the authors and their sex (see Fig. 8).

Azpilcueta, Martín de, 1492-1586

Formato: [APLICAR](#) [EXPORTAR](#) [MARCXML](#) [RDF](#) [JSON](#) [XML](#) [PDF](#) [Enlace persistente](#)



Azpilcueta, Martín de, 1492-1586
(Barasoain, España, 1492 - Roma, Italia, 1586)
Polígrafo: Beiza Plans, Juan

Búsquedas en el catálogo

Obras como autor
Obras sobre esta persona
Obras en las que colabora
Todas las obras relacionadas

Campo de Actividad

Teología
Filosofía

Filiación

Canónigos de San Agustín
Escuela de Salamanca
Universidad de Alcalá de Henares
Universidad de Coimbra
Université de Cahors
Université de Toulouse
Universidad de Salamanca
(1524-1537)

Ocupación

Juristas
Profesores universitarios
Economistas
Sacerdotes

Lengua asociada

Español
Latín

Género

Hombre

Apuntes biográficos/históricos

Se graduó en Teología y Filosofía en Alcalá de Henares y, más tarde, en Cánones en la Universidad de Toulouse, donde ejerció la docencia y se le concedió la cátedra de Prima en Cánones. Fue profesor también en las Universidades de Cahors, de Salamanca (1524-37), donde sería catedrático y, por último, de Coimbra, Portugal, en donde, además de ocupar la misma cátedra, enseñó durante dieciséis años.
Fue el precursor de la Teoría Cuantitativa del Dinero, marcando las diferencias entre los distintos países según la existencia en ellos de recursos naturales y su poder adquisitivo. Además definió, en pleno siglo XVI, lo que más tarde se denominaría "teoría del valor-escasez" de la siguiente manera: "Toda mercancía se hace más cara cuando su demanda es más fuerte y su oferta escasea". Dentro de su producción, cabe destacar su *Manual de confesores y penitentes* (1553), obra de la que en 1569 aparecieron unas *Adiciones al manual: Tratado sobre las rentas de los beneficios eclesíasticos* (1566); *De usuraria y simonia* (1569), entre otras muchas. Sus *Obras completas* fueron publicadas con el título de *Compendium horum omnium Navarri operum* (1598) pues era conocido como Navarrus.

▼ Ver más

Relaciones

Influido por:

Vitoria, Francisco de, 1483-1546
Mariana, Juan de, 1536-1624

Influye en:

Covarrubias y Leyva, Diego de, 1512-1577

Relacionado con:

Francisco de Javier, Santo, 1506-1552
Morra, Luis de, 1505-1600
Bellamini, Roberto Francesco Romolo Sant, 1542-1621
Hall, Joseph, 1574-1656
Carranza, Bartolomé de, 1503-1576
Mercado, Tomás de, 1523-1575
Carranza de Miranda, Sancho, -1531

Linked Open Data

- [Virtual International Authority File](#)
- [Datos bne.es](#)
- [International Standard Name Identifier](#)
- [Library of Congress Linked Data Service](#)
- [Gemeinsame Normdatei \(GND\) Deutschen Nationalbibliothek](#)
- [Système Universitaire de Documentation \(SUDOC\)](#)
- [data.bnf.fr \(Bibliothèque nationale de France\)](#)
- [Social Networks and Archival Context \(SNAC\)](#)
- [Wikidata](#)
- [DBpedia](#)
- [DBpedia en español](#)
- [DBpedia Português](#)
- [DBpedia euskarazko](#)
- [FAST Linked Data](#)

Formas alternativas del nombre

Azpilcueta, Martín de, 1492-1586
Azpilcueta, Martín
Azpilcueta, Martín de, 1493-1586
Azpilcueta, Martinus Navarrus ab, 1481-1586
Azpilcueta, Martín ab, 1491-1586
Azpilcueta, Martín de, 1491-1586
Azpilcueta, Martín, 1491-1586
Azpilcueta Navarrus, Martinus de
Azpilcueta Navarro, Martín de, 1491-1586
Azpilcueta Navarro, Martín de
Azpilcueta Navarro, Martín de, 1491-1586
Azpilcueta Navarrus, Martinus, 1481-1586
Azpilcueta, Martín ab, 1491-1586
Azpilcueta, Martinho de, 1491-1586

▼ Ver más

Fuentes consultadas

1. Biblioteca Nacional de Portugal. -- <http://purl.pt/1005/geral/aut/P/112356.html> ^[?]
2. Catàleg d'autoritats de noms i llibres de Catalunya (CANTIC). -- <http://cantic.bnc.cat/registres/CUCId/a100444383> ^[?]
3. VIAF. -- <http://www.viaf.org/viaf/59863617> ^[?]
4. Bibliotecas Virtuales F.H.L. Edición 2008. Madrid : Fundación Ignacio Larramendi, 2008, p. 147. -- (Martín de Azpilcueta, Barasoain, Navarra, 1492-Roma, Italia 1586)
5. Catálogo de Autoridades de la Biblioteca Nacional de España. BNEI19900481171
6. Comento o resumen del capítulo ... 1556. -- port. (doctor Martín de Azpilcueta Navarro)
7. Díaz y Díaz, Gonzalo: Hombres y Documentos de la Filosofía Española, 1980. Vol. I, pp. 451-459. -- (Azpilcueta, Martín de; n. Barasoain el 13 de diciembre de 1492; m. Roma 21 de junio 1586)
8. Diccionario Biográfico Español. Real Academia de la Historia. Consultado el 12 de julio de 2010
9. Diccionario de Historia eclesíastica de España. - (Azpilcueta, Martín de; b. Barasoain, Navarra, 12-13-1492; d. Rome 6-21-1586; canonist; extensive bibliog. cites name forms: Martín de Azpilcueta (commonest), Martinus Azpilcueta, el Doctor Navarro, Martín de Azpilcueta Navarro, el Dr. Navarro)
10. España. - (Azpilcueta, Martín; teólogo y juriconsultor; n. Barasoain (Navarra), m. Roma, 1491-1586; llamado el Doctor Navarro, por la provincia de su nacimiento)
11. Estudios sobre el Doctor Navarro, 1988
12. Grande encic. port. e brasileira. - (Azpilcueta, Martinho de; Spanish juriconsult; b. in small village near Pamplona, Navarra, and therefore called Doutor Navarro; d. at Rome 6-21-1586)
13. His Manual de confesores & penitentes, 1560. -- 1.p. (Doutor Martin de Azpilcueta Navarro, cathedratco jubilado de prima em cánones na Vilaesidade de Coymbra ...)
14. His Manuale de confessorii et penitentii [M] 1569. -- 1.p. (dottor Martino Azpilcueta Navarro) p. 1, 2nd group, etc. (dottor Martino de Azpilcueta Nauarro)
15. LC data base, 2-12-66. -- (hdg.- Azpilcueta, Martín de, 1492?-1586) LC manual authority cd. (hdg.- Azpilcueta, Martín de, 1492?-1586; variantes: Jaureguiar, Martín de, Navarro, Martín; dominican friar)
16. Library of Congress Authorities, n. 85050081
17. New Catholic encyc. -- (Azpilcueta, Martín (Doctor Navarrus); canonist and moral theologian; b. Barasoain, Navarre, 5-13-1493; d. Rome 6-21-1586; cousin of St. Francis Xavier; taught at universities of Toulouse, Salamanca, and Coimbra)
18. Palau. -- (Azpilcueta Navarro, Martín de) suppl. (Azpilcueta, Martín de)
19. Recondo Iribarren, J.M. El doctor navarro don Martín de Azpilcueta, 1971? -- 1.p. (Doctor navarro don Martín de Azpilcueta) p. 3 (b. 12-13-1492 as Martín de jaureguiar)
20. Teología eta política, 2006. -- port. (Martín Azpilcueta)

Enlaces relacionados

- [Biblioteca Saavedra y Fajardo de Pensamiento Político Hispánico](#) ^[?]
- [Enciclopedia y Biblioteca Virtual de las Ciencias Sociales, Económicas y Jurídicas](#) ^[?]
- [Wikipedia en español](#) ^[?]
- [English Wikipedia](#) ^[?]
- [Wikipedia em português](#) ^[?]
- [Viquipèdia en català](#) ^[?]
- [Euskarazko Wikipedia](#) ^[?]
- [WorldCat Identities](#) ^[?]

*Figure 8 Relationships and links in Martín de Azpilcueta Authority Record
{<http://www.larramendi.es/aut/POLI20090013544>}*

Obviously, this is a simplification of the knowledge available about these authors, but these relationships offer a lot more information than the traditional library catalogues that users normally have to consult. In traditional catalogues, users have to know that information in order to search and locate works by different authors. The idea was, and is, to have that knowledge included in the data of the School of Salamanca Virtual Library so that any user accessing the library could take advantage of that knowledge in their search. It may seem very little, but it is the condensed result of the contributions of librarians and scholars down the ages.

4.3 Semantic reconciliation

With respect to the relationships between a polymath in the School of Salamanca Virtual Library and other external resources on the web, the encoding recommended by the MARC 21 format was also used to link a particular author with all those sources considered to be of interest.

This was in response to the suggestion by Tim Berners-Lee in his *"Design issues"*: "Include links to other URIs so that they can discover more things" in order to build the Semantic Web on the network of relationships between descriptions. In the same way as the web was built in the last decade of the 20th century using hyperlinks between HTML pages, the proposal of Linked Open Data focussed on building networks of standardized linked descriptions.

Now in the present decade of the 21st century, there have been many libraries, archives, museums, and memory institutions that have undertaken a common route toward transforming their data into Linked Open Data and publishing them on the web following the recommendations of the W3C so there are many descriptions available for reuse and with which we can associate our resources, exactly to follow Tim Berners-Lee's proposal and include links to other URIs with the aim of more information being

discovered and of building the network of interrelated descriptions the Semantic Web needs to continue advancing.

In this way, the authority records have been linked to other Linked-Data resources such as the Virtual International Authority File, the Biblioteca Nacional de España, the Library of Congress, the Deutsche Nationalbibliothek, the Bibliothèque nationale de France, the Système universitaire de documentation (SUDOC), the Union List of Artists Names, DBpedia and, more recently, Wikidata. This has opened up the options for browsing and discovering information in other catalogues, but it is also creating the network of relationships between Linked Open-Data resources, which, as has been noted above, is a major part of sustaining the Semantic Web.

We believe that it will clarify matters if we give an example with the details and descriptions that some institutions provide.

Thus, the Virtual International Authority File offers us a description of Juan de Mariana at the following URL <http://viaf.org/viaf/89794074/>. Starting from this resource, we can obtain the URLs leading to different descriptions of Juan de Mariana at such institutions as the Library of Congress, the Biblioteca Nacional de España, the Bibliothèque nationale de France, the Deutsche Nationalbibliothek, and many others, but also in all of the languages of Wikipedia in which Juan de Mariana is described.

At the School of Salamanca Virtual Library, the description of Juan de Mariana (<http://www.larramendi.es/aut/POLI20090012677>) is related to other resources that also follow the Linked Open-Data recommendations.

Furthermore, in order to continue being interoperable with other libraries, the information is encoded in MARC 21 format.

024 72 |\$a|<http://viaf.org/viaf/89794074/>|\$2|viaf

(Virtual International Authority File)

024 72 |\$a|<http://datos.bne.es/resource/XX1120693>|\$2|datoses

(National Library of Spain, datos.bne.es)

024 72 |\$a|<http://isni.org/0000000121430948>|\$2|isni

(International Standard Name Identifier)

024 72 |\$a|<http://id.loc.gov/authorities/names/n81099091>|\$2|lccn

(Library of Congress Name Authority File)

024 72 |\$a|<http://d-nb.info/gnd/11878188X>|\$2|gnd

(Deutschen Nationalbibliothek. Gemeinsame Normdatei)

024 72 |\$a|<https://www.idref.fr/029417422>|\$2|idref

(Système universitaire de documentation, SUDOC)

024 72 |\$a|<http://data.bnf.fr/ark:/12148/cb121049571>|\$2|bnfcg

(Bibliothèque Nationale de France. data.bnf.fr)

024 72 |\$a|<http://id.worldcat.org/fast/1898568>|\$2|fast

(OCLC FAST (Faceted Application of Subject Terminology))

024 72

|\$a|<http://socialarchive.iath.virginia.edu/ark:/99166/w6h14c2s>|\$2|snac

(Social Networks and Archival Context)

024 72 |\$a|<http://www.wikidata.org/entity/Q939889>|\$2|wikidata

(Wikidata)

024 72 |\$a|http://dbpedia.org/resource/Juan_de_Mariana|\$2|uri

(DBpedia, English Chapter)

024 72 |\$a|http://es.dbpedia.org/resource/Juan_de_Mariana|\$2|uri

(DBpedia, Spanish Chapter)

024 72 |\$a|http://pt.dbpedia.org/resource/Juan_de_Mariana|\$2|uri

(DBpedia, Portuguese Chapter)

024 72 |\$a|http://eu.dbpedia.org/resource/Juan_de_Mariana|\$2|uri

(DBpedia, Basque Chapter)

024 72 |\$a|http://gl.dbpedia.org/resource/Padre_Mariana|\$2|uri

(DBpedia, Galician Chapter)

As can be seen, the links that the Fundación Ignacio Larramendi cataloguing team have reflected referred to the main national European and American libraries that have adopted Linked Open-Data technology and form part of the cultural environment of the School of Salamanca. Without doubt, the number of relationships must increase to the extent that these descriptions become available at other institutions in accordance with the Linked Open-Data recommendation.

We will refer later on to the link with Wikidata, but, in summary, it represents a link to the knowledge database, also an authority file, of Wikipedia. The links to descriptions in the chapters of DBpedia in English and in the languages of the Iberian Peninsula and Latin America are also almost obligatory in view of the wide variety of data that they contain and because they are, so far, the resource to which most Linked Open-Data resources are connected in the whole of the web. This circumstance places DBpedia at the centre of the Linked Open-Data cloud and, for this reason, it is a resource of great weight for the Semantic Web.

As foreseen in the *"W3C Library Linked Data Incubator Group Final Report"*, the increased availability of value vocabularies applicable to each area would provide additional strength for data resources designed in accordance with Linked Open-Data technology.

It is evident that, in order to limit ourselves to the School of Salamanca and its Virtual Library, the availability of links enabling information resources from all around the world to be called on will improve the experience users have when searching and browsing in the Virtual Library, which will be all the richer since it will provide the information of that particular library and also that available in many others, doubtless contributing to a boost for the figure of the authors in the School of Salamanca.

However, this process of authority record linking is extremely costly from a cataloguing perspective, making it very difficult for libraries to be able to carry out this task even though, in principle and from a theoretical standpoint, they would be prepared to do so.

For this reason, the Fundación Ignacio Larramendi has applied a semi-automatic linking procedure called *semantic reconciliation*, which it has included in its cataloguing tasks. This procedure was designed in 2017 based on different open-source software elements available on the web. The efficacy of this procedure means that it is now possible to carry out in only a few days what would take months if done by hand⁴⁵.

4.4 Resource aggregation

After defining and verifying the procedure in the Polymath Virtual Library, the subsidiary of the Fundación Ignacio Larramendi then went on to apply it to the authors from Castile and León in the Biblioteca Digital de Castilla y León. Starting from this semantic reconciliation process, the Biblioteca Digital de Castilla y León published a microsite⁴⁶ in 2018 dedicated to authors from this region, numbering approximately 8,000. If we raise this topic here, it is because, as has been mentioned, the authors making up the School of Salamanca are mostly from Castile and León, with very few exceptions (Father Fonseca was Portuguese, Sepúlveda from Andalusia and Azpilcueta from Navarre), and they provide an entry point to the works of these authors scanned in the libraries of modern-day Castile and León. This opens up the number of digital resources available not only in Linked Open Data but across the whole of the web.

This example proves that Linked Open-Data technology is developing and spreading with the result that the Semantic Web can be said to be constantly growing in quality of digitized works. Evidence of this is that the Miguel de Cervantes Virtual Library has also provided its own contents in Linked Open Data, at the following address: data.cervantesvirtual.es⁴⁷, now making it possible to use this source to obtain

⁴⁵ Agenjo, Hernández, "Registros de autoridades, enriquecimiento semántico y Wikidata".

⁴⁶ Castilla y León: Datos enlazados, in Biblioteca Digital de Castilla y León, 2018. Available at: <https://bibliotecadigital.jcyl.es/autcl/es/cms/elemento.cmd?id=ms/autcl/paginas/Presentacion.html>.

⁴⁷ Catálogo de datos abiertos de la Biblioteca Virtual Miguel de Cervantes. Available at: <http://data.cervantesvirtual.com/>.

bibliographic and authority details about authors and works from the School of Salamanca. In fact, the application of Linked Open-Data technology to the Miguel de Cervantes Virtual Library has made it possible for their data to be reused through their SPARQL endpoint, which offers semantic search of all of the digitized works and authors. The experience has been very positive, with an increase of 250 new registrations, that is 21.30% more digital copies⁴⁸.

SPARQL services, as well as different APIs, offer the possibility of aggregating bibliographical resources from a large number of sources. Many large national and academic libraries from around the world now provide the services for consulting and obtaining data, such as, for example, the National Library of Spain or Europeana. It would be very interesting to incorporate into the School of Salamanca Virtual Library the digital copies of works by its authors or the bibliography written about them and stored in universities in the United States, Latin America and the rest of the world. This is what the Fundación Ignacio Larramendi is attempting to organize by aggregating information resources available on the web about an author, a group or a school.

The next step is already beginning to be mapped out, although no practical procedure has yet been established to allow the aggregation of scholarly publications and academic information resources. We feel that it is relatively easy to aggregate academic publications through such resources as ORCID⁴⁹, or open-access academic resources, whether in institutional repositories or journals. Similarly, we wish to investigate the possibilities offered by Google Scholar in detecting scholars in the School of Salamanca and linking to them using the authority records of the School of Salamanca Virtual Library.

Google Books presented some months ago a tool, Talk to books⁵⁰, which enables information to be extracted from the immense database formed by the millions of books that have been scanned, and, although it is still too early to form an opinion, it is thought provoking in terms of new ways of aggregating works related to the School of Salamanca.

⁴⁸ Agenjo, Hernández, "Agregación de datos bibliográficos por medio de servicios Sparql".

⁴⁹ Open Research and Contributor ID (ORCID). Available at: <https://orcid.org/>.

⁵⁰ Talk to books. Available at: <https://books.google.com/talktobooks/>.

4.5 Usability and browsing

One of the main functionalities that must be complied with by relationships between authors, their classes and properties was to enable browsing through the resources of the Polymath Virtual Library website -- first of all, so that users could browse from one author in the School of Salamanca to all of the authors grouped together under that name by critics and, vice versa, to enable users to go from the School of Salamanca to its individual authors and their scanned works, or to make it possible to browse from an author to those who had an influence on him, or from a location to identify the authors who were related to that location. In other words, the relationships reflected on a MARC 21 format authority record provide the map for browsing among the records on the website.

With respect to the external relationships between a polymath's record and other resources on the web, the coding recommended by the MARC 21 format was also used to link a particular author with all those sources considered to be of interest. This was in response to the suggestion mentioned above by Tim Berners-Lee in his *"Design issues"*: "Include links to other URIs so that they can discover more things", but also because many memory institutions, especially the most powerful ones, adopted the route of publishing their data in accordance with Linked Open Data.

The initial goal of the Polymath Virtual Library project to be present on the web has gradually been altered, adapting to the transformation of the web itself, where Linked Open Data is already one of its well-known components on which new applications are built on a daily basis and may well go unnoticed precisely because they meet everyday needs. In the end, the goal is to be accessible on the modern web.

4.5.1 Europeana and Europeana Data Model

The website of Europeana, the European digital library, opened to the public in 2008, and, in the present decade of this century, it has become a major point of reference in many respects -- first of all because of the volume of digital objects from institutions all

across Europe that are available on its website -- more than 58 million -- making it the first point of consultation and information from archives, libraries and museums in Europe and, therefore, a prerequisite for every institution that wants to increase the visibility and accessibility of its digital collection and, secondly, because it had been necessary to establish standards for all those institutions wishing to contribute their contents to build Europeana. There had never before been any common standard among European memory institutions and, on occasion, not even any interest in participating in a shared project. We must not forget that, in parallel with digitization, the standardization of Europeana and Europeana itself, there had been enormous advances made in the democratization of access to materials in archives, libraries and museums.

It should, thirdly, be mentioned that, from the outset, Europeana has drawn a transition to Linked Open Data for the same reasons outlined: offering contextual information and not only bibliographical descriptions linking descriptions to other resources on the web to facilitate browsing, but also building a reference model for the common description of materials from archives, libraries and museums.

The first version of the Europeana Data Model was published in 2011 and was precisely a high-level ontology and the data model that determined the technological goals of the digital library for some years. In 2019, this data model is a requirement for contributing data to Europeana.

For the Fundación Ignacio Larramendi, Europeana and its data model represented another opportunity to open up its contents to an ever wider sector, as well as to contribute to the consolidation of that standard framework and shared working environment for European memory institutions, with a view to increasing the accessibility and visibility of their contents.

The Fundación Ignacio Larramendi was one of the first institutions to apply the Europeana Data Model. The outline for browsing the Polymath Virtual Library website described above was already laid out in 2011 in the case study on the Europeana Data Model.

The Polymath Virtual Library has travelled the path described, and it has been very useful in terms of access to a catalogue through authors and their authority records. In traditional library catalogues, the authority records are, in a best case scenario, an index or other consultation mechanism providing the preferred form under which the works have been catalogued -- in other words, a way to query the works using the name of the author. If, however, the authority records are transformed as we have described, they become one of the most fundamental ways of accessing data because of the ability to navigate through the information.

What is more, this way of presenting information makes it clearer and more accessible and enables different types of content groupings to be applied, often eliminating the need to use search forms. In this way, it is possible to extend the possibilities offered to users to locate information, both in the catalogue itself and in other web sources. In particular, it provides a lot more than a mere search form. As a minimum, this is the intention and the goal to be pursued over time.

In fact, the work carried out by the Fundación Ignacio Larramendi has had a notable influence on other web-search interfaces, especially on those Spanish bibliographical catalogues that have made the transition to Linked Open Data. This can be easily understood because the transition from traditional bibliographic records to Linked Open Data has been carried out using the same MARC 21 records worked with by any library.

In any case, the Polymath Virtual Library has been a testing ground for new ways of cataloguing and presenting bibliographical data, and this has influenced many Spanish libraries concerned about the usability of their catalogues and their data.

4.6 New tasks for librarians: other effects of standardization and Linked Open Data

This dual function of authority records has also enabled other processes to be developed effectively; we have already mentioned that the extension of digitization projects has transformed the way in which we access documents. For the Fundación Ignacio Larramendi, the economy of resources was a very important issue, as it is for all libraries;

it did not make much sense to scan what other libraries had already digitized and made freely available on the web.

However, the standardization made more common by Europeana and Hispana has also made it possible to simplify the processes for acquiring scanned works and increasing the speed with which they become available. For some time, this process was being carried out manually but the creation of Europeana and its API⁵¹, as well as Hispana's OAI-PMH repository,⁵² soon enabled the process to be automated and the metadata to be compiled in a matter of minutes for all the scanned works of an author available in these large digital libraries.

A librarian's work has, in no way been diminished in these automated processes, but rather has simply varied substantially. After each collection is downloaded, whether it is of bibliographical descriptions or authority records, it is necessary to review the records in detail to complete, or correct the particulars described above: define an author's properties and relationships with the rest of the items present in the database, frequently requiring numerous additional searches to be made in order to confirm inaccurate, mistaken or even contradictory details. Each of the polymath authority records is the result of costly and quite often difficult – even frustrating -- research because the only information available is by times estimated or doubtful.

With respect to the bibliographical descriptions of the works, there is one circumstance that forces recataloguing, namely where the information comes from different sources. It is necessary to unify how these descriptions are laid out and to amend them where necessary. First of all, we have to confirm that the description corresponds to the original work, which is not always so, or the descriptions are extremely basic. Next, the electronic publication has to be described, and, thirdly, the details referring to the institution that produced the digitized copy or has provided access to it have to be stored or even fleshed out (see Fig. 9). Similarly, the necessary access points have to be added

⁵¹ Europeana REST API. Available at: <https://pro.europeana.eu/resources/apis/intro> (retrieved on 10th March 2019). The Digital Public Library of America also offers an API, called DPLA API Codex, which allows searching and access to data. Available at: <https://pro.dp.la/developers/api-codex> (retrieved on 10th March 2019).

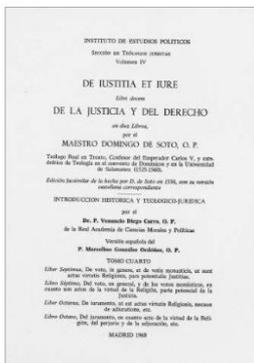
⁵² Hispana. Repositorio OAI-PMH. Available at: <http://hispana.mcu.es/i18n/oai/oai.cmd?verb=Identify>.

to maintain consistency and cohesion between the records and the network of relationships.

De iustitia et iure Libri decem = De la justicia y del...

Formato:        [Volver a resultados](#)
[Enlace persistente](#)

1 9 de 52 9 IR



De iustitia et iure Libri decem = De la justicia y del Derecho en diez libros (2012) - Soto, Domingo de (O.P.), 1495-1560. De iustitia et iure Libri decem. 1553. Latín y español 

Título:	De iustitia et iure Libri decem = De la justicia y del Derecho en diez libros / por el maestro Domingo de Soto ; edición facsimilar de la hecha por D. de Soto en 1556, con su versión castellana ; introducción histórica y teológico-jurídica por el P. Venancio Diego Carro, O. P. ; versión del P. Marcelino González Ordóñez, O. P.
Autor:	Soto, Domingo de (O.P.), 1495-1560  [De iustitia et iure Libri decem] Todas las ediciones
Características de edición:	. 1553. Latín y español
Publicación, Producción, Distribución, etc.:	Publicación: Madrid : Fundación Ignacio Larramendi, 2012 Producción: Madrid : Digibis, S.L., 2012
Descripción física:	Recurso en línea
Tipo de contenido:	texto
Tipo de medio:	ordenador
Tipo de soporte:	recurso en línea
Notas:	Original: Soto, Domingo de. De iustitia et iure Libri decem [Texto impreso] / edición facsimilar de la hecha por D. de Soto en 1556, con su versión castellana ; introducción histórica y teológico-jurídica por el P. Venancio Diego Carro, O. P. ; versión del P. Marcelino González Ordóñez, O. P.. - Edición facsimilar de la edición de 1556. - Madrid : [s.n.], 1967. - v. : il. ; 29 cm. - (Sección de Teólogos Juristas ; 1). - Precede al tít.: Instituto de Estudios Políticos
Contenido incompleto:	I. De legibus (Lib. I et II). LXX, p., 1 h., 200 f.
Materia / geográfico:	Derecho-Filosofía  Justicia  Derecho canónico  Teología  Derecho internacional público 
Autores secundarios:	González Ordóñez, Marcelino, 1914- , Editor literario. De iustitia et iure Libri decem. Latín y español  Diego Carro, Venancio , Introducción. De iustitia et iure Libri decem. Latín y español  Fundación Ignacio Larramendi , Editor  Digibis, S.L. , Productor 
Números normalizados:	DL M 13842-1967

Tipo de publicación:  Libros

Otros temas relacionados:

[Filosofía](#) 
[Derecho](#) 

 [Objetos digitales](#)

*Figure 9 Bibliographic description of the digital copy of "De Iustitia et Iure"
[<http://www.larramendi.es/bib/FIL20120001459>]*

We have to emphasize the fact that reusing data, metadata and digital objects has not eliminated the work of librarians, but rather it has simply changed how it is done, although we can roundly confirm that it has greatly increased efficacy and throughput.

In 2018, when the University of Salamanca celebrated its eighth centenary, the Fundación Ignacio Larramendi reviewed the descriptions of the authors and their works in the School of Salamanca in order to increase the number of links between authors, works, institutions, and, most important of all, the concepts. For example, it is very interesting to establish computer-based links through the descriptions of Francisco de Vitoria and Hugo Grotius and the concepts of International Public Law. As put forth at the beginning, this work gave rise to a new version of the website, the Virtual Library of the School of Salamanca 3.0⁵³.

500 1 |\$w|i|\$i|Influye en|\$4| <http://dbpedia.org/property/influenced>
|\$0|[FILA20180018701](#) |\$a|[Grotius, Hugo](#)|\$d|[1583-1645](#)

Finally, we should like to end this section mentioning the cataloguing team of the Fundación Ignacio Larramendi who carry out these tasks: Isabel Martín and Luis Méndez, coordinated by Patricia Juez.

5 Visibility and web presence

When it comes to assessing the visibility of the School of Salamanca and the School of Salamanca Virtual Library, it is necessary to bear in mind which pages on the web are the most visited. As of 17th January 2019, the fifth most-visited page on the whole of the web is Wikipedia.

⁵³ Biblioteca Virtual de la Escuela de Salamanca 3.0. Available at http://www.larramendi.es/esc_sal/es/micrositios/inicio.do

The level of rejection triggered by Wikipedia in academic circles is very well known. Very few academics do not use it, although it is almost never cited. Some Spaniards will still recall the extensive use made of the "*Enciclopedia Espasa*", although it, of course, has never been cited by anyone in an academic environment. We are not going to defend here the use of Wikipedia to clarify a concept nor to confirm dates; our opinion is that Wikipedia can be a source that facilitates access to well-structured information of a higher level of quality⁵⁴.

In fact, accessing the entry for School of Salamanca in Wikipedia shows that the references contained there include the School of Salamanca Virtual Library. The visibility of the School of Salamanca Virtual Library benefits -- to an extent that is difficult to determine -- from its presence on Wikipedia. For this reason, the Fundación Ignacio Larramendi has included in its task checklist the verification of the corresponding references in the English and Spanish versions of Wikipedia to each of its authors, using links to the authority records contained in the Virtual Library.

These minor Wikipedia editing tasks are in addition to the others mentioned: cataloguing, indexation and digitization. In fact, this communication adopts a line contrary to the Spanish saying "*el buen paño en el arca se vende*" (good cloth can be sold unseen, akin to 'good wine needs no bush'), which is, of course, not the way of commerce and would have caught the interest of Tomás de Mercado.

With the School of Salamanca Virtual Library, we have gone one step further in terms of visibility and presence on the web. Several years ago (2012), Wikidata was created, also available as a Linked Open-Data resource, just like DBpedia, which is more powerful in some ways, but they are certainly not mutually exclusive. The cataloguing team of the Fundación Ignacio Larramendi has adopted the strategy of making its data available on Wikidata. For this purpose, an entry has been drafted in accordance with the stylistic standards of Wikipedia for the Polymath Virtual Library⁵⁵ and has been expanded with

⁵⁴ There are quite a few studies, especially in English, about the reach of Wikipedia and the quality of its articles. See Soler-Adillon, Pavlovic, et al. "Wikipedia en la Universidad: cambios en la percepción de valor con la creación de contenidos" and Thompson, Hanley. "Science Is Shaped by Wikipedia: Evidence From a Randomized Control Trial".

⁵⁵ Biblioteca Virtual de Polígrafos (Wikipedia en español). Available at: https://es.wikipedia.org/wiki/Biblioteca_Virtual_de_Polígrafos.

the corresponding entries to each of the virtual libraries contained in it, including the School of Salamanca Virtual Library. We believe that one of the effects of this action in Wikipedia has been the fact that, in the Spanish Wikipedia, a template has been created to generate citations in the Polymath Virtual Library⁵⁶.

Analyzing the items in the Wikidata entry⁵⁷, we find those identifying and profiling the main features of an individual, an institution or a virtual library through a series of statements. Thanks to this and the Wikidata software, the Polymath Virtual Library is related completely automatically to other similar entities such as the Miguel de Cervantes Virtual Library or the National Library of Spain, but also to Hispana and Europeana, or the themes are set out in relation to the History of Philosophy and the History of Science.

Let us take the example of the School of Salamanca Virtual Library. Every one of the 20 authors also has the individual's description on Wikidata, and the items describing them include the concepts for which they are known in the history of science, culture or law, such as 16th century theology, international law of the Indies, public international law and private law, but also other, more specific, tags such as regicide, inflation, et cetera. In other words, the categories making up the School of Salamanca are also supported by the corresponding statements in the School of Salamanca entry on Wikidata.

From the point of view of accessibility and visibility, the most important point is that these concepts, these names and periods are incorporated into the authorities control system that Wikidata applies to all Wikipedias, thus enabling great accuracy when establishing them and their immediate relationship with the Wikipedias in all the different languages. Wikidata acts as the common connection point for all of the Wikipedias. The properties added to Wikidata are available to all Wikipedia users in a wide variety of languages that is constantly growing.

Another of the effects is that, inside Wikidata, there is a specific identifier that enables it to form part of the Wikipedia authority control system. In this way, whenever the entry

⁵⁶ Plantilla:Larramendi. Wikipedia en español. <https://es.wikipedia.org/wiki/Plantilla:Larramendi>

⁵⁷ Polymath Virtual Library = Biblioteca Virtual de Polígrafos (Wikidata). Available at: <https://www.wikidata.org/wiki/Q53114817>.

for Melchor Cano⁵⁸ is viewed, it is possible to access no fewer than 15 global library catalogues including the Virtual International Authority File, the Library of Congress, the National Library of Spain, the Bibliothèque nationale de France, the Deutsche Nationalbibliothek, in addition to many others from non-library institutions. In other words, the authority records for the authors in the Polymath Virtual Library are also linked inside Wikidata to the large value vocabularies corresponding to the world's major libraries and institutions.

The table below shows, for each author, the number of different-language entries on Wikipedia.

Author	Wikipedia Entries
Bartolomé de las Casas	44
Francisco de Vitoria	28
Francisco Suárez	26
Luis de León	20
José de Acosta	19
Luis de Molina	18
Melchor Cano	15
Juan Ginés de Sepúlveda	15
Domingo de Soto	14
Juan de Mariana	14
Martín de Azpilcueta	12
Domingo Báñez	12
Pedro de Fonseca	11

⁵⁸ Melchor Cano (Wikidata). Available at: <https://www.wikidata.org/wiki/Q644162>.

Diego de Covarrubias	7
Tomás de Mercado	6
Bartolomé de Medina	6
Gabriel Vázquez	6
Juan de la Peña	2
Diego Pérez de Mesa	1
Juan Roa Dávila	0

With this additional step forward, we are trying to ensure the greatest accessibility and visibility for the information provided in the Polymath Virtual Library and the School of Salamanca Virtual Library by placing it on Wikipedia and Wikidata.

Thanks to all these techniques and practices, the School of Salamanca Virtual Library has achieved great visibility on the web, a visibility that the Fundación Ignacio Larramendi monitors through Google Analytics and a monthly report on the number of documents downloaded.

Lastly, as mentioned earlier, other projects are underway, and the Fundación Ignacio Larramendi has already taken the first steps to incorporate the metadata into their web pages in accordance with Schema.org⁵⁹. This initiative has arisen from an agreement between the major search engines such as Yahoo, Bing, Google and Yandex to favour standardized HTML encoding of products, documents and all kinds of content in order to facilitate indexing based on a series of predefined elements specified in the multiple extensions of the Schema.org ontology. The OCLC already publishes its WorldCat catalogue in this format,⁶⁰ and there is a substantial amount of other experience in applying it to the fields of libraries, archives and museums, not to mention scientific

⁵⁹ Schema.org. Available at: <https://schema.org/>.

⁶⁰ "OCLC adds Linked Data to WorldCat.org".

publications. Europeana is even exploring this route as the method for collecting and aggregating metadata.

Similarly, the Fundación Ignacio Larramendi is paying close attention to the definition of the International Image Interoperability Framework⁶¹ which is developing a digital object-encoding and presentation model that dissociates the layer of images and metadata from the software delivering them. This framework means that it is possible to reuse scanned documents, including those of extremely high quality, in different ways, which will lend additional possibilities to the aggregation of contents in the Polymath Virtual Library. The announcement on 5th July 2018, of the application of IIF to the project entitled *"The Salamanca School: a digital collection of sources and a dictionary of their juridical and political language"*⁶² confirmed how interesting IIF can be for the purposes of the Polymath Virtual Library.

6 As we may think (Vanevar Bush⁶³)

The School of Salamanca Virtual Library and other virtual or digital libraries in general also have a role similar to traditional libraries, namely they serve as an ordered set of information resources: manuscripts, incunabula, printed works from manual or mechanical presses and now digital objects. Librarians deal with their acquisition, cataloguing, conservation and reference on their existence. Digital librarians do the same, although they have added to their tasks the creation of digital objects or their link to others available from an external source. The metadata for those digital objects, if well-defined and standardized, enable extraordinary visibility and functionalities, as outlined in this paper, but they also enable an extremely useful functionality that we could call digital textual criticism.

It is becoming more and more common for textual digital objects to be made up not just of their images, but also using the text of the documents obtained using optical

⁶¹ International Image Interoperability Framework (IIF). Available at: <http://iif.io/>.

⁶² Wagner, "IIF in der Schule von Salamanca".

⁶³ Bush, "As We May Think"

character recognition processes. For the standardized coding of texts obtained using OCR, it is possible to use ALTO (Analyzed Layout and Text Object)⁶⁴, which establishes a correspondence between the elements in a text and their position in the layout of the scanned page. This way of encoding text obtained through OCR is intended to preserve the relationship between a scanned text and its layout in the original.

Since 1994, the Text Encoding Initiative has been perfecting and updating its "*Guidelines*" for encoding and exchanging electronic texts. Based on these guidelines, it is possible to encode the logical and structural features of a text with a high degree of detail. Based on the "*TEI Guidelines*"⁶⁵, different initiatives have been created for the digital editing of literary genres, but there are a few such initiatives devoted to the digital editing of texts in the fields of philosophy, theology, jurisprudence and economics, all subject areas in which the School of Salamanca stood out.

Particularly in the last decade, the Digital Humanities have been established using a number of different tools including the "*TEI Guidelines*". Digitizing works in a homogeneous way and in line with international standards is a first step, but it is obvious that the textual criticism of a document is more useful when it is enriched with all kinds of indices: lists of names, titles, places and, above all, concepts. In short, the text is prepared to facilitate subsequent theoretical research and is not limited to the mere conversion of texts to computer-friendly formats⁶⁶. There is a lot of information available about the Digital Humanities, but, in the Spanish-speaking world, it is obligatory to cite the issue of "*Ínsula*"⁶⁷ that reviewed the state of the art of digital textual criticism and listed a wide variety of encoding initiatives complying with the TEI, although there are some that use their own structure, which is generally a dead end.

Any scholar working with old books in Latin will be extremely familiar with the term *locupletissimi* indicating already from the cover that the publisher has enriched the work with indices, tables and explanatory glosses. Now that modern technical and

⁶⁴ Analyzed Layout and Text Object. Available at: <https://www.loc.gov/standards/alto/about.html>.

⁶⁵ Text Encoding Initiative Guidelines. Available at: <http://www.tei-c.org/guidelines/>.

⁶⁶ Aibar Puentes, "La transformación neoliberal de la ciencia: el caso de las Humanidades Digitales".

⁶⁷ *Ínsula: revista de letras y ciencias humanas*. Número 822. Dedicated to: Humanidades digitales y literaturas hispánicas (2015)

computerized resources are available, it makes no sense not to use them, at the very least, for what was done by hand so laboriously centuries ago.

In our professional experience, we can highlight that the Fundación Ortega y Gasset commissioned DIGIBÍS back in 2003 to prepare the texts of the complete works of the philosopher Ortega y Gasset with a view to their comparison for a new revised edition. The amount and accuracy of the textual variants available in the edition of Ortega's complete works⁶⁸ is truly admirable, although it is also true that this material is not very accessible or reusable, since it is only available, at least so far, in a 10-volume paper edition. Starting with the text verification carried out, in this case, using Collate software and other software developments, it was possible to create an information resource that would allow texts to be exploited in different ways, although the editorial decision of the Fundación has, so far, allowed for only a hardcopy edition of the highest quality but unable to be used for computerized analyses or processing.

A new digital critical edition of the complete works of the authors in the School of Salamanca would provide not only those *locupletissimi* indices mentioned above, but also a consolidated electronic text that would combine the accumulated knowledge of scholars. We cannot but congratulate the originators on the initiative behind the project entitled "*La Escuela de Salamanca: una colección digital de fuentes y un diccionario de su lenguaje jurídico-político*"⁶⁹ which plans to form a digital collection of 116 works in accordance with TEI specifications. It began in May, 2018, and has become the benchmark and meeting place for the different projects related to the School of Salamanca and implies a new digital critical edition of the complete works of the authors in the School of Salamanca. This project includes the participation of the Akademie der Wissenschaften und Literatur Mainz, the Goethe Universität, the Max Planck Institut für Europäische Rechtsgeschichte and is funded by the Union der Akademien der

⁶⁸ Ortega y Gasset, *Obras completas*, Madrid, 2004-2010 (reedición corregida 2017)

⁶⁹ Duve, Lutz-Bachmann, Birr, Niedberger, "The School of Salamanca: a digital collection of sources and a dictionary of its juridical-political language. The basic objectives and structure of a research project, SvSal WP No. 2014-01". See also, the website "La Escuela de Salamanca: una colección digital de fuentes y un diccionario de su lenguaje jurídico-político". Available at: <https://www.salamanca.school/es/index.html>.

Wissenschaften. As it could not be otherwise, the works coded in TEI in this project have already been added to the Virtual Library of the School of Salamanca.

We are certain that the digital edition of Vitoria, for instance, based on the TEI guidelines will provide results that will give rise to further evolution of the studies on this author.

7 Conclusions

The School of Salamanca Virtual Library is an attempt to disseminate the intellectual contribution of the works making up that School so as to maximize their visibility and digital accessibility. For this reason, all of the technical recommendations from various institutions, particularly the W3C and Europeana, have been implemented. In consequence, the first conclusion is that, when it comes to creating a digital object, it is essential to follow the good practices of Linked Open Data and to link the descriptions with similar resources that provide new perspectives, as well as abiding by a widely-used ontology such as the Europeana Data Model.

The second conclusion is that the works of the School of Salamanca must be taken to the most visited sites on the web, so we have considered it fundamentally important to interconnect the School of Salamanca Virtual Library with Wikipedia and Wikidata, both with extremely powerful features that contribute to greater visibility. We have just started down the path of implementing Schema.org with the idea of facilitating indexation, visibility and positioning of the virtual library's contents on search engines that are thereby encouraging the contribution of semantic content.

The third conclusion is that we must take care not only of the structure of metadata, but also interconnections of concepts, works, and authors. For this reason, we have opted for the use of the DBpedia ontology, included inside the MARC format underpinning the bibliographical descriptions and the author details.

We are enhancing the digital publication of studies on polymaths by various specialists in different formats (PDF, EPUB and MOBI) so that these can be freely downloaded by any scholar or other interested party. All the metadata of the School of Salamanca

Virtual Library are being collected by Hispana, Europeana and OAlster and thus form part of WorldCat.

As a final remark, we encourage the scholars in the School of Salamanca and, in general, in the fields of philosophy and theology to delve more deeply into the publication of critical editions of the works of the School of Salamanca so that the term *locupletissimi* that publishers added to their editions in Salamanca becomes a reality in the digital setting.

Our digital libraries will be at your entire disposal, just like this one from the School of Salamanca produced by the Fundación Ignacio Larramendi.

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The School of Salamanca. A Digital Collection of Sources and a Dictionary of its Juridical-Political Language is a long-term project of the Academy of Sciences and Literature Mainz in cooperation with the Goethe University Frankfurt and the Max Planck Institute for European Legal History, Frankfurt.

The School of Salamanca's significance and influence on more than one continent as well as in different academic fields have given rise to an impressive multitude of research efforts in various disciplines: philosophers, historians, jurists, legal historians, and theologians pursue the reconstruction of complex subareas of the Salamantine intellectual edifice. The sheer number of these research projects worldwide has caused a notable fragmentation of the scientific landscape. Not only are the connections between persons, texts, and disciplines under threat of becoming lost, but also the understanding of comprehensive questions and methods. *The School of Salamanca. A Digital Collection of Sources and a Dictionary of its Juridical-Political Language* addresses the needs of a growing international scientific community by facilitating access to primary sources, their concepts and contexts.

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