Generation and Transfer of Knowledge for Digital Transformation

II International Symposium, SITIC 2023, Santa Clara, **15-17 November 2023**, proceedings

Volume 6

Editor:
María Josefa Peralta-González

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María Josefa Peralta-González
Director of Science, Technology and Innovation
Central University "Marta Abreu" of Las Villas
Villa Clara, Cuba.

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FOREWORD

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About the Series

The Advanced Notes in Information Science (ANIS) book series publishes conference proceedings, monographs, and thematic volumes that explore the nexus of information, communication, and computer sciences. The ANIS series considers research works covering a range of topics, including but not limited to information retrieval, information systems, information architecture, information behavior, digital libraries, information literacy, information management, data management, library studies, user experience design, knowledge management, sociology of information, science communication, mass communication, organizational communication, and others. The series is intended to serve as a platform for students, researchers, and practitioners from the public or private sectors.

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Federal University of Santa Catarina, Brazil

ABOUT THE CONFERENCE

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- Manuel Osvaldo Machado Rivero, Deputy Director of Information of the Central University "Marta Abreu" of Las Villas, Villa Clara, Cuba.

PREFACE

We are honored to present the papers of the II International Symposium on "Generation and Transfer of Knowledge for Digital Transformation" (SITIC 2023). The event, a global gathering, was held at the Starfish Cayo Santa María Hotel in the province of Villa Clara, Cuba, in conjunction with the IV International Scientific Convention of the Central University "Marta Abreu" of Las Villas. This unique location served as a melting pot of ideas and perspectives from across the world.

The development of modern societies is inextricably linked to their informatization. The digital transformation of all socio-economic processes, a journey we are all part of, allows for an increase in efficiency and effectiveness. In order to achieve this, it is necessary to utilize advanced industrialization technologies, also referred to as enabling technologies of digital transformation. This information-based revolution continuously evolves the formats and methods used to search, retrieve, process, and utilize information, with each of us playing a crucial role in this transformation.

Progress in this development context is not feasible without completing the R&D&I cycle, for which knowledge transfer is of significant consequence. The knowledge produced by research must be transformed into practical technologies that can address challenges and be incorporated into productive processes.

The objective of the symposium, entitled "Generation and Transfer of Knowledge for Digital Transformation," is twofold: firstly, to disseminate the main scientific results

achieved in the field of information technologies and, secondly, to establish a framework for scientific exchange on these. The event was held at the Starfish Cayo Santa María Hotel in Cuba between November 15 and 17, 2023. Attendees included researchers, educators, professionals, and students from a range of academic disciplines. The papers presented in the thematic axis, "Information and Knowledge for Development," are included in these proceedings. Out of 24 submissions during the event, 13 full papers were accepted. We would be remiss if we did not acknowledge the contributions of all the authors who submitted their papers, the members of the Organizing Committee, and all the reviewers who played a pivotal role in enhancing the quality of the work presented. Furthermore, gratitude is extended to the speakers who proffered their insights and the audience who engaged with the SITIC 2023 proceedings.

María Josefa Peralta González
Central University “Marta Abreu” of Las Villas

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Analysis of the methodologies created for libraries in the construction of authority control

Anamarys Toscano Menocal
Universidad Central "Marta Abreu" de Las Villas, Cuba.
Email: anamaryst@uclv.cu

María del Rosario Fernández Rodríguez
Universidad Central "Marta Abreu" de Las Villas, Cuba.
Email: mfrodriguez@uclv.cu

ABSTRACT

Libraries are immersed in a process of structural change, where the implementation of new competency practices means bringing them into conformity with the needs and demands that arise in the information and knowledge society. The growth of technologies and information sources, which are scattered on the Internet, implies the task of obtaining information from a large number of sources available on the Web. The realization of information queries from heterogeneous and geographically dispersed sources requires the implementation of methodologies and regulations, as well as the construction of tools. The research aims to analyze the methodologies created so far in libraries, for the realization of authority control. It was necessary to use both theoretical and empirical methods in the collection of information. In the last 10 years, it is evident in the analyzed methodologies, the beginning of the use of Resource Description Framework (RDF) format for linking and interoperability of data. What used to be a long and time-consuming process, with the use of RDF, the speed and flexibility of the information expressed in this format can be verified.

Keywords: authority control, heterogeneous sources, methodologies, university libraries

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1. INTRODUCTION

In the context of evolving library and information center environments and the growing diversity of information sources on the network, the concept of authority control is emerging as a new trend. The advent of new technologies has led to a proliferation of automated bibliographies, which has contributed to the designation of the current era as the "Information and Knowledge Era." The automation of objects on the Web is a challenging endeavor, primarily due to the sheer volume and complexity of the information they contain, which renders manual management impractical.

In the context of the Cuban web environment, there exists an exchange network utilized by academic institutions for the organization, representation, and dissemination of information within the academic domain. It serves as a gateway to authoritative databases, facilitating the retrieval of pertinent and current information. The University Cooperation Network 1, "Strengthening the role of information and communication technologies (ICTs) in Cuban universities for the development of society," is a collaborative initiative comprising the University of Pinar del Río, the University of Informatics Sciences (UCI), the University "Oscar Lucero Moya" of Holguín, the University "Ignacio Agramonte y Loynaz" of Camagüey (UC), the University of Oriente (UO), and the Central University "Marta Abreu" of Las Villas (UCLV).

The network has an institutional repository (DSpace), a library management system (ABCD), and an educational

learning platform (Moodle). The primary objective is to unify all the authorities within the network, thereby facilitating efficient search and retrieval of information. In view of the necessity and significance of authority control in the network, the present study has been undertaken. The proposed methodology, which emerges from the project as a result, represents a significant step forward in terms of the organization and retrieval of information contained in the ICT Network. Furthermore, it will facilitate the identification of the most viable and effective elements for the advancement of both the academic and working environments.

The research conducted over the years has contributed to the international context by developing methodologies and methodological guidelines for the control of authorities, as well as for the work with authorities (Herrero & Díaz, 2009; Herrero Pascual, 1999; Hyland & Wood, 2011; Magliano, 2002; Martínez Saldaña, 2006; Vaca Palacios, 2018; Villazón et al., 2011; Yi-hang Pong, 2005).

In Cuba, research is conducted with greater emphasis on collaboration with authorities, with findings disseminated in theses and scientific articles. On an annual basis, each member university of the ICT Network conducts a comprehensive assessment, presenting a detailed report on the research activities undertaken within their respective faculties and study and research centers. The procedure fulfills an informational requirement for this specific purpose; however, it does not permit the retrieval of individual data regarding the authors of the scientific output of each study center precisely because it is not organized or structured through the control of authorities.

A further issue that arises in the context of scientific production is the variety of signatures that authors have

historically employed in the preparation of their research works. As a result, the evaluation of both external and internal research is an ongoing and challenging process for those responsible for this task, with the aim of contributing to decision-making and the development and promotion of the visibility and impact of scientific production in universities. The member universities of the ICT Network employ a considerable number of professors and researchers who disseminate their work at the national and international levels. These institutions possess a substantial corpus of published and unpublished research papers, which are currently not accessible through a unified system that catalogs and organizes the scientific output of their creators.

As time progresses, data assumes greater significance across a range of domains, given its potential to encompass information that may be inaccessible or challenging to obtain otherwise. The removal of duplicate records within a single database represents a crucial phase in the data cleansing process, as these can impact the outcomes of a search or the processing of information. As databases grow in size, the complexity of the matching process represents a significant challenge to the integration of heterogeneous data.

A number of authors have put forth their respective proposals for the methodology of authority control. Each of these approaches, in accordance with the specific attributes of their respective institutions, elucidates the nuances of their work, thereby facilitating the identification of pertinent references and variant forms of the heading. It is evident that none of these methodologies can be applied to the context of Cuban universities, as they remain merely a proposal and have not been implemented. Furthermore, each methodology aligns with the specific characteristics of the institutions where they were developed.

These methodologies are not aligned with the technological advancements that university libraries are currently experiencing. Additionally, they do not fully address the heterogeneity of data present in modern information systems. These norms are outdated and do not align with the technological advancements of the modern era. Additionally, they are not designed to accommodate the diverse and evolving nature of data. As a result, these methodologies cannot be applied in the Cuban national context.

2. METHODOLOGY

The research is predominantly quantitative in nature. However, both qualitative and quantitative data are subjected to investigation, analysis, grouping, and description in order to provide a solution to the previously proposed objectives. The study is descriptive in nature, offering a comprehensive account of the terminology, control authorities, access points, and heterogeneous data sources, along with a detailed examination of their characteristics, development, and evolution on the Web. Furthermore, the research examines and describes the experiences of working with authority control at the national and international levels, as well as in academic settings.

A documentary analysis was conducted to identify materials pertinent to the research topic. The information was obtained through the documentation gathered from primary and secondary sources, including electronic journals, websites, and web articles, in order to gain insight into the existing literature on the subject and to understand the significance of authority control. Upon completion of the bibliographic review, the topic to be addressed was selected and subjected to analysis.

3. RESULTS AND DISCUSSION

A number of methodological proposals have been put forth with regard to the implementation of a control of authorities. It is essential to consider the fundamental aspects in order to develop a proposal that is accurate and effective. It is crucial to consider the primary regulations that govern the preparation process. Many institutions, based on the documents to be standardized and their specific attributes, determine the regulations to be utilized. These regulations outline the manner in which the contents should be employed for the creation of the control of authorities.

It is crucial for cataloguers, in collaboration with their respective institutions, to ascertain that no existing authority record corresponds to the subject matter of the proposed new record. It is essential to establish the specific terms that will be used for the controlled vocabulary, as well as the structure of the heading and the relationships that these may have. It is incumbent upon the specialist engaged in this endeavor to document the sources consulted in the preparation of this record.

It is of the utmost importance that there is a rationale to justify the creation of the record and its references. It is not possible to create a name authority record in the absence of a bibliographic entity that serves as an access point. In the event of a potential conflict between similar or identical geographical names, additional sources of information will be consulted to resolve the issue. The various methodologies identified in the scientific literature are presented below. Each of the aforementioned sources is then subjected to a detailed analysis, with particular attention paid to the most significant aspects identified.

As illustrated in Figure 1, each author establishes a methodology that is informed by their place of origin and the linguistic characteristics of their language. In her initial proposal for the establishment of a control of authorities, author Cristina Herrero Pascual outlines four fundamental steps. The initial step delineates the nature of these access points, which pertain to authors, titles, and subjects. The second step addresses the issues that arise with regard to the names of institutions, including the use of upper and lower case letters, the language of the name, geographical names, and so forth. The registration of the authorities and their references in the specified format and software constitutes the third step of this methodology. In general terms, this step addresses the importance of using compatible formats when converting the data in the authority files to an international data interchange format. Finally, the maintenance of the list of authorities is responsible for updating the file and ensuring its consistency, as this will affect both the access to records by users and the online cataloging work that is done on a daily basis.

In her methodology, author Magliano (2002) proposes that ratings in the form of a word or phrase should be based on reference works. Furthermore, she demonstrates the validity of the choice of areas by subject despite the difficulties associated with the numerous cases of identical names. The qualification of authors with identical names is conducted through the use of dates, both for national and international authors. While the Chinese researcher Yi-hang Pong's (2005) methodology is oriented towards satisfying the needs of the bilingual community, improving and streamlining authority control operations, establishing standardization for name titles, and establishing principles for the selection of authority records.

In the context of the Hong Kong Chinese Authority Name (HKCAN) authority check, the presence of a word or combination of words within a name entry may be regarded as a distinctive element. However, this is not to say that such elements are inherently problematic. Indeed, they may be qualified in such a way as to minimize the likelihood of confusion. The distinctive element is typically defined as one of the following: "English compound words," "non-dictionary English words," or "unusual combinations of two or more letters as a key part." In certain instances, commonplace terms employed in a manner that is deemed "distinctive" may also be regarded as distinctive elements.

In her master's thesis, author Martínez Saldaña (2006) puts forth an alternative proposal for the formulation of policies and rules governing the functioning of the work. Furthermore, the adoption of international standards will ensure the quality of the research process for new authorities and facilitate the standardization of name and subject registration. The final proposal, presented years later than the initial methodology proposed by Cristina Herrero Pascual, emphasized the importance of ensuring that homonymy is avoided. Historically, authors have adopted a variety of signatures in the preparation of their research works. Consequently, the designation of an author's name is contingent upon the existence of a singular form, irrespective of the number of publishing options that the author may have pursued.

A group of researchers led by Villazón (2011) put forth a series of methodological steps for the publication of data from government administrations as linked data. The authors put forth the proposition that the process of publishing linked data should be subject to a defined life cycle,

which they themselves have divided into five fundamental stages. In the initial phase, designated "Specification," an examination of government data sources is conducted, a Uniform Resource Identifier (URI) is devised, and the licenses associated with the published linked data are established. Phase 2, designated as "Modeling," pertains to the construction and reuse of ontologies. These ontologies are expressed in Web Ontology Language (OWL) or Resource Description Framework (RDF) and comprise the cleaning of the data and the linking of the data with other previously published data collections, thereby enhancing the discovery and reuse of the data. Generation ensures the transformation of existing data in the data sources to RDF networks and the cleaning of said data. In the subsequent phase, the RDF graphs are published on the Web, accompanied by the metadata pertaining to these graphs, specifically utilizing the Vocabulary of Interlinked Datasets (VoID) vocabulary. The final phase of this methodological process is the development of tools that utilize the published linked data.

Hyland and Wood (2011) published an article entitled "A Cookbook for Publishing Linked Government Data on the Web," in which they proposed a set of five steps for the publication of linked data. The initial step, entitled "Modeling the Data," facilitates the reusing and merging of data sets. The proposal introduces a fundamental schema that streamlines the conventional methodology for generating linked data (Hidalgo et al., 2018). The second step is known as "Naming Things on the Web with URIs." This step considers the URI naming strategy, which provides principles for choosing the appropriate domain for URI sets, path structure, change management, and machine- and user-readable formats. The third step is to

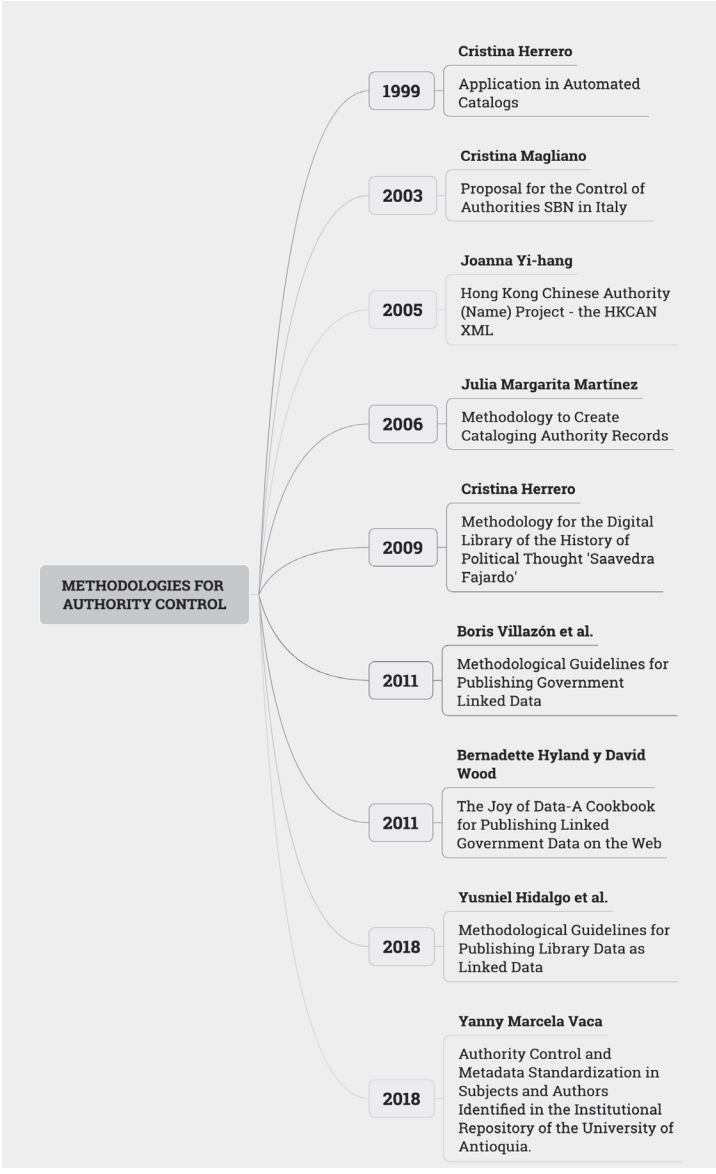

Figure 1. Methodologies for the control of authorities. Prepared by the authors.

reuse vocabularies whenever feasible. This entails the use of vocabularies to describe people, places, and other entities. Furthermore, it encompasses the utilization of Dublin Core terms, which pertain to the description of metadata pertaining to published works. The subsequent phase is the conversion of data to RDF, which is simply the source data in a representation or serialization of linked data. Validation is an essential process that helps avoid unnecessary errors when data are loaded into an RDF database. The publication of human- and machine-readable descriptions represents a form of public communication by an organization. Consequently, data policies must be verified in a Web environment.

In 2018, a collective of authors from various countries published the "Methodological Guidelines for Publishing Library Data as Linked Data." The publication presents five methodological guidelines that provide guidance on the publication of library data as linked data, with a particular focus on ensuring the interoperability of such data. The initial guideline proposed by the authors is data extraction. They assert that their primary objective is to extract and store library data from heterogeneous data sources. The second proposed activity is data preprocessing, which ensures the cleaning and standardization of select metadata fields, including date, volume, and journal numbers, thereby markedly enhancing their quality. The third guideline is data modeling, which is the definition of an ontological model for the sharing and annotation of library data. This model determines the ontologies that will be used to model library data. In order to transform previously extracted, stored, and modeled library data into RDF triples, the fourth step, referred to as data publishing, provides the defined ontology model and the intermediate

database. The output is a set of one or more RDF graphs comprising the library data. This phase is subdivided into three distinct tasks: transformation, linking, and publishing. The final activity, data exploitation, enables the creation of practical applications that utilize the previously published linked data.

In her doctoral dissertation, Vaca Palacios (2018) asserts that a review of the policy manual enabled her to obtain the findings of her research. This constituted a fundamental step in the analysis of the information and in the clarification of the contents of the documents in the repository of the University of Antioquia. The methodology allows for the advancement of attributes in the controlled languages of the subjects, thereby facilitating access and recovery of information contained in the repository's databases. Concurrently, the descriptors are unified to ensure greater organization and validation with the various web-based tools currently available. The objective of this authority control is to verify the correct spelling of the names of the researchers and thus unify the authority records belonging to a given author.

The aforementioned methodologies share a number of similarities, including their foundation on fundamental international formats and guidelines for authority work. Herrero Pascual (1999) developed a methodology, "Application in Automated Catalogs," which aligned with GARE standards. This approach facilitated the standardization of catalog headings related to access points. In 2004, Magliano primarily draws upon extant models within international projects such as VIAF, LEAF, NACO, FRANAR, and IFLA. The standard utilized is the UNIMARC/Authorities: Universal format for authorities.

The proposed Chinese names authority is based on the MARC 21 format, which is designed for use with multilingual materials. The Anglo-American Cataloguing Rules, 2nd edition (AACR2) oversee it, as well as the Library of Congress Subject Headings (LCSH) thesaurus rules. The methodology proposed by the author, Martínez Saldaña, makes fundamental contributions to the processing of personal, corporate, meeting, and geographic name records, as detailed in the PCC/SACO program and NACO training manual. The proposed method for creating records is through the OCLC ConnexionClient interface. MARC tags are employed for the purposes of referencing, indicating related items, providing notes, and sourcing, among other functions. Herrero Pascual and Díaz (2009) demonstrate that it adheres to the authority data model established by the primary international standards and guidelines, including FRANAR, GARR, MARC 21, and AACR2.

4. CONCLUSIONS

In the field of library data mining, two fundamental technological issues emerge: the design of middleware and the mapping of schemas. One of the limitations of these methodologies, particularly those developed at the turn of the century, is their inability to handle heterogeneous data and their adherence to highly outdated regulatory frameworks.

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Management of personal data by students of the Faculty of Mathematics, Physics, and Computer Science in social networks

Manuel Osvaldo Machado Rivero
Directorate of Scientific and Technical Information, Central University "Marta Abreu" of Las Villas, Cuba.
Email: mosvaldo@uclv.edu.cu,
ORCID: https://orcid.org/0000-0001-5095-8389

Leyany María Álvarez Bravo
Villa Clara Provincial Prosecutor's Office, Cuba.
Email: alvarezleyany@gmail.com,
ORCID: https://orcid.org/0009-0006-8884-7186

ABSTRACT
This study described the behavior of students of the Faculty of Mathematics, Physics, and Computer Science (FMFC) regarding the management of personal data (PD) in social networks (SNs). It was a non-experimental, descriptive, and cross-sectional study. A questionnaire was applied to a probabilistic purposive sample of 159 students of the FMFC, where subjects were chosen from all years and careers in an approximate number and not less than 40% of the total enrollment of each year. The SNs most used by the respondents were WhatsApp and Facebook. First and last names, voice messages, age, and photos were the PD most shared on the networks; this occurred mainly with family and friends. To protect the data, students prefer to change the password from time to time since their main concern is to publish in SNs using their name; therefore, they attached greater importance to cancel their PD in case of being used inappropriately. Personal data breaches were only reported on the SN Facebook. Social networks are platforms for interaction and flow of an increasing volume of personal and general data, and there is a high risk that they may be violated due to the lack of knowledge of the users themselves.

Keywords: personal data, data management, social networking, personal data security

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1. INTRODUCTION

Every day, through social networks (SNs), a huge volume of data is exchanged, of which a significant percentage constitutes personal data (PD). According to Acuña Llamas (2018): "personal data is any information relating to a natural person, which identifies him or her or makes him or her identifiable. It is the information that describes us, that gives us identity, characterizes us and differentiates us from other individuals." Many times PD are shared in SNs without the knowledge that they can be used by other people for dissimilar purposes, including illicit activities.

Young people constitute a very active social group in SNs, and within this group, university students are a segment with a marked use of these platforms. The interaction with their faculty, the outreach and social dynamics of universities, the socio-communicative needs of young people, as well as the processes of computerization of modern society, motivate more and more university students to create profiles and develop a cyber-life within the network of networks.

Each user who registers and interacts in an SN provides, from the very moment he or she enters the network,

a significant amount of data, mostly of a personal nature and with the capacity to identify the subject in question. To this should be added an even larger volume, which may include voice messages, photos, videos, messages containing identity numbers, e-mail addresses, among others. Providing a greater or lesser number of PD in the networks will depend to a large extent on how much privacy each person wishes to maintain in their profiles and lifestyle on the Internet.

It is, therefore, necessary to know how students handle their PD in SNs in order to teach them about the dangers of this practice and how to minimize the risks to which they are exposed. Given the problem of the lack of knowledge about the behavior of students in the Faculty of Mathematics, Physics, and Computer Science (FMFC) regarding the handling of PD in SNs, the objective of this research is to describe the behavior of students of the FMFC regarding the handling of PD in SNs.

2. METHODOLOGY

Non-experimental, descriptive, and cross-sectional research. Theoretical methods were used: analytical—synthetic and inductive—deductive, as well as empirical: documentary analysis, survey, mathematical, and statistical methods.

An intentional probabilistic sample of 159 individuals (90% confidence interval and 10% margin of error) was chosen from a population of 329 students belonging to the FMFC, which also complied with the requirement that it included no less than 40% of the total enrollment of each of the years for each career, which was chosen by raffle method. A questionnaire of closed questions

was applied to the subjects, designed taking as a reference the one proposed by Nieves Lahaba and Ponjuan Dante (2021), which was structured in the following dimensions:

- General data: Data were requested regarding age, gender, career, and year of study and whether or not he/she uses any SN (Peña García, 2019).
- Social networks used: We inquired about the SNs in which each subject interacted, the time they usually spend on each of their platforms, and the purpose for which they use them (Reolid Martínez, 2018).
- Personal data security: Information was collected on which data respondents most frequently share through their SN, with what type of people this interaction occurs, as well as the routines employed to protect their accounts and data (Weepiu Samekash, 2020).
- Personal data privacy: Information was collected on experiences with data security breaches in any SN and what kind of consequences caused by such a breach were of most concern to them (Donald Frauenstein, 2020).
- Rights over personal data: The level of importance given by the subjects to different situations in which rights over PD could be involved was assessed (Nieves Lahaba & Ponjuan Dante, 2021).
- Measuring instruments: A Likert scale (very important, not important, and not important at all) was used to obtain results regarding the dimension of rights over PD through the rights of access, rectification, cancellation, and opposition (ARCO).

3. RESULTS

The sample was predominantly female (54.72%), and the average age of the respondents was 20.92 years, with a predominance of the 20–21 years age group (18.87%).

The majors and years with the highest representation were Computer Science (46.27%) and Computer Engineering (43.28%), as well as the second (37.31%) and first year (32.09%), which was due to being the two majors and years with the highest enrollment at FMFC.

One hundred percent of the students indicated using some SN, resulting in WhatsApp (99.37%) being the most used, followed by Facebook (90.57%) and Instagram (73.58%), while TikTok turned out to be the least used (4.40%).

Regarding the purposes for which students have used their SNs, the results were as follows:

- WhatsApp: 100% to communicate with family and friends, 77.22% to exchange with teachers and classmates, and 4.43% to be informed about current affairs.
- Facebook: 83.33% to communicate with family and friends, 49.31% to meet other people, and 47.22% to inform themselves about current affairs.
- Instagram: 94.02% to meet other people, 17.95%, 10.26% to be informed about current affairs, and 1.71% to communicate with family and friends.
- Telegram: 68.18% to be informed about current affairs, 31.82% to communicate with family and friends, and 10.61% to meet other people.
- TikTok: 71.43% to meet other people and 57.14% to communicate with family and friends.

- Twitter: 93.33% to be informed about current affairs and 13.33% to meet other people.

Table 1 shows the results regarding the time students dedicate daily to each SN. In WhatsApp, about 70% indicated dedicating between 7 and 8 hr daily, while in Facebook, the majority used it for 2–3 hr, for the rest of the SNs the interval of 1 hr predominated.

%: Percentage calculated based on the total number of users that use each social network.

Table 2 shows the percentage of users who stated that they shared their different PD in relation to each SN. In general, the most shared PD were names and last names, as well as photos.

It was analyzed with which audience the students exchanged their PD, as a result it, was obtained that:

- First and last names: 71.7% were exchanged with family members, 68.55% with friends, 67.3% with teachers, 63.52% with the general public, and 62.26% with acquaintances.
- Photos: 84.91% were exchanged with family members, 76.73% with friends, 30.19% with the general public, 17.61% with acquaintances, and 8.81% with teachers.
- Videos: 90.57% were exchanged with family members, 77.36% with friends, 4.40% with teachers, and 4.4% with acquaintances. This type of PD was not socialized with the general public.
- Voice messages: 95.6% were exchanged with family members, 91.82% with friends, 67.92% with teachers, and 38.36% with acquaintances. This type of PD was not socialized with the general public.

Table 1. Time spent daily by students on each social network.

SOCIAL NETWORKS	NUMBER OF USERS	TIME DEDICATED DAILY BY STUDENTS TO EACH SOCIAL NETWORK					
		1 hr (%)	2–3 hr (%)	4–6 hr (%)	7–8 hr (%)	9–12 hr (%)	≥12 hr (%)
WhatsApp	158	5.7	5.06	4.43	68.99	14.56	1.26
Facebook	144	20.14	55.56	9.72	10.42	4.16	0
Telegram	66	59.09	19.70	10.61	10.60	0	0
Twitter	60	76.67	23.33	0	0	0	0
Instagram	117	52.14	19.66	4.27	17.95	5.98	0
TikTok	7	71.43	28.57	0	0	0	0

Table 2. Percentage of users sharing each type of personal data by each of the social networks.

SOCIAL NET-WORKS	PERCENTAGE OF STUDENTS SHARING EACH TYPE OF PERSONAL DATA IN EACH OF THE SOCIAL NETWORKS											
	N.A. (%)	F (%)	VID (%)	M.V. (%)	N.I. (%)	D.D (%)	T.P. (%)	C.B. (%)	EMAIL (%)	AGE (%)	GENDER (%)	O.S. (%)
Facebook (144)	89.58	89.58	22.22	20.83	0	0	29.17	0	4.86	89.58	63.89	4.86
Instagram (117)	88.89	95.73	34.19	0	0	0	6.84	0	25.64	37.61	17.95	0
WhatsApp (158)	92.41	91.14	57.59	92.41	5.06	10.76	78.48	5.06	9.49	32.28	22.15	12.66
Telegram (66)	57.58	30.30	10.61	30.30	0	0	46.97	0	10.61	19.70	19.70	10.61
TikTok (7)	0	71.43	100	0	0	0	0	0	0	28.57	42.86	0
Twitter (60)	81.67	30.00	0	0	0	46.67	0	0	45.00	11.67	11.67	11.67

Source: Survey.

N.A.: names and surnames; F: photos; Vid: videos; M.V.: voice messages; N.I.: identity number; D.D.: home address; T.P.: private telephone; C.B.: bank account; O.S.: photos sexual orientation; ( ): number of users who use the SN.

- Personal identity number: 47.8% was shared with family members, 15.09% with teachers, and 9.43% with friends. This PD was not shared with acquaintances or the general public.
- Home address: 52.83% were shared with friends, 35.85% with family members, 27.67% with teachers, and 8.18% with acquaintances. This PD was not shared with acquaintances or the general public.
- Private telephone: 73.58% was exchanged with friends, 69.18% with family members, 58.49% with teachers, 16.98% with acquaintances, and 5.03% with the general public.
- Bank account: 22.64% was exchanged with family members. This data was not socialized with any other type of audience.
- Email: It was exchanged in 59.12% with teachers, 16.98% with relatives, 13.84% with friends, 4.40% with acquaintances, and never with the general public.
- Age: 67.92% were exchanged with friends, 58.49% with teachers, 57.86% with family members, 18.24% with the general public, and 16.98% with acquaintances.
- Gender: 62.26% were exchanged with friends, 48.43% with teachers, 36.48% with family members, 22.01% with the general public, and 16.98% with acquaintances.
- Sexual orientation: 27.04% were exchanged with friends, 18.87% with relatives, 12.58% with acquaintances, 4.4% with teachers, and 4.4% with the general public.

A total of 18.87% of the respondents stated that they had suffered some violation of their PD in the SNs, with 100% of these events being reported on Facebook.

The greatest concern of students regarding privacy (97.76%) was that they post on SNs using their name, followed by having their identity supplanted and losing control of their SNs (both with 87.31%).

When examining the routines used by students to protect their PD in SNs, it was found that "elaborate a complex password" and "change password every so often" were the most employed (60.38%), a result very similar to that published by Nieves Lahaba and Ponjuan Dante (2021). Seventy-five percent of the respondents stated that they combined three or more routines to increase the security of their SNs.

The behavior of the indicators of ARCO to PD analyzed from the category "very important," evidenced results that show that students attach more importance to cancel their PD in case of being misused (79.25%), as well as to request the suspension of data that are inadequate or excessive, without the prejudice of blocking (79.25%).

Table 3 represents the percentage of answers given by respondents to the question: What level of importance do you attach to the situations in which your PD rights could be involved?

4. DISCUSSION

The greater presence of women in this research was influenced by the predominance of this sex in the enrollment of the Faculty, according to data provided by the Teaching Secretariat of the Faculty. Although gender has not been shown to determine a lower or higher use of SNs, several studies have demonstrated the prevalence of females in the samples analyzed (de la Mora Martín et al., 2020; Mendoza et al., 2014).

Table 3. Percentage distribution of the answers given on the level of importance given by the respondents to the situations in which their personal data rights could be involved.

SITUATIONS IN WHICH YOUR PERSONAL DATA RIGHTS COULD BE INVOLVED	LEVEL OF IMPORTANCE		
	VERY IMPORTANT (%)	NOT VERY IMPORTANT (%)	NOT IMPORTANT AT ALL (%)
Access to the processing of my data	78.62	21.38	0
Cancel my personal data (PD) if they are used improperly	79.25	20.75	0
Knowing where I can rectify my PD	42.14	32.08	25.78
Request cancellation of files where the data is used for advertising purposes	57.23	34.59	4.4
Request and be informed about your PD, the origin of the same	36.92	35.22	21.38
Request the rectification of data when it is inaccurate	42.14	27.04	27.04

(*Continued*)

Table 3. *Continued*

SITUATIONS IN WHICH YOUR PERSONAL DATA RIGHTS COULD BE INVOLVED	LEVEL OF IMPORTANCE		
	VERY IMPORTANT (%)	NOT VERY IMPORTANT (%)	NOT IMPORTANT AT ALL (%)
Knowing the means by which organizations provide information on the use of PD	33.96	46.54	15.72
Request the suspension of data that are inadequate or excessive, without prejudice to the duty to block them	79.25	16.98	0
Oppose the processing or collection of PD when this is not carried out by a public entity	74.84	21.38	0

Regarding age groups, the results obtained were similar to that reported by other studies (de la Mora Martín et al., 2020; Peña García, 2019). The predominance of the 21-year-old group in this study coincided with other research results applied to university students, where a mean age equal to 21.4 years was found (Marín Díaz, 2015; Mendoza et al., 2014; Peña García, 2019).

The greater use of WhatsApp over the rest of the SNs must have been related to a boost in its exploitation due to the COVID-19 pandemic. During the period of non-face-to-face teaching as a result of the confinement, most of the students of the careers at the Universidad Central "Marta Abreu" de Las Villas (UCLV), in addition to using Moodle as a teaching platform, created and used groups on WhatsApp to communicate quickly, orientations about the subjects and other minor academic activities. Everything seems to indicate that this behavior has been maintained, which undoubtedly influenced what was observed during this research. These results are similar to those obtained by Reolid Martínez (2018) and differ from those reached by Bolaños Córdova (2015) and Chunga Chinguel (2016), who reported Facebook as the most popular SN.

With the exception of WhatsApp, where 68.98% indicated that they use it between 7 and 8 hr daily, for the rest of the networks used between 70 and 75% of the students manifested connecting to these for 1 hr or 2–3 hr daily, which is a result approximately equal to that found in other research on this topic (Mendoza et al., 2014; Reolid Martínez, 2018). It is striking the fact that the students who manifested using WhatsApp for 9–12 hr (23) and for more than 12 hr (7), since this would imply an intensive use of such network, even during class hours and other academic activities.

Through SNs, it is possible to share and interact with diverse groups of people, from family and friends to strangers. In a general analysis, students tend to share their PD mainly with friends and family. The above was very evident in the case of WhatsApp, where family and friends obtained equal percentage of responses, a result supported by the studies of Morocho Sarchi (2019) and Del Águila Noriega (2021). Also in this network, a high percentage was observed for the case of teachers, this given as explained above, by the marked use that students make of WhatsApp for academic purposes. The fact that in the Twitter network 66.67% stated that they shared their PD with the general public was noteworthy.

Several studies suggest that profile theft and impersonation are very frequent on Facebook (Marín Dueñas et al., 2020; Quiñones Acevedo, 2016). However, dissimilar international publications refer to facts related to unauthorized uses of SN users' data, both by other people and by the companies that manage these platforms. According to a study conducted at the Universidad Católica Santo Toribio de Mogrovejo, 63.62% of the students surveyed have presented problems with their PD (offensive comments, password theft, or contacts with fake profiles; Chunga Chinguel, 2016).

The results observed regarding students' concern for the privacy of their data differ from those published by Nieves Lahaba and Ponjuan Dante (2021), in that the main concern was being a victim of phishing, followed by "accessing my email account without permission," with "being published in SNs with my name" not being one of the main concerns. It is suggested that the main targets of phishing are mainly adults, especially senior citizens, who are not digital natives and, therefore, have little

knowledge of how to manage their SNs (Donald Frauenstein, 2020).

5. CONCLUSIONS

Social networks constitute platforms for interaction and flow of an increasing volume of personal and general data, with a high risk of their vulnerability due to the lack of knowledge of the users themselves.

In the present study, the most used SNs were WhatsApp and Facebook, with names and surnames and photos being the data most shared by the respondents, mainly with their family and friends.

Facebook turned out to be the only SN in which students experienced that their data had been violated.

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Methodological strategy for the formation of information competencies with the use of ICTs

Daniel José Olazabal Guerra
Empresa de Tecnologías de la Información para la Defensa XETID, Cuba.
Email: odaniel.cmw@infomed.sld.cu, dolazabal@xetid.cu,
ORCID: 0000-0002-5557-8462

Aylin Estrada Velazco
Universidad de las Ciencias Informáticas, Cuba.
Email: avelazco@uci.cu,
ORCID: 0000-0002-2557-361x

ABSTRACT

Competencies are currently defined and classified according to their trend. Among the competencies classified as basic-generic is the competence of information and knowledge management. In Cuba, informational competencies are trained in the postgraduate stage through information literacy programs; however, they should be trained during general or university education in order to provide society with a competent professional. With the objective of designing a methodological strategy for the formation of informational competencies with the use of information and communication technology (ICT), a quasi-experiment was developed in the Faculty of Health Technology of the University of Medical Sciences of Havana during the 2022 academic year. The methodological strategy was modeled and implemented in two independent samples. When the evaluation was carried out, it was obtained that 50% of the total sample reached the evaluation of good, while 36.8% was evaluated as excellent. The strategy was validated by experts with a high rating, while the validation of the students according to the satisfaction survey showed that 100% considered that the use of ICTs in the process of information competencies training had a positive influence, 91.6% considered that they acquired the competencies, and 100% expressed satisfaction with the use of ICTs during the development of the course. It is concluded that the methodological strategy for the formation of informational competencies with the use of ICT is valid for future generalization.

Keywords: information competencies, information literacy, methodological strategy, ICTs

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1. INTRODUCTION

Information and communication technologies (ICTs) are nowadays an important working tool to dynamize the process of scientific research at all levels. The efficient use of these technologies contributes favorably to a higher degree of technological professionalization of professionals in the process of permanent training, which allows them to face a research according to the advances of society in the present century (Mesa Vázquez et al., 2022).

In the information society, as it could not be otherwise, the new technologies to access, process, and transmit information, the new forms of communication determine that a large part of the contents and competencies of the basic training required today are directly related to ICTs (Gutiérrez Martín, 2022).

It is necessary to analyze the definition of competence, which is considered as the mobilization of knowledge, ability, attitude, and value that a person shows when acting effectively in the face of various problems based on his or her own characteristics and experiences. Therefore, it refers to a group of knowledge, procedures, and attitudes

that are combined, in a coordinated and integrated manner, in the sense that the person must know how to do and know how to be for professional development (González Calatayud et al., 2018; Salazar Farfán & Lescano López, 2022).

In the knowledge society that humanity lives in, information plays a key role, and it is important to acquire competencies and/or informational skills to effectively access the largest amount of information resources, which will be part of new knowledge (Aliaga Marañon, 2022). From the systematization carried out to normative documents of Higher Medical Education in Cuba for undergraduates, difficulties are detected in the development of actions during the teaching–learning process from the curriculum in the formation of informational competencies of human resources who are trained in Health Technology careers at the University of Medical Sciences of Havana, coupled with the disuse of activities to form informational competencies through the use of ICT (Zelada Pérez, 2018).

In assessing the above, a clear contradiction is established between the model of competent information professional demanded by society today and the professional who graduates from university training without developing informational competencies during their training.

Research problem: How to contribute to the development of informational competencies with the use of ICTs in the students of the Faculty of Health Technology of the University of Medical Sciences of Havana?

General objective: To implement a methodological strategy for the use of ICT in the development of informational competencies in the students of the Faculty of Health Technology of the University of Medical Sciences of Havana.

2. METHODOLOGY

A quasi-experiment was developed in the Faculty of Health Technology of the University of Medical Sciences of Havana during the 2022 academic year. For the development of the research, theoretical methods (analytic-synthetic, inductive-deductive, historical-logical, documentary analysis, systematization, modeling, and functional structural systemic) and empirical (observation and survey) were used, as well as statistical methods for the presentation and analysis of the information, supported by the work with office tools and SPSS software.

The population defined for the research were the 30 students who constituted the enrollment of the fourth year of the regular day course of the Faculty of Health Technology of the University of Medical Sciences of Havana in the academic year 2022, which at the same time constituted the sample, grouped in two sample groups. For the expert interview, a non-probabilistic sample of five specialists with experience in the use of ICT in the educational teaching process and informational competencies was selected.

The interviews were anonymous, guaranteeing the voluntariness of those involved to participate in the research by signing the informed consent form, and inclusion and exclusion criteria were established.

3. RESULTS

Based on the literature review, the methodological strategy was modeled. For this purpose, the model proposed by several authors (Suárez Jorge, 2023; Valle Lima, 2012; Zelada Pérez, 2018) was taken into account, from which the author defined his own model for the strategy designed, which is shown in Figure 1.

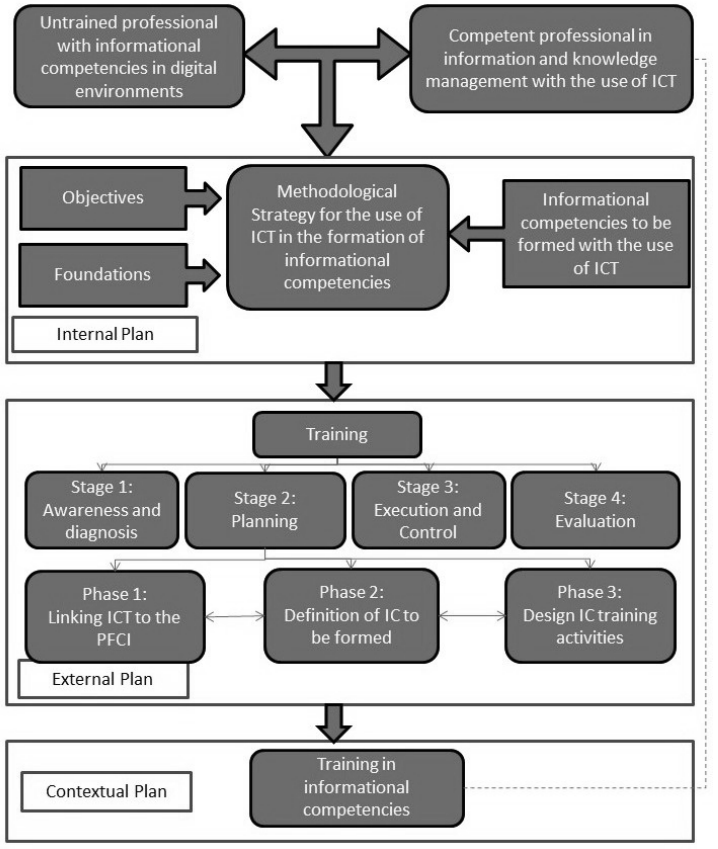

Figure 1. Methodological strategy for the use of ICTs in the development of information competencies. Source: Prepared by the authors.

Among the main results of the initial diagnosis, it was found that most of the respondents carried out self-study activities using mobile technology, dedicating more than 10 hr a day to review the Internet through electronic devices, so it was decided to take advantage of this potential in the process of updating the subject in the virtual health classroom (AVS).

For the development of the teaching process, didactic activities were enabled in the AVS, as well as the encouragement of activities from the Moodle platform such as Workshops and Wikis, contributing to the formation of values in the students at the same time as the formation and development of informational competencies. Among other actions, workshops were developed, from which infographics and video tutorials were elaborated by the students themselves, and demonstration of skills through role-playing games in which ICTs were used for the user training process.

Similarly, learning methodologies based on traditional and new educational trends (Riquelme, 2023) were used, having as a premise the use of ICT in the process of training and development of information competencies, highlighting the workshops, such as the inverted classroom, heuristic method, discussion and debate, discovery methods, playful method, pyramid method, among others.

The strategy was implemented in two independent samples. When the evaluation was carried out, 50% of the total sample was evaluated as good, while 36.8% was evaluated as excellent. The strategy was validated by experts with a high rating, while the validation of the students according to the satisfaction survey showed that 100% considered that the use of ICTs in the process of information skills training had a positive influence, 91.6% considered that they acquired the skills, and 100% expressed satisfaction with the use of ICTs during the development of the course.

4. DISCUSSION

Similar studies have shown that the use of various methods for the development of information competencies

has the expected effect, which corresponds to the results obtained in this research. Such is the case of Torres (2020) who developed a pedagogical and didactic strategy for the development of informational competencies through learning processes necessary to prepare the university community with the ability to search, handle, and manage information, with a critical, reflective, and responsible attitude for decision making, in the face of the new challenges demanded by the knowledge society.

The study observed during the implementation of the virtual learning environment, and the entry and exit tests showed that the virtual learning environment significantly improves information management skills. Students improve in the expression of their need for information, identify keywords and related terms, identify typologies of information sources, as well as in the construction of a search strategy to retrieve information, favorable impact when applying the pedagogical and didactic strategy with significant improvement in information management skills and lessons learned that contribute to the development of information management skills within a virtual learning environment.

On the use of various activities within the methodological strategy with the use of ICT, similar results are obtained to Granda et al. (2019), who in the study carried out used techniques similar to those of the present research, such as gamification, the inverted classroom, and distance education, with the use of ICT and spaces in virtual classrooms on the Moodle platform.

Other results with which the results obtained are compared are those achieved by Aquino et al. (2021) who determined that the experiences confirm that the correct use of learning environments in higher education beneficially

supports the learning of undergraduate students, as long as the teacher makes use of these environments pedagogically. They also concluded that learning environments based on self-regulation should be promoted and that learning environments should no longer be used as mere technological tools based on pedagogical methodologies. To this end, they recommended that higher education institutions should carry out actions in the use of ICTs to achieve the development of competencies and the expected learning achievements, betting on hybrid models in order to improve educational processes.

In a research conducted by Basilotta et al. (2020), it is shown that students have different technological devices at home. The presence of such resources is common, and students use ICTs to perform various personal and academic activities. However, despite the fact that ICTs are integrated into their daily lives, the results obtained in the items related to information literacy were less encouraging, finding a medium level of knowledge and ability. However, attitudes are more positive, with a higher average.

5. CONCLUSIONS

It is concluded that the methodological strategy for the formation of informational competencies with the use of ICTs is valid for future generalization.

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FAIRification: A necessary practice for research data management

Dianelis Olivera Batista
Universidad Central "Marta Abreu" de Las Villas, Cuba.
Email: dolivera@uclv.cu

Amed Abel Leiva Mederos
Universidad Central "Marta Abreu" de Las Villas, Cuba.
Email: amed@uclv.edu.cu

María Josefa Peralta González
Universidad Central "Marta Abreu" de Las Villas, Cuba.
Email: mjosefa@uclv.edu.cu

ABSTRACT
The term FAIRification has become widespread among professionals whose work is related to research data management. However, little is known about FAIRification practices. This paper aims to examine FAIRification practices applied to research data from all areas of knowledge. The research is an exploratory study, using documentary analysis and content analysis methods. The results show that the literature on the subject is recent and generally in English. The papers, projects, and scientific articles analyzed show the development of infrastructures and tools but also the need for a culture of research data management. It is concluded that most of the experiences in FAIRification have been directed to the development of workflows, infrastructures, and tools to comply with FAIR principles. There is a predominance of FAIRification of data in the health research domain, with a greater boom after COVID-19.

Keywords: FAIR data, FAIRification, research data management

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1. INTRODUCTION

Research data management has become established in the scientific and academic domains in recent decades. For Cox and Pinfield (2014), research data management consists of a series of different activities and processes associated with the data lifecycle, involving data design and creation, storage, security, preservation, retrieval, sharing, and reuse.

Wilkinson et al. (2016) propose the findable, accessible, interoperable, and reusable (FAIR) principles, considering them a prerequisite for achieving research data management. These authors point out that contemporary e-Science requires data to be FAIR in the long term, and these objectives are fast becoming expectations of agencies and publishers.

Among the advances in the implementation of these principles, the GO FAIR initiative (GO FAIR, 2017) stands out. Within this initiative, the term "FAIRification" is beginning to be used, whose use, both in English and Spanish (FAIRificación), has spread in recent years. This term is used to refer to the processing of data and metadata to comply with FAIR principles. However, little is known about FAIRification practices. Only the study by Inau et al. (2023) refers to such experiences but in the area of health data management specifically. This work, which is part of the theoretical framework of an ongoing doctoral research, aims to examine FAIRification practices applied to research data from all areas of knowledge.

2. METHODOLOGY

The research is an exploratory study. Documentary analysis and content analysis methods were used. First, a bibliography on the subject was compiled, using the term "FAIRification" as a search strategy. The results were filtered, taking as exclusion criteria those documents that did not allude to practices and experiences. Finally, a total of 14 scientific articles, six papers presented at events, and five research project presentations were analyzed.

3. RESULTS AND DISCUSSION

The literature on FAIRification practices is recent. As can be seen in Table 1, the publications are from 2018 onwards, and an increase is observed from 2020 onwards. It should be noted that one of the project presentations is undated and that perhaps the number of publications is not higher in 2023 because the search was performed in September of the same year.

Table 1. Number of publications per year.

YEAR	PUBLICATIONS
2018	One
2019	One
2020	Three
2021	Six
2022	Seven
2023	Six

Source: Prepared by the authors.

Almost all the documents are in English. Only one paper was published in Spanish where Anglada (2021) describes the requirements of repositories to comply with FAIR principles and the facilities offered by Dataverse. In another paper, Mavraki et al. (2021) define a semantic model for data and metadata to be FAIR within the LifeWatchGreece biodiversity research infrastructure.

Annane et al. (2021) present an ontological model for FAIR data in the meteorological domain. They take into account the characteristics of meteorological data and make it applicable to Météo-France (French National Meteorological Service) but also to any institution working with this type of data. In addition, the authors intend to continue to enrich and refine the proposed model.

On the other hand, Mangione et al. (2022) analyze the gray literature tools and approaches that emerge when adopting FAIR principles. A total of 477 emerging tools are analyzed and organized into a comprehensive map. Österle and Touré (2022) describe the creation and use of a health network in Switzerland that enables the development of a FAIR ecosystem. Azeroual et al. (2023) refer to a systematic literature review on current research information systems (CRISs) and discuss how FAIRification should work in CRISs based on existing practices.

Regarding projects, ELIXIR-EXCELERATE is presented by Jacobsen et al. (2018). It describes a seven-step FAIRification process, auxiliary tools, and recommendations for data manipulation in the field of rare diseases. The seven steps include (1) defining user driving questions, (2) pre-FAIRification analysis, (3) semantic model definition, (4) data record transformation, (5) metadata definition, (6) FAIR data resource implementation, and (7) user interface or application query.

Another Entellect project, deployed by Elsevier (2019), is a platform that empowers data-driven R&D in the pharmaceutical industry and refers to the need for cultural change. Meanwhile, the FAIRplus project, according to the European Commission (n.d.), aims to improve FAIR levels of data and change the culture of data management. This project has generated a scalable framework for FAIRification of data. It has refined the implementation of FAIR principles in working with public data from Innovative Medicines Initiative projects and internal data from pharmaceutical industry partners.

Later, EOSC-Nordic (2020) is developed, which has guided repositories in the Nordic and Baltic countries to make their data FAIR. The EOSC-Nordic FAIRification initiative team defined a sample size of approximately 100 data repositories, for which they evaluated the implementation of FAIR principles, with the aim of guiding and training repositories towards a higher level of FAIRification.

Aventurier et al. (2022) present the recommendations of the ANR-BRIDGE project for data FAIRification. The goal of this project is to provide guidelines and harmonize research data policies and repository management in a reusable approach for other institutes or contexts, focusing on three priorities: analyze and improve institutional data governance policies, provide and support common guidelines for data producers and managers, and choose FAIR vocabularies and develop tools for repositories with some shared metadata schemas.

One of the articles analyzed describes the FAIR4Health project. According to Alvarez-Romero et al. (2021), FAIR4Health is a project whose main objective is to encourage and promote the application of FAIR principles in data derived from publicly funded health research initiatives.

The main purpose is to be able to share these data and reuse them in the EU health research community. Jacobsen et al. (2020) describe a generic FAIRification workflow. This flow should be applicable to any type of data. The steps are (1) identify the FAIRification target, (2) analyze data, (3) analyze metadata, (4) define a semantic model for data (4a) and metadata (4b), (5) make data (5a) and metadata (5b) linkable, (6) host FAIR data, and (7) evaluate FAIR data. For each step, it describes how data are processed, what expertise is required, and what procedures and tools can be used.

Sinaci et al. (2020) propose a technological architecture for FAIRification. The proposed architecture is based on the use of fast health care interoperability resources. The authors conclude that health care datasets or data resulting from health research can be FAIRified, shared, and reused within the health research community following the proposed workflow and implementation of the technology architecture.

Bernabé et al. (2021) refer to the use of techniques to identify the need for FAIR data, what tasks to perform, resources used, and so on. These authors design a method that uses "goal-oriented models" to support the "objective identification" and "conceptual modeling" steps of FAIRification. First, the motivations for the need for FAIR data are identified. Then, objective models are used to define the scope, identify important concepts, and validate the resulting conceptual model. The method will also describe best practices and activities for conceptual modeling.

Gundersen et al. (2021) decide to advance the application of FAIR principles to produce searchable metadata for genomic clues. To this end, they develop a JSON schema, called FAIRtracks, and integrate it into a novel track search

service, called TrackFind. They demonstrate practical use by importing datasets through TrackFind into existing examples of analytical tools relevant to genomic tracks: EPICO and GSuite HyperBrowser. Thus, they provide a first version of a draft standard for genomic tracking metadata and the accompanying software ecosystem.

Groenen et al. (2021) implement a FAIRification process for recording vascular anomaly data. They describe the five phases of this process in detail: (1) pre-FAIRification, (2) facilitating FAIRification, (3) data collection, (4) generating real-time FAIR data, and (5) using FAIR data. The authors believe that the process can be reused by other rare disease registries and that this work can be a substantial contribution to a FAIR ecosystem of rare disease data.

While dos Santos et al. (2022) show FAIRification experience in rare disease data. In Europe, 24 European Reference Networks (ERNs) are working on rare disease registries in different clinical settings. The FAIRification process differs between the different ERN registries. For example, registries use different software systems and are subject to different legal regulations. To help ERNs make informed decisions and harmonize FAIRification, a management team was created.

Queiroz et al. (2022) present actions to generate FAIR data and matadata for COVID-19 research. The article presents a workflow of actions taken to generate FAIR metadata for COVID-19 research. In addition, tools for (semi) automating metadata processing are evaluated whenever possible. Although defined for a particular use case, it is expected that this workflow can be applied to other epidemic investigations and in other domains.

Both Alharbi et al. (2022) and Alharbi et al. (2023) propose methodologies and structures to facilitate

FAIRification decision making in the pharmaceutical R&D industry. In turn, these authors identify challenges facing the FAIRification process and formulate a cost-benefit assessment. In this way, they aim to provide adequate decision making regarding the research data in the pharmaceutical sector that should be prioritized when implementing FAIR principles.

Ribeiro et al. (2023) conducted a case study of the application of FAIR principles for data sharing, use and reuse in musicology. Datasets were located and consulted at the FAIR preprocessing level from sites in the area of Musicology and in Google Scholar. As a result, a semantic model based on vocabularies to describe electronic resources could be proposed. In addition, points of convergence between FAIRification processes and data preparation for use as related open data were perceived.

Touré et al. (2023) follow up on the work presented in the paper by Österle and Touré (2022) concerning the Swiss Personalized Health Network. The Resource Description Framework schema is implemented along with a data ecosystem encompassing data integration, validation tools, analysis aids, training, and documentation to represent metadata and health data in a consistent manner. This will enable the achievement of national data interoperability goals. In this way, researchers in Switzerland have access to FAIR health data for further use.

In the article by Parciak et al. (2023), the implementation of a FAIR-mode data processing automation framework in a hospital research center is presented. The authors demonstrate the implementation of the proposed framework by describing its use in the Medical Data Integration Center. The prototype implementation also includes a

metadata schema for data provenance and a process validation concept.

Welter et al. (2023) develop a flexible, multilevel, domain-independent FAIRification framework that provides practical guidance for improving FAIRification for existing and future clinical and molecular datasets. The framework is validated in collaboration with several major public–private partnership projects, demonstrating and delivering improvements across all FAIR aspects and across a variety of datasets and their contexts. The authors believe that the reproducibility and applicability of the approach to FAIRification tasks is established.

In recent years, there has been a predominance of publications focused on FAIRification in the field of health research. The authors of this study concur with Inau et al. (2023), who discuss concepts, approaches, and implementation experiences in health FAIR initiatives, that successful FAIRification of data has informed the management and prognosis of various diseases. In addition, the available literature indicates that more efforts have been made to FAIRify disease data since COVID-19.

4. CONCLUSIONS

Most of the experiences in FAIRification have been directed to the development of workflows, infrastructures, and tools to make data and metadata compliant with FAIR principles. FAIRification predominates in the health research domain. A boom has been seen after the COVID-19 pandemic, as the need to share data to address the disease sparked greater interest in these issues. Future studies should be conducted to see how FAIRification practices evolve, as they are very new.

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Guidelines for a research information system at the University of Moa, Cuba

Digna Suárez-Fernández
Universidad de Moa Dr. Antonio Núñez Jiménez, Cuba.
Email: dsfernandez@ismm.edu.cu,
ORCID: https://orcid.org/0000-0003-1742-5390

Beatriz Reyes Nicot
Universidad de Moa Dr. Antonio Núñez Jiménez, Cuba.
Email: bnicot@ismm.edu.cu,
ORCID: https://orcid.org/0009-0003-4028-3148

María Josefa Peralta González
Universidad Martha Abreu de Las Villas, Cuba.
Email: mjosefa@uclv.edu.cu,
ORCID: https://orcid.org/0000-0002-5188-2328

Yelina Piedra Salomón
Universidad de La Habana, Cuba.
Email: yelinapiedra@fcom.uh.cu,
ORCID: https://orcid.org/0000-0002-5829-3374

Amed Leiva-Mederos
Universidad Martha Abreu de Las Villas, Cuba.
Email: amed@uclv.edu.cu,
ORCID: https://orcid.org/0000-0002-9144-5018

ABSTRACT

Despite the efforts made at the University of Moa "Dr. Antonio Núñez Jiménez", Cuba, to improve information management, difficulties persist in its collection, integration, and recovery for the processing and dissemination of the results of the institutional scientific activity and the evaluation of research. This article presents guidelines to be considered for the implementation of a research information system. Research methods and techniques were applied, such as analysis of bibliographic information, structured interviews, questionnaires, participant observation, and benchmarking. For business modeling and requirements education,

the logical stages of computerized information systems development were used as references. The implementation of research information systems in the Cuban university context allows an integral and efficient management of the processes related to research management, which contributes to improve the quality and efficiency of the scientific activity in the academic institutions of the country.

Keywords: research information systems, research information management systems, requirements elicitation, research management, University of Moa

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1. INTRODUCTION

The university of the 21st century is closely associated with research; this is highlighted in the university–science relationship, the role of the research professor, the institutional commitment to the social and economic development of its environment, and the primacy of research as one of its substantive processes. The challenge of research management in these institutions entails the conjugation of talents, resources, and institutional capacities to respond to the demands and requirements of the knowledge society (Rodríguez-Ponce, 2017).

In recent years, research information systems, known as current research information systems (CRISs) or research information management systems, have been consolidating in the global context. This web tool has the

functionality of integrating and linking sources of information related to research on a single platform with the idea of making known to internal and external users of the organization the capabilities, collaborations, results, and expertise related to the research process (Marmoti, 2020).

In the university context, they provide researchers, administrative staff, and management with support to document, manage, report, share, and evaluate research activities (Bryant et al., 2021; Riihiaho et al., 2015). They contribute to the transformation of science evaluation systems (Beigel et al., 2021) and, in turn, propitiate that the data associated with institutional research information comply with findable, accessible, interoperable, and reusable (FAIR) principles.

The literature consulted shows a discreet development of these systems to favor the management of science in Cuban universities, even though their usefulness has been recognized for an adequate management of science, technology, and innovation (STI) and the evaluation of research (de Laufeo Padrón, 2021; Machado Rivero et al., 2020; Suárez et al., 2022).

At the University of Moa "Dr. Antonio Núñez Jiménez" (UMoa), an institution attached to the Ministry of Higher Education (MES), formerly Instituto Superior Minero Metalúrgico de Moa, research has been conducted aimed at filling gaps in the treatment of information; however, difficulties persist in its collection, integration, and recovery for the good performance of people and efficiency in the processes related to research evaluation, manifested in:

- the decentralized and dispersed generation of information on institutional scientific activity, which makes it difficult to compile it for administrative reports on STI in different organizational units.

- the registration and preservation of this information in .docx and/or .xlsx files, causing delays in the recovery and reuse of the data.
- the research outputs disseminated in open access, which are not contextualized with the scientific work of the researcher and research groups.

In this order of ideas and as part of the institutional effort aimed at digital transformation in the substantive process of research, this research aims to identify guidelines for the implementation of a research information system at the UMoa.

2. METHODOLOGY

In this exploratory qualitative research, the following methods and techniques characteristic of scientific research are applied to understand the organizational context, shape the business modeling, and specify the requirements to be met by the system:

- Analysis and synthesis method for the process of analyzing the institutional context and identifying the main problems affecting the processing of information in research management.
- Systemic-structural and modeling method for the process of identifying the system requirements.
- An unstructured interview with managers and executives of the institution associated with the management of the STI process.
- An analysis of the bibliographic information available in normative documents such as UMoa's Strategic Planning Period 2022–2026, the Annual Science,

Technology, and Innovation Balance Report (2021 and 2022), and the Functional Organic Manual and Resolution 145/2023 Regulations for the application of teaching categories in higher education of the MES.

- A questionnaire to two sample groups in order to identify the requirements of the system: the first one conformed by managers and executives involved in this process and the second one by researchers with different main teaching categories.
- Benchmarking to web portals of operational university CRISs registered in the Directory of Research Information Systems (https://dspacecris.eurocris.org/cris/explore/dris) in order to know the research information that is usually disseminated in these systems about university scientific work.

3. RESULTS AND DISCUSSION

3.1. Business Modeling: Research Management in the STI System at the UMoa

Based on the strategic planning of the MES and the institution's potential, the UMoa designs its strategic project in accordance with the process-based approach that characterizes university management for the period 2022–2026. The strategies that make up its project contribute to the fulfillment of the goals of the indicators defined to evaluate the performance of the processes. In the university's strategic project for the year 2023, six strategies were implemented with their specificities and actions that were planned in the annual plan of activities, with the tasks to be fulfilled by each organizational unit, by virtue of the strategies that lead to the achievement of the objectives.

These indicators and goals were established for each year and contributed to one or more strategic objectives.

Regarding the STI process, 38 indicators were specified that quantify information related to variables such as research projects, scientific publications, the university digital publishing house, software registrations, awards, research and development (R&D) services and products, exports, imports, and organizational forms of interface dynamization. Each year, indicators, processes, and strategic objectives are evaluated, with the categories of over accomplished, accomplished, partially accomplished, and unaccomplished.

The Vice Rector's Office for Research and Graduate Studies is the intermediate management body that directs the results in the STI process, in which the faculties, teaching departments, study centers, professors, and students also participate. According to data from the Annual Science, Technology, and Innovation Balance Report (2022), the UMoa has a faculty potential for science of 169 professors who dedicated about 20% or more of their time of the year to research. Of these, 55 hold PhDs, and 108 hold Master's degrees. During the year, the UMoa worked on 20 R&D and innovation (R&D&I) projects and has 22 research groups made up of 176 professors. It has a scientific policy that specifies the institution's lines of research and impacts results in strategic sectors for the country.

The evaluation of scientific activity is carried out at several levels:

- The performance of the university professor is evaluated based on indicators defined in his or her annual results plan.

- The fulfillment of the indicators and goals planned in the organizational units, such as faculties, teaching departments, and study centers, is examined in order to make an assessment of the institutional results in the STI process.
- Compliance with planned tasks and financial resources allocated to R&D&I projects is analyzed.

During 2018, the institution underwent a process of institutional external evaluation by the National Accreditation Board of higher education programs and institutions in the country where variables such as human resources management, undergraduate and graduate professional training, social interaction, and social impact of scientific research were examined. Its undergraduate and graduate programs are periodically evaluated by the National Accreditation Board.

The institution currently lacks a web application that facilitates the management of scientific projects and events. Digital materials derived from scientific and academic production generated by members of the institution are collected, preserved, and distributed in the Institutional Repository "Nínive" under an open access policy (http://ninive.ismm.edu.cu), supported by DSpace. Those publications signed by authors who work at the institution and published by the university publishing house are kept in the Open Journal Systems of the three journals that comprise it: Minería y Geología, Innovación Social y Desarrollo, and Ciencia y Futuro (https://revista.ismm.edu.cu/).

3.2. CRIS Requirements Education at the UMoa

Main objective: To facilitate stakeholders (interest groups or interested parties) the access, retrieval, and use of

information related to research through its automation and centralization in a platform that fits the institutional context of project supervision, monitoring, and evaluation of scientific activity.

It is understood that these stakeholders constitute potential users of the system: institutional personnel involved in the management of research information, such as researchers, department heads, study center directors, project heads, vice-deans of research, executives, senior management, as well as external evaluators.

To fulfill its objective, the system must meet the following requirements:

- The system will centralize the institution's research information through a CRIS.
- The system will generate user profiles for the simple and transparent management of the scientific and academic activity data of the university's researchers that contextualizes the scientific production with research groups and projects, complying with the current regulations for the protection of personal data in electronic support.
- The system will generate usage statistics, alerts, and key performance indicators related to the results of the scientific activity of organizational units of the institution.

To this end, the system will provide:

- Generate user profiles for data suppliers (the researcher and/or STI activist of the departments) and data controllers (specialists in processing, analysis, and information management of the university library).

- Download a copy of the researcher's curriculum vitae.
- Access the researcher's publications hosted in the Institutional Repository or in the institutional journal in which it was published.
- Notify the head of area about modifications in the researcher's profile.
- Set up a project profile with a description of the project, its members, and research outputs (scientific publications, event papers, or others).
- Generate reports on the performance of scientific activity in organizational units.
- Search the platform by researcher profile, organizational units, and lines of research.
- Notify the user when he/she is inactive in the system for a prolonged period of time and/or has pending notifications.
- Provide help to the user in case of eventualities, doubts, or failures in the system.

Content requirements:

- The system will provide information about researchers through a researcher profile where the following elements are recorded: first and last name, photo, position, affiliation, skills, faculty, department, teaching category, whether they are authors or co-authors of publications, and scientific publications.
- Information about research projects will be provided through a project profile with information on participants, duration, results, type of project, and source of funding.

- The institutional work in STI will be addressed: its university publishing house, software registrations, awards, R&D services and products, organizational forms that dynamize the interface, highly relevant scientific publications, visibility of the university in international rankings, and social impact of scientific activity.
- The policies of use established for the Institutional Repository (http://ninive.ismm.edu.cu/page/about) and the URI assigned to each publication in it as its persistent identifier will be respected.
- It will be accompanied by a policy aimed at facilitating access, retrieval, reuse, and interoperability of information in accordance with standards and protocols consistent with the international, national, and institutional framework for objects of R&D interest.

Technological requirements:

- The system will be implemented in accordance with the technological infrastructure available in the organization that enables frequent maintenance of the software and its availability on the local network.
- The system will allow the interoperability and reuse of data on R&D objects among the software platforms of the institutional context where information on scientific activity is collected through internationally accepted data model standards.
- The system shall be able to perform data extraction, transfer, and upload from manual collection of researcher-provided data and automated and controlled data transfer from relevant internal and external systems.

- The system will implement a control for the access and processing of information from the registration in the platform with the institutional e-mail account.
- The user interface will be designed in accordance with the university's visual identity manual in a responsive manner and will be implemented on a Web browser.
- The system will automatically generate backup copies of the information.

For all of the above, the following are considered as components of the system:

- Information provider sources: the curriculum vitae, annual results plan of the researchers, and the information currently collected in the software platform of the Institutional Repository and the university digital publishing house.
- Tools and resources for information processing and management: the open access software platform for the CRIS, persistent identifiers for authors and scientific publications, and the institutional policy that establishes a model of interoperability between information subsystems and modes of action for the management of such information.
- Target sources of information: personal sources (stakeholders) and others, such as the Institutional Repository, bibliographic resources and external datasets, national CRIS, and the Internet.

4. CONCLUSIONS

Current research information systems allow the global and efficient management of processes related to the

institutional management of research in universities. The understanding of the organizational context of information management in this process, the elicitation of requirements, and identification of the components of an institutional CRIS, in this case, for the UMoa, constitute the starting point for the design of these systems from a user-centered perspective.

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Female presence in heritage documents: A bibliometric analysis of the booklets of the Coronado Collection

Gretel Alvarez Ledesma
Central University "Marta Abreu" of Las Villas, Cuba.
Email: gretela@uclv.cu,
ORCID: https://orcid.org/0000-0001-8152-3310

María Josefa Peralta González
Central University "Marta Abreu" of Las Villas, Cuba.
Email: mjosefa@uclv.edu.cu,
ORCID: https://orcid.org/0000-0002-5188-2328

ABSTRACT
The role of women in the literature of the past is a subject little studied in the Coronado Collection. The description of the pamphlet collection is presented from a gender bibliometric perspective. It is based on a predominantly quantitative approach, using documentary analysis and the bibliometric method as the main research method. It applies bibliometric indicators focused on gender from authorship, subject matter, and title. It shows that the Coronado Collection is characterized by male predominance in most of its variables and reflects female discrimination in a high percentage of the works that compose it.

Keywords: Coronado Collection, bibliometric study, brochures, genre

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1. INTRODUCTION

Gender studies are recognized as a branch of the social sciences that analyzes the social and cultural reality of both sexes. Gender is seen as a "historical and sociocultural construction that assigns roles, identities, values and symbolic productions to men and women, incorporated into them through the processes of socialization" (González Pagés, 2010, p. 9). These studies analyze aspects related to human behavior, social relations, sexual differentiation, feminism, masculinity, and other topics.

Gender has been the subject of analysis within a variety of sciences, but undoubtedly, where it has developed the most is within social, humanistic, and cultural studies. In the last century, it has flourished as a perspective within more modern sciences. The large amount of information generated by these studies over the years, linked to scientific and technological development, has led to an increase in the scientific production of the subject within different research communities. Inevitably, it has been placed in the spotlight of the metric disciplines.

Gender-focused bibliometric studies aim to reflect the influence that gender difference has had on the way science is done. They expose the extent to which each gender favors research results. They evaluate the scientific activity of one gender or another in a given setting. They make it possible to determine the existence or not of gender equity in the scientific and research environment, an important aspect when establishing scientific policies.

The union of this method with gender studies makes it possible to analyze the behavior of gender within a documentary collection with a permanent link to history and with marked cultural characteristics, which facilitates the

description of a certain period or social-historical phenomenon. The Coronado Collection of the Central University "Marta Abreu" of Las Villas (UCLV) is conceived as a collection of rare and valuable documents. It was the personal library of the Cuban bibliophile Francisco de Paula Coronado.

It has documentation from the 15th century to the first half of the 20th century. It has a rich thematic variety, and the nationality of its origin is diverse. It has a wide variety of documents, including books, pamphlets, newspapers, magazines, manuscripts, photographs, maps, engravings, letters, and Coronado's personal stationery. Most of its copies have patrimonial value.

It has a collection of more than 8,000 pamphlets on different subjects, reflecting the politics, history, and culture of different countries over the years. The oldest ones are on religious subjects (sermons and ordinances), and almost, all of them are of Spanish origin. In addition, there are a large number of documents on law and history, representing the 16th and 17th centuries within this bibliographic repertoire.

With the introduction of the printing press in Cuba at the beginning of the 18th century, documentary production increased, and with it, the number of original pamphlets from the island. At this stage, the pamphlets, within the Coronado Collection, revolved around military subjects and those related to medicine and art. At the end of this century and the beginning of the next, the printing business boomed, and the publication of pamphlets took on an important role. The themes increased to prayers, novenas, and tariffs.

The 19th and 20th centuries are widely represented in this documentary repository. General topics such as laws,

regulations, resolutions, congresses' memoirs, memoirs of boards, memoirs of government colleges, memoirs of political activities, speeches, conferences, memoirs of funerary acts, and biographies, in addition to historical and literary topics, reflect a great number of branches of knowledge and dissimilar authors of national and international scope.

The Coronado Collection, in a general sense, has been studied from different angles. It has been the subject of research from sociocultural studies (Borges Machín, 2006), information sciences (Alvarez Ledesma, 2012), biology (González Alvarez, 2012), linguistics (Martínez González, 2013; Mederos Pérez, 2018), computer science (Díaz Valdivia, 2017), and other disciplines.

However, there is no previous research on the Coronado Collection to highlight the presence of women in its pamphlets. No studies have been carried out to identify the number of women authors, the literary production by specific periods, the relationship of the themes within the pamphlets, or their behavior seen from a gender perspective. In this sense, the objective is to analyze the pamphlets of the Coronado Collection from a gender bibliometric perspective.

The novelty of the study lies in the fact that it is the first investigation of the Coronado Collection booklets with a gender focus, which will increase their richness and social and cultural value. It is the first study that will result in the elaboration of a database with bibliometric characteristics of the brochures of the Coronado Collection, facilitating future metric and bibliographic research of greater depth.

2. METHODOLOGY

The research has a predominantly quantitative approach based on the Coronado Collection and analysis of data to

Table 1. Definition of gender bibliometric indicators.

INDICATORS	VARIABLE	CONCEPTUAL AND MATHEMATICAL DEFINITION
Number of documents (Ndoc)	Year	Number of works published. The indicator is calculated by year to represent the time frame covered by each fund. $$Ndoc = doc_1 + doc_2 + doc_n$$
Percentage of documents signed by men (%NdocM)	Author	Percentage representing the number of works carried out only by men. $$\%NdocM(i) = \frac{NdocM(i)}{\sum Ndoc} \cdot 100$$ where "NdocM" is the number of documents in which only men were involved.
Percentage of documents signed by women (%NdocF)	Author	Percentage representing the number of works carried out only by women. $$\%NdocF(i) = \frac{NdocF(i)}{\sum Ndoc} \cdot 100$$ where "NdocF" is the number of documents in which only women were involved.

(*Continued*)

Table 1. *Continued*

INDICATORS	VARIABLE	CONCEPTUAL AND MATHEMATICAL DEFINITION
Title gender in documents	Title	Genre of the titles of the works in the collection $$GT(i) = \frac{Ndoc(i)}{\sum Ndoc} \cdot 100$$
Concentration index (CI)	Author	It allows reflecting the percentage of individuals that present a certain study characteristic in relation to their sex group, or the intra-sex percentage, taking each sex separately as a reference. $$CI(F) = \frac{F(i)}{\sum F} CI(M) = \frac{M(i)}{\sum M}$$ where "*i*" is thematic genre.
Feminization index (FI)	Author	It allows calculating the representation of women with respect to men in a given category. $$FI = \frac{F(i)}{M(i)}$$ where, if FI < 1, there is an underrepresentation of women; if FI > 1, there is a situation of feminization; and if FI = 1, there is equity.
Occurrence of gender issues	Title	Word map in the title of the documents of the analyzed funds of the crowned collection.

Source: Own elaboration.

solve the research problem. It is classified as descriptive, non-experimental, and longitudinal. Data on several variables and dimensions of gender in the Coronado Collection are collected, characterized, and evaluated. The variable is manipulated intentionally, and its behavior is observed in its natural context. The behavior and evolution of the genus is studied over time.

The definition of bibliometric indicators (Table 1) was based on the consultation of antecedents identified in the study (Cuellar Santos-Suárez, 2015; Martí-Lahera, 2011; Rodríguez Zerqueraz, 2017; Sánchez Bueno, 2014). The results of the measurement are analyzed by variables, taking into account the characteristics of the documentary collection for which it is measured. This stage defines the representation of the results.

3. RESULTS AND DISCUSSION

In the analysis, we worked with three specific variables: year, author, and title. The year variable was taken from the date of publication of the documents, the author variable from the person responsible for the creation of a work, and the title variable from the name assigned to each material. The year variable made it possible to measure the level of publication by period within the Coronado Collection and to determine the years of greatest productivity. In the case of authors, the genre of the authors was identified, and the most productive were determined.

In the title, the genre was established, and the subjects addressed in the works were identified, with the aim of constructing a word map based on their occurrence in the title. To determine the genre of the title, two categories were used: nominal title (including the proper name of a person or thing in the syntagm) and operational title (not

including the proper name of a person or thing in the syntagm). Only in the case of nominal titles was it possible to identify gender. In this way, the declared indicators were analyzed and measured:

3.1. Number of Brochures Per Year

This indicator makes it possible to quantify the number of documents published in each year and to represent the time frame covered by the selected sample. Due to the wide temporal dispersion, the dates were grouped by centuries, and within each century, they were concentrated by decades, for a better examination and representation of the data. The analyzed pamphlets gather a total of 366 materials, in correspondence with the calculated sample. Figure 1 shows their temporal distribution.

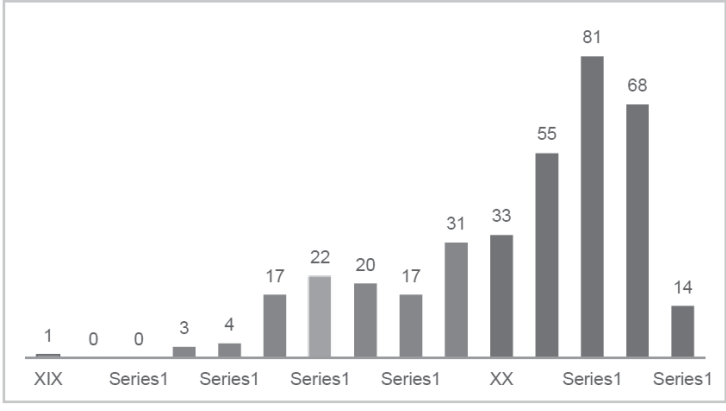

Figure 1. Representation of brochures by year. Source: Prepared by the authors.

The graph shows that the publication of pamphlets corresponds to the 19th and 20th centuries. This data corroborate the process of evolution of printing in Cuba,

from its appearance in the 18th century until it was consolidated in the second half of the 19th century. The first Cuban printings responded to official orders, and most of the works were privileged by government companies. It was not until the end of the 18th century that this sector began to expand, and little by little, there were printers all over the island. Already in the 19th century, the publishing business could be considered a stable business.

This century was also marked by the revolutionary boom of the sugar industry in Cuba, which was linked to a great cultural exchange with other countries. These factors had an impact on the island's publishing boom in the second half of the century. The graph shows how the greatest concentration of documents from this period is found from the 1950s onwards. Of the 115 pamphlets belonging to this stage, 107 were published after 1950, which represents 93% of the documents corresponding to the 19th century.

As can be seen in the graph, the highest concentration of pamphlets is found in the 20th century. Of the 366 materials analyzed, 251 belong to that period, which represents 69% of the sample. At that time, the division of labor had already been established in the printing press, with the owner, printer, press operator, typesetter, and typographer. The trade had already been established with the typical characteristics of Cuban printing, and the mechanical press had already been introduced.

During this period, the Coronado Collection includes biographical works, speeches, lectures, essays, letters, short stories, novels, historical writings, poetries, and other subjects. It is important to point out the decade from 1920 to 1929 for its representativeness within the

documentary collection. This period is represented by 81 pamphlets, 32% of the works of the 20th century, and 22% of the total materials in the sample. This increase is related to the fact that it was during this period that Francisco de Paula Coronado became director of the National Library. This is also due to the large number of biographies, including that of Coronado himself.

3.2. Percentage of Brochures Signed by Men

This indicator makes it possible to calculate the presence of the male gender in the authorship of the pamphlets. It also makes it possible to identify the most productive authors within this typology of documents. Out of a total of 366 documents, 273 were signed by men; this represents 74% of the sample studied. Once again, the dominant presence of the male gender in the authors of the works can be seen. This indicator continues to be a reflection of the patriarchal society of the time in which the materials were published.

Table 2 shows the most productive authors within the male gender. Nine authors were identified with 69 pamphlets, which represents 25% of the total number of works signed by men. The author with the highest number of pamphlets is Carlos Marx, with 15 documents, representing 5% of male authorship. He is followed by Diego Vicente Tejera García with 12, Alfredo Miguel Aguayo with 10, José Manuel Carbonell and Tomás Vicente Coronado Interián with 7, José María Chacón y Calvo and José Manuel Cortina with 5, and Francisco González del Valle and Gonzalo Aróstegui with 4.

Table 2. Productivity of the male gender in the authorship of brochures.

AUTHOR	NUMBER OF DOCUMENTS
Karl Marx	15
Diego Vicente Tejera García	12
Alfredo Miguel Aguayo	10
José Manuel Carbonell	7
Tomás Vicente Coronado Interián	7
José María Chacón y Calvo	5
José Manuel Cortina	5
Francisco González del Valle	4
Gonzalo Aróstegui	4

Source: Own elaboration.

Karl Marx is a renowned German philosopher, intellectual, and politician, who is the father, along with Frederick Engels, of ideologies such as scientific socialism, modern communism, Marxism, and historical materialism. His work covers the fields of philosophy, economics, history, sociology, political science, and journalism. The Coronado Collection has several pamphlets of *Capital: Critique of Political Economy* in the form of notebooks, where the information of what would become one of his best-known works: Capital is collected.

Diego Vicente Tejera García was a Cuban patriot and defender of the poor and the oppressed, who was the founder of democratic socialism in Cuba and known as a poet, politician, and intellectual. He began studies in

medicine, law, philosophy, and agronomy and graduated with a Bachelor of Arts degree. His work was always linked to his political and revolutionary work. In the Coronado Collection, there are works of his authorship related to criminal matters. Among them, we can mention *Concepto de la comunidad de bienes* (1922), *El Hondo problema de la pena de muerte* (1927), *Responsabilidad penal en que incurren los imponedores de modas* (1928), and others.

Alfredo Miguel Aguayo, as explained above, was a Puerto Rican pedagogue, who lived in Cuba for many years and published numerous works related to pedagogy. Some of his pamphlets in the Coronado Collection are *La Pedagogía en las universidades* (1909), *Enseñanza de la lengua materna en la escuela elemental* (1910), *Desarrollo y educación del poder de observación* (1913), *El Método funcional en la educación* (1916), and *Como debe organizarse el cuerpo de instructores de una universidad, en interés de la enseñanza, la investigación y selección del profesorado* académico (1930).

3.3. Percentage of Brochures Signed by Women

This indicator makes it possible to calculate the presence of the female gender in the authorship of pamphlets. It also makes it possible to identify the most productive female authors within this type of document. There are 41 pamphlets written by women, which represent 11% of the total number of documents in the sample. This shows the inferiority of female authorship in the Coronado Collection. However, most of the works are identified in the 20th century. Of the 41 documents written by women, 33 were published after 1900, which represent 78% of the materials written by women.

The trend within this indicator persists in the low number of publications per female author. Table 3 shows

the general average distribution of works of one pamphlet per female author. Only two women with authorship in more than one document were identified. These are Dulce María Borrero de Luján and Domitila García de Coronado. With two pamphlets each, they represent 10% of the works of female authorship.

Table 3. Presence of gender in the title of the brochures.

GENDER IN TITLE	NUMBER OF DOCUMENTS
Unidentified	95
Female	74
Male	195
Female–male	2

Source: Own elaboration.

Dulce María Borrero de Luján was a Cuban poet, educator and defender of womens' rights. She was a member of the National Academy of Arts and Letters and served as Director of Culture of the Ministry of Education and founded the Bibliographic Association of Cuba. She is recognized for her varied conferences and speeches on artistic, literary, and pedagogical topics. The Coronado Collection includes her works *La Poesía a través del color* (1912) and *Dos discursos: El magisterio y el porvenir de Cuba, la fiesta intelectual de la mujer, su actual significado y su misión ulterior* (1935).

Domitila García de Coronado was a Cuban writer, editor, and professor, who was considered the first woman to practice journalism in Cuba. She founded the Academia de Mujeres Tipógrafas (Academy of Women Typographers) and played an important role in the editing and publication of newspapers and magazines such as La Antorcha,

El Cérifo, and La Mujer. In the Coronado Collection appear her works *Método de lectura y breves nociones de instrucción primaria elemental* (1906) and *Breves nociones para aprender el arte tipográfico con facilidad* (1911). The study identifies other authors, including Mirta Aguirre, Gertrudis Gómez de Avellaneda, Luisa Pérez de Zambrana, and Consuelo Álvarez, who are of great value in the history and culture of Cuba.

3.4. Brochure Title Genre

This indicator makes it possible to determine the presence of the female or male gender within the syntagmatic structure of the title of the brochures. Out of a total of 366 documents in the sample, it was possible to identify the gender in 271 materials, which have a nominal title. As Figure 2 shows, there are 74 works with female presence in their title, representing 27%; 195 titles have male presence, for 72%; and two have both female and male presence, for 1%.

The predominance of the male gender in the title of the documents is evident. This superiority is marked by the existence of a large number of biographies of important personalities for Cuban history and culture. Such is the case of Cristóbal Colón, Julián del Casal, Tomás Estrada Palma, Quintín Bandera, Miguel Jerónimo Gutiérrez, Carlos Manuel de Céspedes, Bartolomé Masó, Lázaro Cárdenas, Ignacio Agramontes, Guillermo Moncada, Gerardo Machado, Máximo Gómez, and others. There are also numerous historical writings related to events and outstanding figures in the history of Cuba and Latin America, such as Félix Varela, José Antonio Saco, Gabriel Terra, Porfirio Díaz, and so on.

Most of the pamphlets with a female presence in the title are literary writings, among which poetry and novels

stand out. Some of them are recognized worldwide, such as *The Lady of the Camellias* by Alexandre Dumas, *Miss Elena* by Ponson du Terrail, *The Heart of Eva* by Augusto Arias, and *Amalia Batista or The Last Danzón* by Álvaro de la Iglesia. Biographical writings can also be found, although not so predominantly. Among them, figures such as Santa Teresa de Jesús, Gertrudis Gómez de Avellaneda, Greta Garbo, Ana Bolena, Isabel I of Castile, and others, stand out.

In the case of the works with the presence of male and female gender in the title, there are two documents. One of them is the *Acta de Casamiento de María Cristina con D. Fernando Muñoz*, referring to the secret marriage between María Cristina Borbón (Queen consort of Spain from 1829 to 1833) and Agustín Fernando Muñoz y Sánches (Spanish military man). The other booklet is entitled *Plácido y Cristina Ayala: dissertación histótico-crítica* by author Carlos A. Cervantes in 1927. It is an analysis of the work of Gabriel de la Concepción Valdés (Plácido) and María Cristina Fragas (Cristina Ayala) as exponents of mulatto poetry and literary Criollismo in colonial Cuba.

3.5. Distribution Index in Brochures

This indicator allows us to calculate the difference between the two genders within the same category. In this case, the same time frame was used. It is measured by analyzing the authorship of both genders and comparing their behavior over time. The period from 1890 to 1939 was taken as the one with the highest documentary productivity within the selected sample, representing 65% of the total number of pamphlets. The period was grouped into decades for better analysis and data processing.

Figure 2 shows the superiority of the male gender throughout the time frame analyzed, which includes the five decades of greatest production. Out of a total of 239 pamphlets, there are 209 written by men, and 30 written by women. These indicators show a male distribution index of 0.87 against a female distribution index of 0.12. The decade from 1920 to 1929 stands out with a total of 74 documents, 31% of the period represented. Of these, 71 are signed by men and three by women, giving a male distribution index of 0.96 for this period and 0.35 for male authorship. This is the period with the highest male presence in the Coronado Collection.

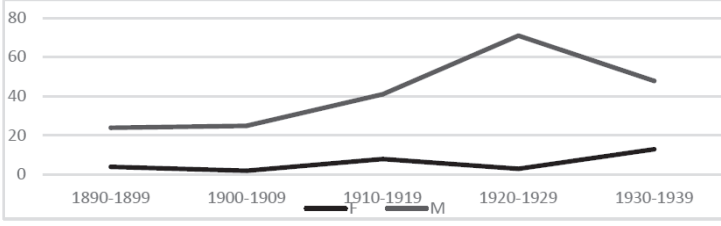

Figure 2. Temporal distribution of gender in the authorship of the brochures. Source: Own elaboration.

The graph shows the greater presence of female authorship in the decade from 1930 to 1939. Of the 61 pamphlets published in that period, 13 belong to women, which represents 21% of that period and 32% of the total number of works signed by women. This generates a female distribution index of 0.21, the highest of all the analyzed periods. Although it is still lower than the male distribution index, it reflects the evolution of women within the Coronado Collection and its correspondence with the changes in Cuban society in the 20th century. Among the works of this decade appear the authorship of Consuelo Álvarez,

Dulce María Borrero, Gertrudis Gómez de Avellaneda, and Luisa Pérez de Zambrana, classic defenders of women and their social rights.

3.6. Concentration Index in Brochures

This indicator makes it possible to calculate the percentage of individuals presenting a given study characteristic in relation to their sex group or the intra-sex percentage, taking each of the sexes separately as a reference. It was calculated on the basis of the topics addressed in the brochures. It made it possible to identify the gender with the highest representation within each of these topics, as well as to calculate the most frequently addressed topic within each gender.

Table 4 shows the nine most represented subjects within the Coronado Collection. Subjects contained in more than 10 works were taken. These include biographical works, conferences, law, speeches, history, literature, Marxism, medicine, and pedagogy. The most recurrent theme is biography with a total of 105 works, 29% of the sample studied. In this subject, 95 documents are signed by men and 10 by women. This marker generates a male concentration index (CI) of 0.35 and a female CI of 0.24.

Table 4. Themes most represented in the brochures according to gender.

SUBJECT	NUMBER OF DOCUMENTS	WOMEN	MEN
Biography	105	10	95
Literature	74	19	55

(*Continued*)

Table 4. *Continued*

SUBJECT	NUMBER OF DOCUMENTS	WOMEN	MEN
History	20	0	20
Pedagogy	20	5	15
Law	17	0	17
Marxism	16	0	16
Speeches	14	1	13
Medicine	12	0	12
Conferences	11	0	11

Source: Own elaboration.

This theme coincides with the highest concentration of male authorship. Here, we find biographies of renowned personalities such as Christopher Columbus, Bolivar, Weyler, Torquemada, Goya, Da Vinci, Cirilo Villaverde, Heredia, Martí, Varona, Máximo Gómez, Guiteras, La Avellaneda, and others. Among the authors of these biographical works are Francisco de Paula Coronado, Manuel García Garófalo, Victor Hugo, Pastor del Río, Salvador Massip, Jorge Mañach, Francisco López Leiva, Rafael María de Labra, and others.

The subject with the highest concentration of women is literature. Of the 74 works on this subject, there are 19 signed by women, that is, 25% of this subject. This indicator gives a female CI of 0.46 out of the total number of documents with female authorship in the Coronado Collection. This subject includes short stories, novels, poetry, essays, rhymes, and operas. Here, aforementioned authors such as Gertrudis Gómez de Avellaneda, Luisa Pérez de Zambrana, and Dulce María Borrero stand out. In addition,

works signed by Luz Gay, Emilia Serrano (La Baronesa de Wilson), María Gómez Carbonell, and others appear.

3.7. Feminization Rate in Brochures

This indicator makes it possible to calculate the representation of women with respect to men in a given category. In this way, the existence of underrepresentation, feminization or gender equity can be determined. It is analyzed on the basis of the subject matter addressed in the brochures. A total of 24 topics were identified within this documentary typology. An analysis of the nine most frequently addressed subjects, shown in Table 3, reveals the underrepresentation of women in all of them.

A feminization index (FI) of 0.10 was obtained in biography, 0.34 in literature, 0.33 in pedagogy, 0.07 in speeches, and 0 in history, law, Marxism, medicine, and conferences. This behavior is maintained almost in the totality of the subjects. A different behavior was observed only in two subjects: language and typography. There are two brochures on language, one with male authorship and one with female authorship. This results in a FI equal to 1, which shows equity in this area. Typography is addressed in two materials, both signed by women, showing a situation of feminization.

Figure 3 shows the difference between the female and male genders in the most frequently addressed topics and in the topics where gender equity and feminization occur. The existence of underrepresentation of women in most of the topics is observed. However, the presence of women in this Coronado Collection should be highlighted as a reflection of the increasingly important position that women have been acquiring in society since the 20th century.

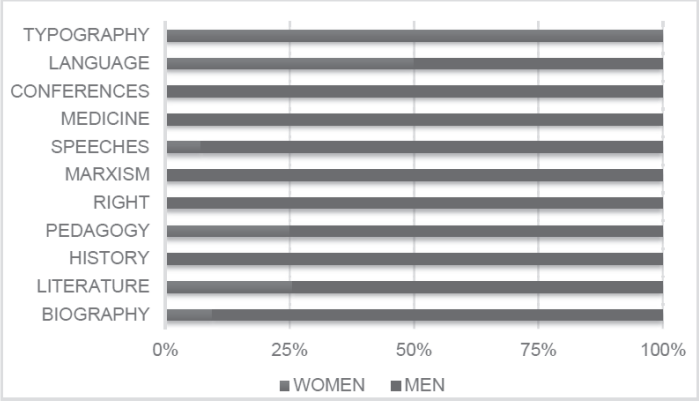

Figure 3. Female representation in the themes of the brochures. Source: Prepared by the authors.

3.8. Thematic Occurrence of Gender in Brochures

This indicator makes it possible to represent the occurrence of terms in the topics addressed in the brochures based on a map of words extracted from the title of the documents. Occurrence is taken as a synonym for frequency. The objective of this indicator is to visualize the words most frequently used in the titles of the copies analyzed. The starting point is the identification of those words related to the genre, then they are organized, and the map is constructed. A total of 110 documents were identified with the presence of the genre in their title, 30% of the books collected in the sample.

From the 110 titles, a total of 26 words related to one or the other gender could be extracted, as can be seen in in Table 5. Such is the case of women, mother, wife, daughter, feminism, ladies, maternity, they, widow, feminine, marquise, duchess, duenna, lady, miss, muse, actress, skirts, lady, and girl. Only seven words refer to the male gender:

men, father, husband, sir, pants, gentleman, and duke. As can be seen, the most used word is Mrs.

Table 5. Occurrence of gender in the title of the brochures.

WORDS	NUMBER OF DOCUMENTS	GENDER
MEN	6	M
WIDOW	1	F
DAUGHTER	4	F
FATHER	3	M
FEMALE	2	F
HUSBAND	1	M
MOTHER	2	F
MATERNITY	2	F
WOMEN	3	F
MARQUISE	1	F
WIFE	1	F
FEMINISM	2	F
DUCHESS	2	F
MRS	10	F
MISTER	5	M
MISS	5	F
MUSE	1	F
ACTRESS	1	F
SKIRTS	1	F
PANTS	1	M

WORDS	NUMBER OF DOCUMENTS	GENDER
GENTLEMAN	1	M
LADY	2	F
THEY	1	F
LADY	5	F
GIRLS	1	F
DUKE	1	M

Source: Own elaboration.

The word Mrs. has historically been used to refer to women of advanced age, married women, or as a sign of respect or courtesy in the presence of a title of nobility or social position. The use of the term in the title of brochures responds to the protocol of respect and politeness that is imposed when referring to outstanding figures of history or culture. Its repeated use, in this specific collection, is determined by the high number of biographies that make up the sample. As explained above, biographical works are the most common in this type of documents.

In this subject, it is common for the title of the document to contain the name of the person being discussed. As a tendency, the word "Mrs." is placed before the name of the woman. Examples of this are the titles "Biografía artística de la señora doña Elisa Villar Jurado de Volpini prima donna absoluta de los principales teatros de ambos mundos" (artistic biography of Mrs. Elisa Villar Jurado de Volpini prima donna absoluta of the main theaters of both worlds), "Mrs. Gertrudis Gómez de Avellaneda: biographical information on the occasion of a recent book," and "Escritos biográficos sobre Doña María de Padilla" (biographical writings on Mrs María de Padilla).

4. CONCLUSIONS

The application of the bibliometric indicators of gender in the pamphlet collection of the Coronado Collection allowed to verify that the documents are characterized by the predominance of the male gender and are a reflection of the female discrimination in their great majority. However, the existence of recognized figures of the female gender was demonstrated and highlighting the historical and social value of the Coronado Collection because of its imprint on Cuban culture and on the role of women in society.

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Innovative methodologies and ICT mediation: Challenges in the careers of the University of Managua

Helga Mercedes Navarro Canales
Universidad de Managua, Nicaragua.
Email: prof.helganavarro@udem.edu.ni

Pablo Emilio Hurtado Flores
Universidad de Managua, Nicaragua.
Email: prof.pablohurtado@udem.edu.ni

Alvin López Pulido
Universidad de Managua, Nicaragua.
Email: prof.alvinlopez@udem.edu.ni

ABSTRACT
Innovative methodologies for the teaching–learning process, making use of information and communication technology (ICT) in undergraduate courses at the University of Managua (UdeM), has focused on the design and development of relevant technological tools. The objective is to contribute to the design of relevant technological tools and didactic situations that facilitate the implementation of innovative learning and teaching methodologies at the UdeM and the development of skills from a transformative, integral, and permanent perspective for the achievement of quality in teacher training as a strategic teacher. The research assumes a qualitative approach, diagnosing the needs and challenges in the implementation of innovative methodologies by teachers in the teaching–learning process at the UdeM. The findings obtained have allowed the development of pertinent resources and didactic proposals, providing teachers with tools to improve the quality of training and promote active and meaningful learning of students. The main results were obtained. The paper is the result of a research project, which has contributed to the advancement of higher education through the effective integration of ICT in undergraduate courses at the UdeM, promoting transformation and continuous improvement in teaching.

Keywords: mediations, innovative methodologies, ICTs, University of Managua

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1. INTRODUCTION

Current university educational scenarios have become a motto whose mission is to prepare students to "learn to learn"; however, the results of recent educational research show that traditional approaches continue to prevail in the teaching process. This reality finds a higher level of impact in the methodological and pedagogical transformations that teaching has undergone, demanding to think of alternative ways to motivate students, to stimulate their creativity, increasing their participation in the training process as strategic learners.

The teaching role must be subject to a reconfiguration, striving for the dismissal of those practices that hinder learning and reflecting on those that depend on an innovative and socio-constructivist approach where it manages to transcend the scheme of rationality for creativity in teaching (Anijovich, 2019). The continuous pedagogical training to teachers should make them aware that to improve the formative process, it is not enough that teachers "only know about the subject of the subjects they teach" or use pedagogical strategies in a mechanical way; it is important that they know about the processes that are activated in the action of learning and teaching, as well as pedagogical

approaches that contribute to the understanding of a pedagogy of emotions (Benavidez & Flores, 2019).

In this sense, the University of Managua (UdeM) has great challenges: to assume a paradigm shift focused on learning, which represents a renewal of teaching practices, and a strengthening in their cognitive, metacognitive, and technological capabilities, from a humanistic and ethical function. Based on this postulate, they will be able to understand the analysis of learning strategies based on problems, debate, argumentation, cases, metacognition, mobile, electronic portfolios, service, authentic, and situated, which will be useful if they wish to reach social constructions of knowledge, design innovative learning situations, and towards the generation of new conclusions.

In the light of pedagogical theories, the continuous formation of learning by doing is intended. Traditionally, the methodology applied in teaching has been characterized by encyclopedism, the primacy of content, the passivity of the student, and the teacher as a simple transmitter of knowledge. Technological progress implies a change in which today's knowledge will be obsolete in a few years since students do not need repetitive knowledge, but to learn to solve problems, reason about new situations, and be able to adapt to changes (Monereo, 2018).

The understanding of learning and teaching strategies from this perspective implies for the UdeM, rescuing the integral and contradictory, never linear nature of learning, as well as, the questioning of psycho-pedagogical problems with an ethical, innovative, and creative attitude. For this, it is of interest that teachers know some of the most important methodologies of today, which explain how to develop innovative formative situations and the fundamental and mediating role of culture and others, to enrich

the cognitive and affective structures, therefore, stimulating the process of learning to learn (Montoya, 2018).

Consequently, the general objective is to contribute to the design of technological tools and relevant didactic situations, which facilitate the implementation of innovative learning and teaching methodologies at the UdeM and the development of skills from a transformative, comprehensive, and permanent perspective for the achievement of quality in teacher training as a strategic teacher.

2. METHODOLOGY

The qualitative paradigm is assumed in this study, which becomes an interpretative proposal that is oriented to describe and interpret the phenomena in their natural context, in their history, to achieve a detailed and deep representation of the dynamic and global behavior of the teacher training processes.

Throughout the research process, it is a condition to assume the integration of the meanings and meanings contributed by the people who participate in the implementation of innovative learning and teaching methodologies at the UdeM, and the interpretations made by the researchers, and to return the results to them for decision making.

The methodology to be used is exploratory, descriptive, and explanatory from the research point of view. The intervention strategy to be used is diagnostic stage, foundation and design, and application and evaluation, as a result of continuous training, postgraduate studies, and teaching supervisions.

The UdeM is intentionally selected as the context. The unit of analysis is selected intentionally, being the teaching management. In the exploratory study, a sampling by maximum variety (66.6%) was selected. During the intervention

process, 15 professors are purposively selected, among them career coordinators and supervisors, in addition to a sampling by key informants (Academic Vice Rector, teaching director, research director, and postgraduate).

The empirical methods and techniques used were document analysis, participant observation, qualitative interview, and focus group discussion.

3. RESULTS AND DISCUSSION

The results of the diagnosis intended to propose didactic and investigative actions, mediated by training (course and diploma) to teachers, and supported by participant observation and discussion group.

From the training to supervisors "didactics in supervision," as a first diagnostic phase and supervision to teachers, accompanying the supervisors themselves, in May 2019, the following regularities emerged from the diagnosis and aided by participant observation and formative survey in training and supervision.

Taking into account the comparison between the current state and the desired state, resulting from the methodological triangulation, with emphasis on participant observation, the following potentialities and weaknesses are declared:

- Potentialities: teachers are aware of the supervision of class, and they manage to reveal the professional link with the subject, aided by professional problems, practical cases, situations of daily and working life, adequate theoretical preparation, adequate use of teaching means, promotion of values for the achievement of learning for life, practice of empathy, and affordability of the content.

- Weaknesses to be improved in class: exemplification of concepts to achieve better understanding, empowerment of self-learning through the educational platform, linkage of the content with the profession, use of innovative strategies for learning to learn, didactic sequence focused on the development of the class, traditional didactic planning, continuous motivation towards the class, teamwork, and predominance of the explanatory method in class.

Based on the regularities of the diagnosis and the need to obtain a more accurate representation of reality, it was decided to train teachers in two moments: a course in 2019 "Innovative Didactics in Higher Education" and a diploma course in 2020 "Didactic Planning in Higher Education."

With the application of the motivation survey, focus group, participant observation, and semi-structured group interview with teachers, the following results were obtained:

- Potentialities resulting from the course and diploma course: dialogue, reflections from experiential practice, alternative formats of self-learning guides for the most effective use of the educational platform in practice and the incentive of learning to learn in students and teachers as strategic teachers, design of various innovative teaching resources (infographics, mind maps, game-based learning, projects, challenges, experiential, professional cases, educational videos, and others) with their corresponding worksheets, use of learning evaluation rubrics to improve learning, syllabi based on innovative methodologies for learning to learn and their

practical visualization with a group of students at the science fair, as well as, the publication of an article in the *Journal Ensayos Pedagógicos*, a monograph in Editorial Feijoo, and three events in international congresses.

- Aspects to be improved: more dynamic use of the platform to promote autonomous learning in students from the self-learning activity, various alternatives to promote formative evaluation, the need to transfer the paradigm focused on teaching to the paradigm focused on learning and familiarization with the publication of scientific articles, writing of monographic materials, and participation in events, based on the results of educational practice.

4. CONCLUSIONS

The application of methodological tools to implement teaching–learning strategies in the formative process of higher education, with emphasis on innovation, oriented towards the approaches of interactivity and creativity, aided by the platform created for this purpose at the UdeM, innovative methodologies, didactic planning and the creation of learning spaces, as well as strategies and techniques for the development of learning to learn.

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Model for the evaluation of metadata quality: Proposal for open science management in Cuba

Lisandra Díaz de la Paz
Universidad Central "Marta Abreu" de Las Villas, Cuba.
Email: ldp@uclv.edu.cu

Alberto Taboada Crispí
Universidad Central "Marta Abreu" de Las Villas, Cuba.
Email: ataboada@uclv.edu.cu

Amed Abel Leiva Mederos
Universidad Central "Marta Abreu" de Las Villas, Cuba.
Email: amed@uclv.edu.cu

ABSTRACT

The evaluation of metadata quality is of vital importance in the management of open science (OS) in Cuba. In the metadata used in open-access computational systems, unresolved quality problems such as incompleteness of records, ambiguous author names, null values, inconsistency in the use of data exchange formats, and the non-adoption of procedures for metadata quality management are detected. Therefore, this paper proposes a model for the evaluation of metadata quality associated with the management of OS in Cuba. This model is constituted by four stages. Stage 1 refers to the measurement of the identified quality dimensions. Stage 2 corresponds to data cleaning and standardization. Stage 3 corresponds to data integration. Stage 4 deals with data disambiguation based on open access criteria and standards. As a result, completeness at the record level and accuracy at the author name level were identified as the main dimensions of quality. Possible duplicate elements were detected for subsequent integration. A case study is presented with two variant solutions, one for grouping synonymous author names and the other for disambiguating synonymous and homonymous author names, thus, laying the foundations for the interoperability of computational systems.

Keywords: metadata quality, open science, disambiguation of author names, data integration, data cleansing

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1. INTRODUCTION

In Project 3, called "Information and Communication Technologies (ICT) in support of educational processes and knowledge management in higher education (ELINF)," a set of actions are being carried out to achieve interoperability among the main open source computer systems: the teaching-learning platform Moodle, which works with learning object metadata; the system for the Automation of Libraries and Documentation Centers (ABCD), whose cataloging module works with metadata using the MARC 21 format (in transit to resource description and access); the institutional repository DSpace, which works with Dublin Core metadata; and the VIVO system for research data management that uses the ontology web language and resource description framework for the management of its internal ontology. The main objective of the project is to form a network where actors in Cuban education and research can search for virtual services needed for their professional tasks, access information for scientific research, and exchange publications and data by working together in an integrated environment that supports open science (OS; Goovaerts et al., 2016). As indicated by FOSTER (2018) and echoed by Meneses-Placeres et al.

(2022), OS includes open access, open research data, open peer review, and OS policies, which are complemented by other more concrete components such as open research practices, reproducible research, open source software, and open licenses. OS complies with the FAIR (Findable, Accessible, Interoperable, and Reusable) principles; for these reasons, the computer systems used in this context must comply with these principles, and for this purpose, metadata formats are used that allow communication and interoperability between them.

In the metadata used in these open-access computer systems, unresolved quality problems such as incompleteness of records, ambiguous author names, null values, inconsistency in the use of data exchange formats, and the non-adoption of procedures for metadata quality management are detected. Therefore, it is of vital importance that the data involved are of adequate quality to be able to interoperate and that the searches performed on them provide relevant information that allows successful information retrieval.

2. METHODOLOGY

As part of the 3 ELINF project, a set of actions are being carried out to achieve interoperability among the main computer systems used in the cataloging of bibliographic records, in the teaching-learning process, and in the institutional repositories of six entities in the country. These entities are the University of Pinar del Río (UPR), the University of Informatics Sciences (UCI), the Central University "Marta Abreu" of Las Villas (UCLV), the University of Camagüey (UC), the University of Holguín (UHO), and the University of Oriente (UO). This paper proposes a model for the evaluation of metadata quality associated

with OS management in Cuba, consisting of four stages. The first stage refers to the measurement of the identified quality dimensions. The second stage corresponds to data cleaning and standardization. The third stage concerns data integration. The fourth stage deals with data disambiguation based on open access criteria and standards, as shown in Figure 1.

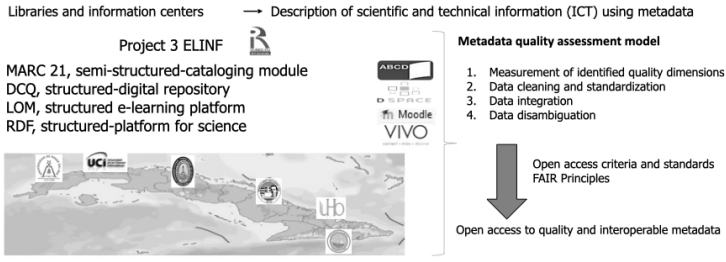

Figure 1. Model for the evaluation of metadata quality in OS management in Cuba.

2.1. Measurement of Identified Quality Dimensions

In the measurement process, the quality dimensions affected by problems identified in the status reconstruction phase and their corresponding metrics should be selected. The measurement is used to establish references, with the purpose of enabling a quality diagnosis (Batini et al., 2009; Batini & Scannapieco, 2016). To perform quality measurement, it is necessary, once the dimensions of interest have been identified, to use metrics that best fit them, as these indicate the degree of quality that the metadata possess.

Data are described through multiple dimensions that are usually grouped into frameworks. These dimensions vary from one framework to another depending on

Table 1. Main metadata quality dimensions identified.

DIMENSION	DEFINITION IN THE CONTEXT OF METADATA	METRICS
Completeness	Extent to which metadata records store all the information necessary to have a global representation of the described object.	$Q_{comp} = \frac{\sum_{i=1}^{N} P(i)}{N} (1)$ $Q_{wcomp} = \frac{\sum_{i=1}^{N} a_i \times P(i)}{\sum_{i=1}^{N} a_i} (2)$
Accuracy	The degree to which the metadata values are "correct" and describe the actual object is defined as a measure of the proximity of a data value *v* to some other value *v'*, which is considered correct.	Syntactic accuracy: $1 - \frac{\sqrt{\sum_{i=1}^{n} d(campo_i)^2}}{\sum_{i=1}^{n} d(campo_i)} (3)$ Semantic accuracy: $\frac{\sum_{i=1}^{N} tf1vector_i * tf2vector_i}{\sqrt{\sum_{i=1}^{N} tf1vector_i^2 * \sum_{i=1}^{N} tf2vector_i^2}} (4)$

the context of analysis of the dimensions (Moges et al., 2013). Bruce and Hillmann's (2004) framework presents seven domain-independent dimensions for the purpose of improving its applicability. These dimensions are completeness (Comp), accuracy (Exac), logical consistency and coherence (CLCo), timeliness (Opor), conformance to expectations (CoEx), accessibility (Acce), and provenance (Proc). In Díaz de la Paz et al. (2021), correspondence between these seven dimensions and several metadata quality frameworks is established for the period from 2009 to 2019. Figure 2 shows that completeness, accuracy, logical consistency, and coherence are the most analyzed, and among them, completeness is present in all the frameworks reviewed.

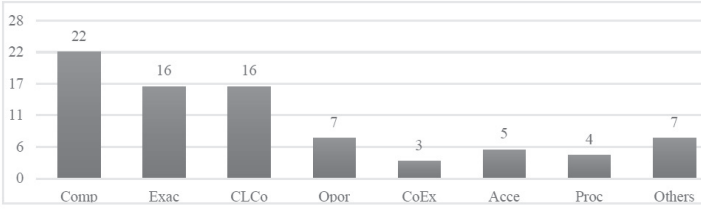

Figure 2. Usability of Bruce and Hillman's dimensions in other frameworks. Source: Based on Díaz de la Paz et al. (2021).

Table 1 shows the main dimensions identified in the context of the 3 ELINF project and the metrics used to assess the quality of metadata in the computational systems involved. The metrics are taken from Ochoa and Duval (2011, 2006).

2.2. Data Cleaning and Standardization

Data cleaning and standardization refers to the correction in the data of possible errors, for example, incomplete data,

duplicates, inconsistent formats in terms of description, abbreviations and units of measurement, missing input data, or data that violate the integrity constraints of the system. The cleaning stage is one of the most important, as it ensures the quality of the data. At this stage, anomalies detected in the data integration process should be corrected. Data anomalies can be classified into syntactic anomalies, semantic anomalies, and context anomalies (López Porrero, 2011).

- Syntactic anomalies: These anomalies refer to lexical errors, formatting and domain errors, and non-standardization of information.
- Semantic anomalies: These anomalies include violations in row integrity constraints, contradictions in data values that violate some kind of dependency between them, and duplicate rows and invalid rows.
- Context anomalies: These anomalies include missing data values in rows or missing complete rows that exist in the mini-world and have not been represented.

The problems present in a single source are compounded when you need to integrate data from multiple sources. Each source may contain erroneous data, and data may have different representations in each source or be represented in one or the other in a contradictory way or mixed with other data because the sources are created, developed, and maintained independently and for very specific purposes. This increases the level of heterogeneity in the database management systems, data models, and data source designs used.

2.3. Data Integration

Data integration refers to the process of combining data from different heterogeneous sources with each other

in order to provide the user with a unified view of the data that is clean, free of anomalies, and of the required quality.

Data integration is a non-trivial, multi-faceted, and, in many cases, autonomously impossible process. There are several heterogeneity conflicts which need to be addressed by a possible solution:

- Syntactic heterogeneity: The language used in the two sources may differ even if they are semantically identical. For example, in one source, you can have students and in the other pupils.
- Structural heterogeneity: The types and structure of the data may also vary. For example, the salary can be represented as a dollar value in a single table or have a reference to the identifier of a pay scale stored in a different table.
- Representational heterogeneity: Different sources may implement different models for their data, different levels of normalization may appear, and data represented as a single element may exist in multiple elements in another source.
- Semantic heterogeneity: The opposite of syntactic problems, where two semantically different objects are referred to in the same way.

These are some of the fundamental problems of all forms of data integration. Data integration provides a mechanism for joining data from different sources into a single schema. Integration takes place in two stages:

- Homogenization: Transformation of the information from the original format of the natural sources to the

format and data model of the target system takes place in this stage.

- Integration: The retrieved information is aggregated and organized into the target system.

2.4. Data Disambiguation

The disambiguation of data with textual information such as names of persons, institutions, words, and so on is an open problem of natural language processing, which includes the identification of when that data in question present polysemy (multiple meanings), and it is desired to match each data in the correct context.

There are dissimilar approaches to address this problem. In Díaz-de-la-Paz et al. (2022), a framework is presented that combines an ontological approach with deep-learning techniques for personal author name disambiguation based on the gold-standard LAGOS-AND dataset (Zhang et al., 2021). One of the fundamental steps at this stage is duplicate item detection and removal. There is a direct proportionality between metadata quality assessment and OS management; the higher the metadata quality, the greater the success of retrieving disambiguated and interoperable data in the context of OS in Cuba.

3. RESULTS AND DISCUSSION

One of the case studies where metadata quality is evaluated is the cataloging module of the ABCD suite, for which two databases are used; one extracted from the UCLV catalog (BD_UCLV) and the other from the UCI catalog (BD_UCI), with 18,745 and 13,807 records, respectively, collected at the end of 2016. The "MARCQuality" tool

is used to issue a quality criterion for these datasets. Figure 3 shows the fields cataloged in each bibliographic record, organized from lowest to highest according to their label, and calculates the completeness as expressed in metric 2 of Table 1, using the particle swarm-based optimization method described in Díaz de la Paz et al. (2021).

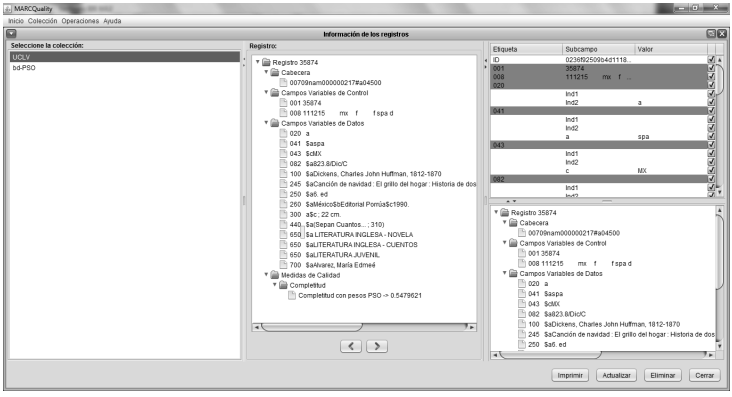

Figure 3. Bibliographic record belonging to the BD_UCLV collection.

Then, the possible duplicated elements are listed, and two options to mark are observed; one is the "Main" record (which is marked by default according to the completeness values calculated but can be changed by the specialist), and the other is the "Select" option to mark those records to be integrated. The integrated record is displayed in the right pane once the conflicts detected during the merging are resolved. If there are no conflicts between the records or if they could be solved automatically, the integrated record is displayed in the right panel. Otherwise, a dialog box is displayed to ask the user how to proceed in cases where there is a conflict (see Figure 4).

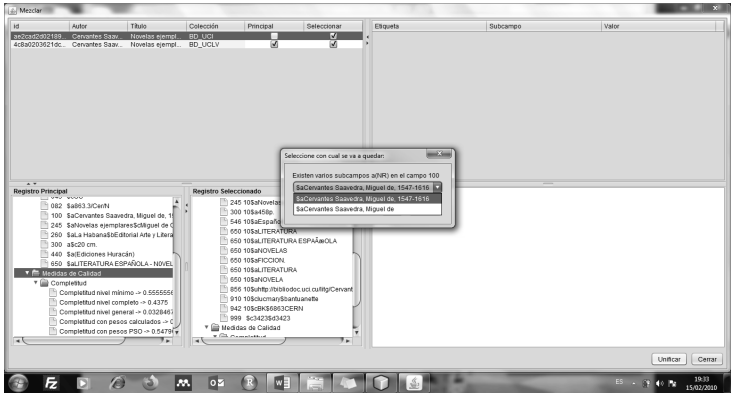

Figure 4. Resolution of conflicts detected during the data integration process.

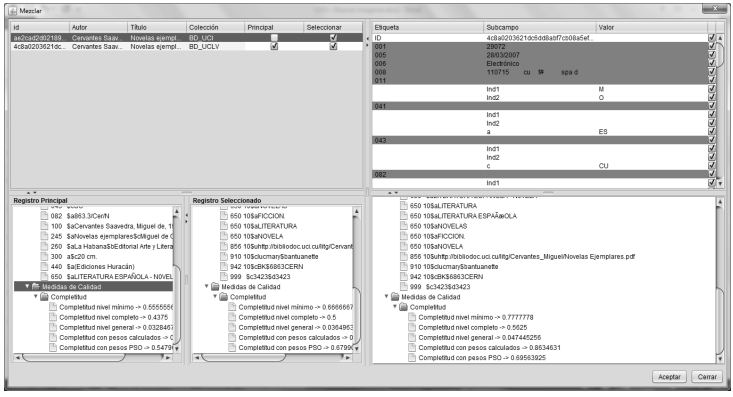

Figure 5. Example of an integrated record when resolving conflicts.

When the integration is performed, the resulting record has a completeness value equal to or higher than the highest completeness value of the separate records. Figure 5 shows that the completeness criterion of the record marked as the main record is 0.5479, that of the selected record is 0.6799, and that obtained by integrating the records is approximately 0.6956. Therefore, its quality is improved in

terms of the completeness dimension. These changes can be made persistent in the corresponding collection if the specialist desires to do so.

Another functionality provided by the MARCQuality tool is the standardization of synonymous author names in the "Standardize authors" option. Figure 6 shows a list of authors and co-authors grouped according to the unsupervised grouping method based on DBSCAN density.

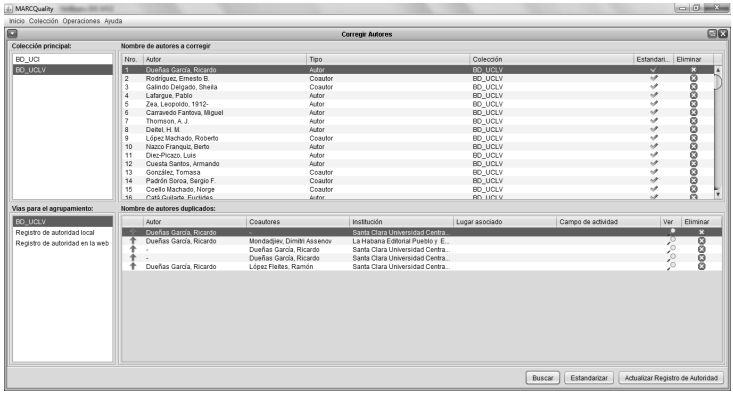

Figure 6. List of authors and co-authors with their possible name variants.

To disambiguate the names of homonymous authors (names that are spelled the same but represent different persons), the hybrid framework proposed by the authors of this paper (Díaz-de-la-Paz et al., 2022), inspired by the method presented in Zhang et al. (2021), is used. Rules and queries that increase the semantic rigor in the construction of the weighted co-authorship network are added to this proposal. This framework combines the ontological approach with several deep-learning network models. For the validation of this framework, a comparison was performed with respect to different data portions of the

LAGOS-AND dataset; the hybrid approach obtains a good performance for gated recurrent unit (GRU), whose F1 and recall value improves by more than 9% and 17% to the MAG Author ID and Name Similarity datasets, respectively, noting that long short-term memory improves the accuracy value by 7%, as illustrated in Díaz-de-la-Paz et al. (2022). Therefore, in the present work, the hybrid solution of AND ontology and GRU deep neural network model is used, which shows the best results for personal author name disambiguation.

4. CONCLUSIONS

This paper proposed a model for the evaluation of the quality of metadata associated with OS management in Cuba. The most relevant quality dimensions to be addressed in this context were determined, as well as how to measure them. The proposal was evaluated in an instrumental case study, which allowed knowing the degree of completeness and accuracy present in the analyzed datasets; possible duplicated elements were detected for their subsequent integration. A case study was presented with two variants of the solution, one to group the names of synonymous authors and the other to disambiguate the names of authors with polysemy. This served as a basis for the interoperability of the computational systems.

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MOOCs in open education: Comparative studies, regularities, and recommendations for their design

Nancy Andreu Gómez
Universidad Central "Marta Abreu" de Las Villas, Cuba.
Email: nancya@uclv.cu,
ORCID: https://orcid.org/0000-0002-2577-1114

Maida Librada Bilbao Consuegra
Universidad Central "Marta Abreu" de Las Villas, Cuba.
Email: maidabc@uclv.cu,
ORCID: https://orcid.org/0000-0001-6137-3810

Carlos Javier Palacios Morales
Universidad Central "Marta Abreu" de Las Villas, Cuba.
Email: cpalacios@uclv.cu,
ORCID: https://orcid.org/0000-0002-1282-5507

ABSTRACT
Open education is a movement that is growing rapidly in today's world. Within this movement, the so-called open educational resources arise, an initiative to share, modify, or reuse everything that is produced in terms of learning. However, it has been the massive open online courses (MOOCs). Those resources have had more growth in recent years. A much-discussed problem in the international scientific community is the design of these courses, and there have been so many and diverse proposals that denote the need for the establishment of regularities for the methodological work in function of this process. The aim of this paper is to present the results of a small-scale comparative study on the didactic and technological design of these courses in a sample of 58 courses in four prestigious platforms (Coursera, MiríadaX, Udacity, and EdX). This is based on five parameters that serve as a basis for determining similarities and differences and establishing regularities that reveal certain trends. The comparative studies method was used, which proposes a system of methodological steps for its implementation accompanied by percentage analysis and measures of central tendency, such as mean and mode. The regularities obtained allowed a

critical and reflexive analysis from the Cuban pedagogical foundations that have allowed reorienting the methodological work in the design of MOOCs.

Keywords: massive open online courses, open education, distance education, comparative studies, open educational resources.

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1. INTRODUCTION

For Cuba, it is a priority objective to advance towards the process of digital transformation in all economic, political, and social spheres. Thus, higher education must redefine its processes and create a culture that allows fostering innovation, collaboration, and experimentation in the teaching–learning process based on the development of digital competencies in teachers as leading elements of this process.

For this reason, new models of virtual education are implemented, and open learning and distance education are promoted as alternatives that offer different opportunities to educators and provide greater flexibility in undergraduate and graduate studies (Aretio, 2021; Bailey et al., 2020; Soler-Pellicer et al., 2024).

Currently, the debates on the nature and characteristics of a new model of higher education that can be glimpsed

after the emergence of massive open online courses (MOOCs) have become extraordinarily relevant, first strongly and then critically. Interestingly, López Nicolás (2020) considers that the pandemic boosted telework in universities and companies around the world because, until now, only timidly evolved towards the adoption of these modalities.

It is for this and many other reasons that open education is increasingly advancing, and a large number of countries are now adopting it. It is not a new technology but a new philosophy of how to conceive education, that is, to conceive education as a public good and as a human right. The idea is that all human beings, regardless of where they live, their economic status, level of schooling, or age, can learn without access restrictions and free of charge. It is, therefore, an opportunity for the excluded, the disabled, the elderly, and ethnic minorities. Therefore, it is an appeal to the democratization of knowledge and educational inclusion.

That is why the maxim that sustains it is lifelong learning, expanding educational opportunities to different sectors, promoting openness in terms of access, and eliminating the barriers of traditional educational systems.

However, open education also presupposes sharing and distributing everything that is produced so that knowledge, means, tools, and learning objects can be used, modified, or redistributed by users. The goal is to provide everything we have done to improve education, and this is where the concept of open educational resources (OER), a term coined by UNESCO, comes in.

There is no single definition of OER that has been accepted globally. The term was first adopted by UNESCO in 2002, at the forum on the Impact of Open CourseWare

for Higher Education in Developing Countries, sponsored by the William and Flora Hewlett Foundation, an institution that awards large grants to educational and cultural institutions. They are defined as those resources for teaching, learning, and research that reside in a public domain site and that have been published under an intellectual property license that allows others to use them freely or for purposes other than those contemplated by their author (UNESCO, 2002, p. 17).

In this sense, the Creative Common (CC) license has become a global standard for the registration of open resources of any kind. It is a way to ensure that the author preserves some rights while releasing others. Especially, CCLearn is a division dedicated to enhancing the potential of the Internet to support open learning and OER. The key difference between OER and any other type of educational resource is its license (Santos-Hermosa, 2022, p. 13), in addition to important advantages that the author raises, such as:

- Accessibility: availability to be located and used.
- Interoperability: ease of adaptation and interconnection between different systems.
- Sustainability: correct functioning regardless of versions, software, and so on.
- Metadata: descriptions for indexing, storage, search, and retrieval.
- Granularity: single or composite units.
- Reusability: property to be modified.

The most frequent classification found within OER is that which divides them into educational content, tools, and implementation resources. However, MOOCs have had a greater growth in the last 10 years.

Studies show that teachers consider MOOCs valuable as teaching models in socio-educational contexts since they offer undoubted advantages, such as free use, training for disadvantaged groups, and time flexibility (Gómez-Galán et al., 2020). Several MOOC management platforms have emerged worldwide, offering an infinite number of courses related to different areas of knowledge. Some examples of platforms are Coursera, Udacity, EdX, MiríadaX, and others. Similarly, several higher education institutions have recognized the benefits of MOOCs and have proposed their own courses, which take advantages of modular and decentralized design, based on specific needs, and at the same time, dynamic and adaptable.

One of the current problems is the difference in criteria for MOOC design. It is complex to find in the multitude of research works on the subject and to determine regularities in them that allow to draw guidelines for the methodological work in the creation of these types of courses. Interesting experiences in the design of MOOCs stand out (Cirulli et al., 2017; Edel-Navarro et al., 2018; Gértrudix-Barrio et al., 2017; Oyo et al., 2017).

Several authors have created courses with recommendations for their implementation or design (Alhazzani, 2020; Arpaci et al., 2020; Cobos & Ruiz-Garcia, 2021; Doo et al., 2020; Gómez-Galán, et al., 2020; Julia & Marco, 2021; Lambert, 2020; Zulkifli et al., 2020). However, comparative studies for the determination of regularities in their design are very limited.

This paper addresses this important issue and, based on a comparative study of 58 MOOCs hosted on four internationally recognized platforms, determines regularities in the didactic and technological design of these courses. Based on the results obtained from the comparative study,

a reflective analysis is made from the traditions and theoretical positions defended by Cuban pedagogy.

2. METHODOLOGY

The essential method used in this work is the comparative study. Comparative studies occupy a very prominent place in the social sciences. This is not only because of the value of the descriptions, explanations, or interpretations of reality that can be made from them but also, especially in recent decades, because they have emerged as an input for the diagnosis of social problems and for the design of policies. At the same time, they also serve as a benchmark and a source of legitimacy (Piovani & Krawczyk, 2017, p. 11).

These studies involve the analysis and synthesis of the similarities, differences, and patterns of two or more cases that share a common approach or goal. In many academic settings, it is assigned the status of a scientific method for research activity and has been frequently employed in quantitative and qualitative research. The effectiveness of the method lies in the selection and definition of the objects and properties to be compared, as well as in the care and systematicity of the procedures of production and analysis of the data from which the comparisons are made (Marradi, 1991, p. 2).

The following methodological steps were taken into account:

- Selection of the process under analysis and identification of the objective of the study and the metrics that will be useful to achieve it.
- Selection of the sampling objects.
- Selection of the comparison parameters.
- Collection of the data.

- Analysis of similarities and differences.
- Determination of regularities and trends.
- Interpretation of the results.

Selection of the process to be analyzed and identification of the objective of the study and the metrics that will be useful to achieve it: It was determined that the object of analysis would be MOOCs in prestigious platforms such as MiríadaX, Udacity, EdX, and Coursera. These courses in different subjects would be taken and using comparison criteria in the qualitative order that could be subsequently quantified and processed using a percentage analysis accompanied by tables and graphs. The subjects of the MOOCs analyzed are diverse: social sciences (39.2%), humanities (21.4%), natural sciences (18.5%), exact sciences (4.8%), and technologies (16.1%).

Selection of sampling objects: A total of 58 MOOCs were sampled and distributed as follows: 14 courses on the EdX platform, 16 courses on the Coursera platform, 15 courses on MiríadaX, and 13 courses on Udacity.

Selection of comparison parameters: Taking into account that this is a small-scale study with the objective of focusing on the didactic and technological conception, the following comparison parameters were established:

- Average duration of the course.
- The way the lessons are organized.
- The way in which the content is presented.
- The way in which the content is evaluated and the relationship between the individual and social nature of the learning being evaluated.
- Technological resources used for advancement, restriction, collaboration, feedback, and others.

The steps of data collection, analysis of similarities and differences, determination of regularities and trends, and the interpretation of the data are presented below.

3. RESULTS AND DISCUSSION

After comparing the differences and similarities in each of the parameters, we proceeded to determine regularities that finally allowed us to establish trends. Regarding the duration of the courses sampled, there are two interesting elements. There is an oscillation of duration that varies between weeks and eight months in length. All the analyzed platforms contain MOOCs that have this variability. However, when calculating the average duration, an average of 3.7 months is obtained, and when calculating the mode, the most repeated value is MOOCs with a duration of three months, representing 57.2% of the total of the sampled courses.

When studying in each case, the way in which the lessons are organized, it was found that 36.2% are structured in modules subdivided by topics, 32.8% in weeks subdivided by topics, and 31.1% are structured directly in topics without using an organizational criterion of higher hierarchical level. As can be seen, there are no significant differences that, in this aspect, denote a predominant tendency.

In 93.2% of the courses, it was observed that there is a logic given by the existence of an introductory section with a welcome message, followed by the development of the content. The evaluation is located indistinctly, as a process for each of the topics in 88.2% of the courses, and 12.8% contain only a final evaluation.

The form in which the content is presented is variable; it can be seen that the information is mainly in video format (77.5%) and, to a lesser extent, in various documents

with a predominance of .pdf format (22.5%). In the courses sampled, no content was found in the form of electronic presentations (.pptx format). When analyzing this aspect, it was observed that these slide presentations were finally converted to documents in .pdf format, and most of them were shown in the videos.

It is significant as a regularity that in 67.2% of the videos found as sources of information, the teacher is observed imparting the content. This element is important to achieve the affective climate that a virtual teaching and learning process needs. Another aspect to be considered was the duration of the videos presented. As a regularity, it can be seen that the average length of the videos is 15–20 minutes.

According to studies carried out on the psychology of information processing and perception, memory, and attention, the overall average time of an online video should be 10–15 minutes for elementary school students and 20–25 minutes maximum for students at higher levels. These researchers have shown that after 10 minutes of visualization, attention rates decrease. In fact, research indicates that, for the most part, students will only watch the entire video for about 6 minutes.

The reasons for the success of video for e-learning are that it is an effective way to implement the explanatory-illustrative method and can help learners visualize abstract or complex topics easily. In fact, studies show that about 30% of the brain's total capacity is devoted to processing visual stimuli.

Many online courses observed are video-based but also include supplementary readings, graphics, written quizzes, tests, and exercises. This means that there needs to be a unity between one or more sources of information that can be supplemented and one or more sources of assessment.

The way in which the content is evaluated, although diverse, has invariants that typify MOOCs. The functions of evaluation do not change in online courses; likewise, evaluation must fulfill pedagogical, innovative, and control functions (Portela & Álvarez, 2010). From the point of view of the scope of the evaluation, it can be individual, group, pair, or team evaluation, analogous to that developed in face-to-face education.

In this study, we stopped to evaluate whether the evaluation fulfilled certain functions since this required the presence of specialists in the different areas of knowledge; for this reason, the analysis focused on determining regularities in terms of typology. Figure 1 shows that a total of 37 (63.7%) courses focused the evaluation on automatic grading questions, with multiple-choice and single-choice questions predominating over other typologies, out of the 58 MOOCs sampled. It is noteworthy that only nine (15.5%) courses used group evaluation, using discussion forums in different typologies. Co-assessment or peer assessment was present in eight (13.7%) courses and, in four MOOCs, team activities were revealed (6.9%). The integration between individual and group activities was present in 20 courses (34.5%).

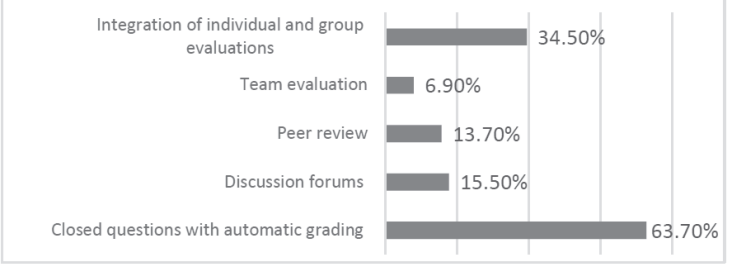

Figure 1. Predominant types of evaluations. Source: Own elaboration.

From the above analysis, it can be seen that despite the trend towards incorporating activities of a social nature in the evaluation process, there is still a predominance of activities that focus on the individual evaluation of the learner. In recent years, a considerable number of authors have worked on the basis of classifying MOOCs into two large groups: xMOOCs and cMOOCs. For these authors, cMOOCs are characterized by social learning and promote discussion and interaction ("c" refers to collaborative learning), while xMOOCs limit interaction to teacher and student and are generally evaluated by means of closed questions. Lately, the term tMOOC has also proliferated, referring to a hybrid model with the previous ones. Many other terms have appeared that obviate the nature of learning and make this phenomenon very complex.

We join the criterion of Castellanos et al. (2001) who state that learning continuously crystallizes the dialectic between the historical-social and the individual-personal. It is always an active process of reconstruction of culture and discovery of the personal meaning and vital significance that knowledge has for the subjects.

These theoretical positions are based on the historical-cultural theory of Vigotsky (1987). This theory is assumed by Cuban pedagogy and, among its foundations, states that learning implies the transition from the external to the internal, from the interpsychological to the intrapsychological, from the dependence of the subject to independence, and from external regulation to self-regulation. For this reason, the unity between the social and the individual is necessary.

The technological resources used in MOOCs were another parameter taken into account. There is a wide range of resources that can help learning and allow its analysis

(learning analytics), but we only stopped to explore some resources that are frequently used for the progressive advancement, restrictions, or completion of activity.

4. CONCLUSIONS

Up to now, we have not found a comparative study in theoretical reviews of updated sources. This is based on the establishment of regularities and trends and based on parameters such as the duration of the course, the way in which the lessons are organized, the way in which the content is presented, the way in which the content is evaluated, the relationship between the individual and social character of learning, as well as the technological resources used for the advancement, restriction, and completion of the activity.

Among the regularities observed was the average duration of most of the MOOCs analyzed, established in a period between three and four months, with courses lasting three months being the most appreciated. In the way in which the lessons are organized, a balance between courses that are structured in modules subdivided into topics and those that are organized by weeks and topics or those that are structured only in topics is observed as a regularity.

As a significant regularity, the predominance of video over other sources of information to present the content stands out, which is due to the advantages of using this medium to explain and illustrate phenomena, processes, or learning objects in a more effective way and to present abstract or complex content that requires the use of moving images.

Although it has been investigated that there is a tendency in MOOCs to increase the number of courses that opt for collaborative evaluation in groups, by teams or

pairs, the predominance of individual evaluation with the use of closed questions with automatic grading is still a regular feature.

A distinctive feature of the MOOCs present in all the courses analyzed is the use of technological tools or resources that allow this type of course to be operational, such as resources that allow automatic progress based on the completion of activities or access restrictions conditioned to the completion of tasks. This regularity is given by the free access to these courses that become massive courses and generally do not allow a very personalized attention.

In order to establish trends through scientific methods, successive comparative studies are required. This could be a focus of future research. However, observation and empirical experience indicate an increase in MOOCs with a didactic conception that integrates individual and group evaluation, the use of videos as a source of information, and a growing level of prestigious institutions dedicating spaces to offer these types of courses.

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System of actions to prepare teachers for the creation of open educational resources

Maida Librada Bilbao Consuegra
Universidad Central "Marta Abreu" de Las Villas, Cuba.
Email: maidabc@uclv.cu,
ORCID: https://orcid.org/0000-0001-6137-3810

Nancy Andreu Gómez
Universidad Central "Marta Abreu" de Las Villas, Cuba.
Email: nancya@uclv.cu,
ORCID: https://orcid.org/0000-0002-2577-1114

ABSTRACT

The Ministry of Higher Education has made the creation of massive open online courses (MOOCs) in universities as a key objective in part of the digital transformation of Cuban universities. This has led to a need to prepare teachers and managers to face open education. Open educational resources (OER) promote the opening and democratization of knowledge and expand the opportunities for access to information. It is necessary for higher education centers to develop and manage resources to support the teaching–learning process and to prepare their teachers in the production of these resources. The objective of this paper is to present the results of the Virtual Learning and Distance Education Group of the Universidad Central "Marta Abreu" de Las Villas in the work with the preparation of teachers to face open education. Specifically, the paper will focus on the actions taken to prepare teachers for the creation of OER. The results shown were obtained using the systematization of experiences as an essential method of qualitative research. A comprehensive system of strategic actions has been developed and implemented across various domains, with the objective of preparing teachers to engage with open education, particularly as creators of OER. Work stages have been delineated to facilitate the transition to open education and the development of OER by teachers.

Keywords: open education, MOOCs, teacher preparation, open educational resources

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1. INTRODUCTION

In recent decades, in the international context, a series of educational practices have been presented that have in common the development of new pedagogical trends that encourage not only methodological novelty but also access to education and educational resources as ways to achieve sustainable development. In response to educational needs, the open access movement (Ortega, 2016) arises to counteract the high prices of textbooks and scientific journals that limit access to information in both developed and developing countries.

Open educational practices are defined as activities that support the use, reuse, and production of open educational resources (OER) through institutional policies, promotion of innovative pedagogical models, and the empowerment of students as co-producers of their lifelong learning (OPAL, 2011). Open educational resources promote the opening and democratization of knowledge and expand opportunities for access to information. It is necessary for higher education centers to develop and manage resources to support the teaching and learning process, which can be used, shared, distributed, and reused by all teachers (Trujillo Sainz, 2020).

In 2002, the term OER was used for the first time at a UNESCO conference; in 2005, a study was launched to analyze the scope of OER. In 2007, a report was published with the results of the study; in 2008, governments were urged to finance the production of OER in what was called the "Cape Town Open Education Declaration." The most commonly used definition of OER currently used by UNESCO is "digitized materials offered freely and openly for teachers, students, and self-learners to use and reuse in teaching, learning, and research" (UNESCO, 2019).

The UN establishes a series of recommendations on OER, such as:

- Capacity building of stakeholders in the creation, access, reuse, adaptation, and redistribution of OER.
- Development of support policies.
- Promotion of effective, inclusive, and equitable access to quality OER.
- Encouraging the creation of sustainability models for OER.
- Promotion and strengthening of international cooperation.

The purpose of this paper is to focus on the development of capacities and skills in teachers regarding the creation, access, reuse, adaptation, and redistribution of OER. The need to create awareness and skills to use OER, to recognize how OER can increase access, and to improve learning outcomes and empower students to become co-creators of knowledge is expressed. In addition, the need to sensitize teachers to the exceptions and limitations for the use of copyrighted works and to prepare teachers for some of these aspects in a gradual manner in the different stages of the research is also expressed.

Among OER, the most widely used courses in recent years have been MOOCs. Their impact on online training has experienced a significant boom. A MOOC simplifies distance learning due to its characteristics: open, collaborative, massive, and free. Its structure is designed to promote student learning, as it has objectives and components within a set of learning areas or specific topics, with numerous resources in the form of videos, links, documents, and spaces for discussion and communication, presenting various forms of evaluation, as well as certification of what has been learned.

The purpose of this paper is to present the results of the Virtual Learning and Distance Education Group of the Universidad Central "Marta Abreu" de Las Villas (UCLV) in the work with the preparation of teachers to face open education. Specifically, the paper will focus on the actions taken to prepare teachers for the creation of OER. These actions were implemented through strategic actions in different directions of work. The results shown were obtained using systematization as an essential method of qualitative research.

2. METHODOLOGY

The dynamics of higher education, regardless of the modality and level, demand the constant exploration of contexts and subjects to achieve detailed descriptions of any new learning experience intended to be established. The dynamics explain the reality, the actions, and their effects. This requirement invites educational agents to "observe" and "follow" the referenced practices (Restrepo & Tabares, 2000). This observation and monitoring of the educational reality is a complex process that responds to strategies previously defined for this purpose; one of them

is the systematization of experiences (Barbosa-Chacón et al., 2010).

The systematization of experiences is assumed, according to the proposal (Van de Velde, 2008), with its respective adaptations to the specific context in which the research is developed and which takes up (Jara, 1994). The systematization of experiences alludes to the ordering of information and critical interpretation of the process developed, in order to identify "significant learning that should be communicated and shared to nurture one's own experience or to inspire others in a transformative perspective" (Jara, 2016, p. 47).

A process of systematization of the experiences lived in the preparation of teachers was carried out by organizing and reconstructing them chronologically, and the following stages were defined:

- First stage (2015–2018): Preparation of teachers for the creation of virtual classrooms on the Moodle platform.
- Second stage (2019–2021): First actions in the preparation of teachers in open education and OER.
- Third stage (2022–present): Creation of MOOCs to prepare teachers for the creation of OER.

3. DEVELOPMENT

3.1. First stage (2015–2018): Preparation of teachers for the creation of virtual classrooms on the Moodle platform

From the integration of the universities in 2015, the Department of Educational Technology began to reside at the headquarters of the UCLV. A number of shortcomings were diagnosed related to the development of practical

skills in the management of the Moodle platform and especially, problems with the didactics to apply this learning in the teaching–learning process that was developed in a face-to-face manner.

Among the inadequacies detected are as follows:

- The virtual classroom is mainly used to place folders with documents that students must consult, which turns it into an information repository.
- Large number of empty courses.
- Existing courses have not incorporated the potential of interactive platforms for learning assessment.
- Poor access of teachers and students to the courses.

We set ourselves the task of designing a postgraduate course and contextualizing it to the demands of university faculty preparation. In 2015, the first edition of the postgraduate course began in person. From 2015 to the beginning of 2018, the postgraduate program has been improved year by year, and 16 postgraduate courses have been offered. Annually, two postgraduate courses are offered to the university (one in each semester), in addition to particular requests from areas or departments.

This postgraduate course prepares teachers under the principle of the unity of didactic and technological aspects, and at the end of the course, the teacher is able to create a virtual classroom on the Moodle platform, both as a support for face-to-face teaching and for distance learning. Although this stage does not include content related to OER, it is considered a prior and necessary step in the training of teachers to be able to face the process of open education and the creation of MOOCs and other OER in the future. It is necessary to know the technical and methodological potential of interactive platforms for the design

of an open and online course.

As a final result of this stage, the following are obtained:

- The preparation of a good number of teachers in the Moodle platform and in the design of virtual classrooms.
- A discreet increase in the quality of the virtual classrooms of the UCLV.

3.2. Second stage (2019–2021): First actions in the preparation of teachers in open education and OER

At this stage, the study of the theoretical bases of open education and OER begins as an indispensable step for the incorporation of these contents into the postgraduate courses taught by the Department of Educational Technology. As part of the tasks assigned by the VLIR project (project 3: ELINF) and by the National Center for Distance Education (CENED), Cuban universities must initiate a path toward open education, which will promote the international visibility of the science that is produced and may constitute a source of income.

At this stage, a period of sensitization of teachers and directors about the need to move toward open education practices began, and actions were started to be taken to bring them closer to the subject and to provide them with a basic knowledge of its theoretical and legal bases.

As a first action at this stage, two members of project 3: ELINF, who are also part of the Virtual Learning and Education Group on MOOCs and OER, received training. As a result of the training, the participating teachers participate in the collective assembly of an open course on the platform of the University of Holguin on MOOCs design in the context of Cuban education. All of the above allows

the incorporation of a topic of open education and OER, as part of the subject Educational Informatics of the Master's Degree in Educational Sciences.

A topic on open education and creation of MOOCs is incorporated into the postgraduate course "The Creation of Virtual Classrooms in Higher Education." For the delivery of the same, a video is created where the principles of open education and the fundamental characteristics of MOOCs are stated. The evaluation of this topic was carried out through a discussion forum where the participants expressed their criteria on open education and its possibilities of implementation in Cuban education. In parallel, methodological activities on the bases of open education and the creation of MOOCs are taught.

The main results of this stage are as follows:

- Preparation of teachers of the Department of Educational Technology in aspects related to open education.
- The sensitization of teachers and managers regarding the principles of open education and the creation of OER begins through methodological work.
- The preparation of university teachers for the creation of MOOCs based on the potential of the Moodle platform begins, starting with graduate courses.

3.3. Third stage (2022–present): Creation of MOOCs to prepare teachers for the creation of OER

As progress was made in preparing teachers for the virtualization of learning and in developing digital competencies for working with interactive platforms, new needs arose that were imposed by the new times. In particular, the open education movement was strengthened, and within this, the

goal was to turn the teacher into a producer of OER. On the other hand, the Ministry of Higher Education made the creation of MOOCs in the country's universities an essential objective and was established as a quality indicator to measure the digital transformation process in these institutions.

As members of the VLIR project (project 3: ELINF), we were assigned new tasks to implement open education within the project. Thus, an integrated work is carried out between the Directorate of Scientific and Technical Information and the Directorate of Educational Technology to prepare professors of the five participating universities (UCLV, University of Informatics Sciences, University of Camagüey, University of Pinar del Río, and University of Holguín) in this topic.

After conducting a series of work sessions in an integrated manner, the result is the design of a MOOC entitled "Open Science and Education in Higher Education." Among the most outstanding features of this course is the use of videos with open licenses and activities in HTML5 Package (H5P) considered as OER.

This MOOC was structured in the following nine topics:

1. Topic 1: Science and open education. Foundations, definitions, current trends, and legal basis.
2. Topic 2: Copyright in open environments. Licenses for the development and use of resources in open science and open education.
3. Topic 3: OER, types, and characteristics. MOOCs.
4. Topic 4: Interactive quizzes in MOOCs for learning assessment.
5. Topic 5: The teacher as producer of OER. Free software for design.

6. Topic 6: Open science. Open research.
7. Topic 7: Research data management.
8. Topic 8: Publishing in open access: Preprints and open access journals.
9. Topic 9: Open science evaluation. Alternative metrics. Open peer review.

The course was hosted on the RedTIC platform, part of the VLIR project, available at https://moodle.vlired.cu/course/view.php?id=56. The course lasted two months, began in April 2022, and was attended by more than 190 teachers from the five universities involved and other institutions in the provinces where these universities are located. The culmination of this course was a virtual workshop with the participation of the project leaders.

Another determining factor for the establishment of this new stage was the need to prepare teachers to create interactive activities on open-source platforms that could be used on other platforms due to their interoperable nature. In addition, many teachers demanded the production of videos for national and international events.

For this reason, it was decided to design a second MOOC oriented to the production of OER, with two essential directions. The first of these directions was aimed at preparing teachers for the creation of interactive activities in H5P and the second direction toward the production of videos in open-source platforms.

Work with H5P was selected because this interoperable package allows educators to create diverse and highly engaging content such as electronic presentations, quizzes, interactive videos, and many others. At present, developers from various countries around the world have managed to

create more than 30 types of activities of this type, which are available on the https://h5p.org/ website.

These activities are studied and it is decided to select those most frequently used in the different areas of knowledge, so 15 types of activities are incorporated into the course. The second direction of the MOOC was oriented toward the production of videos with open-source software. One of the resources that in recent years has had an accelerated growth in the design of MOOCs is video, which has proved to be a very successful means for the student to learn autonomously.

Video has turned out to be a didactic medium par excellence because it can be used to explain, illustrate, and demonstrate a phenomenon, object, or process in a way that is very close to reality. When a video is used, the student can advance or stop at a personalized pace depending on his or her needs, and this makes it a very practical means of self-management of knowledge. However, many teachers would like to be able to produce their own videos to teach at a distance, but they do not master these programs. For this reason, these topics are incorporated into the MOOC, which requires a study of the most widely used open-source programs for screen capture and video editing.

After a thorough search to prepare teachers for open-source video production programs that could be easily downloaded from the Internet, it was difficult to find those that integrated capturing and editing. Those that managed to do both functions mostly exported the videos with watermarks and, on other occasions, did not have a simple or intuitive interface for a teacher who is not a specialist in audiovisual productions. That is why it was decided to offer two programs that complement the process: OBS

Studio for capturing screens and OpenShot for editing. All videos used in this course have open licenses.

At the end of the MOOC design stage, the MOOC was structured in nine topics:

1. Topic 1: OER. MOOCs.
2. Topic 2: Introduction to H5P. Some typologies of questions with text in H5P: word completion, word marking, and word trailing.
3. Topic 3: Some typologies of questions with images in H5P: interactive image, find a hot spot, and find multiple hot spots.
4. Topic 4: Some typologies of questions in H5P. The exam, drag and drop on images, text sorting, and image sorting.
5. Topic 5: Integrative resources in H5P: presentation with slides and interactive video.
6. Topic 6: Integrating resources in H5P: the column and the interactive book.
7. Topic 7: Integrative resources in H5P: The decision scenario in H5P.
8. Topic 8: Screen capture with OBS Studio.
9. Topic 9: Editing videos with OpenShot.

This course was held between February and June 2023 and concluded with a total of 34 participants, including 17 from other institutions in the country. As a result, each participating teacher developed around 12 OER in H5P that can be used in the virtual classrooms of their subjects. At the end of the meeting, a five-question survey on satisfaction and expectations was conducted. It was found that 91.17% considered themselves *very satisfied*, 8.82% were

moderately satisfied, and no value was placed in the satisfied or dissatisfied criteria.

When asked how they self-assessed themselves on a level of 1 to 10 on the knowledge and skills acquired, it was found that 88.23% self-assessed themselves between the values of 8 and 10 and 11.76% between the values of 6 and 7. No student self-assessed themselves below these levels. Both qualitative and quantitative results can be found at https://aula.uclv.edu.cu/mod/feedback/analysis.php?id=3130. This MOOC is proposed to be part of the UCLV summer school.

The results of this stage are as follows:

- A MOOC on open education and open science is available on the RedTIC platform.
- A MOOC on the production of OER for the virtualization of learning is available on the university's graduate platform.
- A first group of teachers from both UCLV and other universities are prepared to create MOOCs and OER in H5P.
- A system of openly licensed videos and activities in H5P is considered OER.
- A course on OER production in H5P, mounted on the Nectar platform, is ready to be marketed through the SICTE technological interface.

4. CONCLUSIONS

The Directorate of Educational Technology of the UCLV has carried out a set of strategic actions aimed at preparing teachers for the production of OER in response

to the requirements of the Ministry of Higher Education and as part of the digital transformation of Cuban universities. From 2015 to date, work stages have been established, which in an organized manner and through the systematization of experiences, and have directed the work toward the transition to open education and the creation of OER. Today, courses are available on the graduate platform, which allow for the preparation of teachers in the creation of OER. At this moment, there is already a group of teachers, both from UCLV and from other universities, prepared to create MOOCs and OER in H5P.

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Active learning: Challenges for the information professional

Iliana Artiles Olivera
Universidad Central Marta Abreu de Las Villas, Cuba.
Email: iliao@uclv.edu.cu

Carlos Alexander Mendoza Jacomino
Universidad Americana, Nicaragua.
Email: calexmj2013@gmail.com

Dianelys Martínez Paz
Universidad Central Marta Abreu de Las Villas, Cuba.
Email: dmpaz@uclv.cu

ABSTRACT
Active learning in continuing education empowers reflective teachers who practice new knowledge and skills in order to develop future information professionals, long-term memories, and deeper understanding; connect different ideas with each other; and think creatively. The Information Sciences career of the Universidad Central "Marta Abreu" de Las Villas in this endeavor and in the activity of continuing education for teachers aims to design learning situations in continuing education actions for teachers who train information professionals. These situations are linked to active learning, considering the experience as an opportunity to learn and integrate it into their performance as innovative teachers. The qualitative methodology followed the course of the pedagogical experience and was based on discussion groups with teachers. The course, which was implemented as a function of continuing education, showed that participants integrated experiences based on active methodologies into their daily classroom practice. This integration facilitated the training of thinking to create and rethink ideas, using imagination, creativity, strategic and ethical, critical and constructive reflection within the innovation processes. Additionally, it awakened the willingness to learn, to risk, and to face uncertainty. Active learning situations achieved controversy, agreement and/or disagreement, and the satisfaction of an innovative teacher.

Keywords: active learning, good practices, innovative teacher, continuing education

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1. INTRODUCTION

In the last two decades, research in the area of education, cognitive psychology, and neurosciences has generated an important advance in the knowledge and explanation of the teaching–learning process in learners of different ages, social classes, and cultures. This fact has allowed the impulse and development of teaching models and learning theories, focusing their attention on the human development of people, their welfare, and basically the expansion and enhancement of the capacities to learn how to learn.

Consequently, more than ever, it is necessary to have an active learning proposal that is coherent, progressive, and aligned with the main international references. This proposal helps students acquire transformative competences that will allow them to succeed in the society in the coming decades. The loss of significance of the contents promotes criticism everywhere, acquiring theoretical status since the emergence of the new school as an opposition and alternative to the traditional school. "Hearts not heads" was a premise that permeated deep into teachers' consciousness. "Don't fill my head" and "enough of expositions" were some of the allegedly progressive slogans of the past years (Zariquey, 2020).

This concern is also based on the teachers' own experiences. Criticism of the class reduced to the informative lesson has not only strong theoretical foundations but also abundant practical examples of the lack of functionality of didactics based on this model. Those who have been in contact with university students affirm how discouraging a university is based on anomie, the lack of innovative methodologies, and few strategies that challenge intelligence and reasoning.

Several authors (Díaz & Hernández, 2010; Montoya, 2018; Ortiz-Colón et al., 2018; Zariquey, 2020) emphasize a methodological and practical foundation to plan, develop, and evaluate active methodologies that allow contrasting the educational benefits of each one according to its purpose and philosophy.

Consequently, the Information Sciences career of the Universidad Central "Marta Abreu" de Las Villas (UCLV) proposes courses for the training of teachers that focus on effective learning and innovative teaching. These processes are seen as mutually enriching in various social, cultural, and formative environments. Therefore, the conceptual discussion will focus on both the learner and the teacher.

In this sense, the general objective is to design learning situations in continuing education actions for teachers who train information professionals. This will be achieved through active learning, where experience is seen as an opportunity to learn and integrate into their performance as innovative teachers.

2. METHODOLOGY

The courses developed for teachers of the Information Sciences career of the UCLV constituted methodological

didactic actions aimed at raising awareness and improving understanding and application of the cultural-historical approach. In the development of the courses, discussion groups predominated as a form of formative feedback and in which examples of learning situations were designed with an active approach. Therefore, the methodological approach was assumed to be qualitative, which becomes an interpretative proposal oriented to describe and interpret the phenomena in their natural context.

The selected context is the Information Sciences career, with intentional sampling consisting of 17 teachers of the career. The exploratory study was carried out with the professors of the Information Sciences career, accompanied by the department head and the career coordinator, as participants in the activities developed based on the discussion groups.

3. RESULTS AND DISCUSSION

During the development of the course, activities based on active learning emerged, favoring simulated learning situations, active environments, activities, and accompaniment to develop skills for searching, analyzing, and synthesizing information. These activities also focus on solving real problems in the classroom and promoting dialogue and expression, which are essential in an innovative pedagogical process and active learning.

The following is an example of cooperative learning, implemented in the graduate course entitled "Innovative Didactics in Information Sciences." The topic was developed from the cooperative technique of Aronson's Puzzle with the purpose of sharing and reflecting on the findings of each innovative methodology selected.

- First moment (base group): Each individual teacher will research the selected innovative methodology guided by the following questions: How is each of these methodologies defined, and what are their main characteristics? What does the current scientific evidence show us about the results of the implementation of these methodologies in different educational levels and contexts? What factors related to their implementation contribute to the success or not of learning? What opportunities and limitations do they present according to contexts, modalities, and educational levels? and What research proposals would you make to further deepen the contributions of this methodology in the educational context of Information Sciences? They are informed that there is an organizational table in the Moodle Platform where the reading material on the innovative methodology to be studied is distributed by teachers. The individual constructions should be uploaded to the platform.
- Second moment (group of experts): The members of each group who have the same assignment of the content of the innovative methodologies will meet in this group of experts to discuss and comment on the content with a greater level of depth. It is recommended to systematize the information using a collaborative tool (WikiSpaces, Google Drive, Wakelet, BounceApp, and collaborative PowerPoint). Doing this exercise will help to delimit the scope of innovative methodologies and prepare to share learning with heterogeneous groups.
- Third moment: Go back to the teachers of the initial core group and present individually what has been learned in

order to demonstrate the learning that has been built and to facilitate the appropriation by everyone of the different innovative methodologies analyzed in the expert groups. Subsequently, the group should hold a discussion session on the central elements of each innovative methodology and make a decision on how to organize the collective presentation through the Padlet digital mural by accessing https://es.padlet.com/.

The digital mural should be uploaded to the platform. Each group will present its presentation in 30 minutes, followed by a question and comment session. At the end of all the presentations, the teacher will make a presentation to complement the work done by the groups and address those innovative methodologies that were not worked on.

From the analysis and to facilitate the understanding of the learning of the course, the teachers recommended the following reflective ideas as a novel action: do not fully agree with all the ideas expressed by the authors in the documents, think that your ideas can enrich what you read through your experience, reflect on each proposal, and solve the problems posed in order to see the relationship between what is expressed in theory and what you can execute in practice. Do not be afraid to disagree; this will help you to assume an attitude of change, imagine, fantasize, think, and postulate scientific hypotheses regarding your teaching and the way in which you design, execute, and evaluate your teaching strategies so that you can create your own theory. If you feel conflicted, it will be the best symptom that you are learning, observing, listening and relating the opinions of others with your own, and admitting that others think differently. This contributes to the development of your own theory; while you read the

recommended materials of the program, you carry out a metacognitive dialogue with yourself and with your colleagues from your own references and challenge yourself to rebuild your mental schemes, to self-motivate yourself, and to build your learning itinerary. At the end of each session, you should hetero-evaluate, co-evaluate, and self-evaluate yourself thinking about the improvement process.

4. CONCLUSIONS

Encouraging active learning in teachers enhances active listening skills; therefore, they learn to summarize the points of view of others and to think critically and reflectively. Teachers who use these strategies tend to have a distinct, and even surprising, improvement in the quality of thinking of their students, the future Information Science professionals. Students develop better critical thinking skills when they are explicitly taught how to think about their thinking.

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National technology project for the libraries of the Bolivian Catholic University San Pablo (2020–2023)

Alfonso Miguel Alarcón Lujan
Universidad Católica Boliviana San Pablo, Bolivia.
Email: aalarcon@ucb.edu.bo

Julio Alberto Galarza Rosales
Universidad Católica Boliviana San Pablo, Bolivia
Email: jgalarza@ucb.edu.bo

Andrea Ballivián Blanco
Universidad Católica Boliviana San Pablo, Bolivia
Email: aballivian@ucb.edu.bo

ABSTRACT

Problem: It has not been possible to implement an integrated library management system (SIGB) to unify the use of international standards and appropriate tools to provide services to end users and avoid unnecessary duplication of efforts in the different libraries at headquarters. Objective: This study aims to enhance the national library system (SINAB) by incorporating regulations and organizational structure of the SINAB and national acquisition and subscription of virtual resources, implementing an integrated Universidad Católica Boliviana San Pablo (UCB) library system (KOHA), and developing a national UCB libraries system web page as a tool that gathers all the university services for the support of learning, teaching, and research that benefit the UCB academic community. Methodology: For the development, drafting, and approval of the project, the project management body of knowledge (PMBOK) tool was used. According to PMBOK definitions, a project is a temporary effort undertaken to create a unique product, service, or result. In simple terms, a project can be any action that needs to be taken to accomplish something new. This can go beyond the business context, as it can encompass launching a product, starting a new course, and even making major purchases. Results and discussion: The study achieved several key outcomes, including subscription to 12 virtual tools and resources, all included in the NEO; learning; implementation of the SIGB KOHA in the four UCB sites, which are now in operation; creating tutorial videos;

regulations of SINAB-UCB, approved by the Board of Directors; and a call for the creation of the national web page.

Keywords: digital library, university library, information system, information technology, KOHA

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1. INTRODUCTION

In order to achieve a library system, it is important to standardize their integrated library management systems (SIGBs), as a first step, as well as the unification of services through regulations. This is why the project presented is tangible; national library system (SINAB) can be recognized through products such as the single catalog, the national web page, subscription to virtual resources through national proration, and the regulations approved by national bodies.

It is from the year 2020 that the way to realize everything advanced until that moment was visualized, and that is how the national project of technology for Universidad Católica Boliviana San Pablo (UCB) libraries was born, with the first intention of migrating the different bibliographic databases to an integrated system, starting from this huge work is that the project is put together including other objectives and products, which ended up in the approach of objectives presented in this work.

1.1. UCB National Library System

The definition of library system corresponds to the organized set of library services existing in a given geographical area (Arzamendi, 2003, p. 3).

There are several elements required by any library system: a competent administration that regulates the operation of library services, a regulatory basis dictated by the corresponding authority, and a technological infrastructure that supports the services in an efficient and responsible manner.

Thus, at the initiative of the National Academic Vice Rector, in 2020, we presented a project called, "technology project: UCB libraries," which included different aspects such as hiring of professional staff, subscription of virtual resources and E-books, web page, and the implementation of a unique SIGB.

1.2. SIGB KOHA

The most complex product to carry out was undoubtedly the last one. The situation of the databases was very varied; in the four sites, there were five description formats, and in many cases, they did not comply with regulations in their processing. The services were also different, so it was decided to implement an SIGB. After many meetings, KOHA was chosen.

What is KOHA?

- KOHA is an integrated web-based library management system under the GPL license that runs on both Linux and Windows. KOHA was created in 1999 by the Library Trust in New Zealand.
- KOHA allows the librarian to handle most of the administrative procedures of a library, as well as provide visitors with a public catalog for reference and circulation.

- The word KOHA comes from Maori and means gift or donation (https://koha-community.org/).

Therefore, the expected output was "KOHA open source integrated library management system implemented and operational within UCB, according to the requirements proposed by the library staff."

1.3. Subscription to Virtual Resources and E-books

According to Gómez Hernández (2002),

> Digital library elements serve to enhance rather than replace the conventional library. The user coexists with electronic and paper documents. Services are produced in remote environments, their intrinsic form being digital, and in face-to-face environments, where digital technologies are also applied. The hybrid library affects not only the user in the provision of services, but also the professional in the management of processes (p. 171).

The concept of virtual library is varied; however, the following clarifies the concept:

> Virtual libraries are platforms that provide content, as well as bibliographic and documentary services. They are made to respond to the great demand for information from students, professionals, and any other person. Some virtual libraries present different types of content depending on the specific area of information. Many of them present dynamic tools and user-friendly resources. They allow the transmission of knowledge, access to information and facilitate research. The material you find in

> these platforms is completely digital, in some cases to access the texts you will need a password and in other cases not. Sometimes you can even download or print them (IGNITE Online, 2010).

The UCB has a historical relationship with the subscription of virtual resources and the annual statistics of resources such as EBSCO, JSTOR, and DIALNET, being the first in Bolivia to subscribe to SCOPUS. However, the health emergency caused by COVID-19 showed us that the supply of virtual resources was not enough. It is for this reason that E-books and other remote access tools were incorporated, for example, to the offer that will later be developed in this document.

2. METHODOLOGY

Several meetings were held with librarians and computer scientists from the four regional academic units, as well as with librarian colleagues from different universities in Argentina and Chile, who shared their experiences in the management of library systems. Two working groups were formed to develop projects oriented to the organizational aspects of SINAB-UCB and library technology.

The project management body of knowledge (PMBOK) methodology was used for the development of the projects. It is a compendium of best practices, first published in 1996, which describes guidelines, terminologies, and other standardizations, ensuring a broad view of project management. The PMBOK guides management, providing important data for companies around the world to follow uniform directions in order to reduce failures, improve performance, and have a more accurate forecast of results (Sydle, 2022).

3. RESULTS AND DISCUSSION

3.1. Renewal of Virtual Resource and E-book Subscriptions Nationwide

The technology project: UCB libraries enabled the subscription of the following virtual resources at the national level:

- SCOPUS
- RESEARCH4LIFE
- EBSCO
- JSTOR
- ASTREA
- DOI subscription with CROSREFF company

It also enabled subscription to E-books through the following digital content companies:

- MCGRAW-HILL
- CENGAGE
- PEARSON

Figures 1 and 2 show the usage statistics of virtual resources and E-books, respectively.

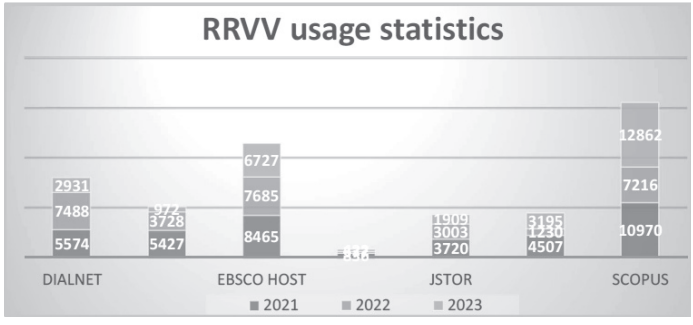

Figure 1. Number of RRVV use (2021–2023).

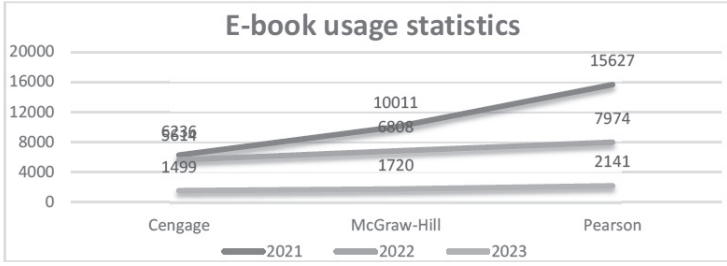

Figure 2. Number of E-books use (2021–2023).

3.2. Integrated Library Management System: KOHA

As of January 2022, the Argentine company INFODOC, represented by Pablo López Liotti, was contracted through an international call for proposals to undertake the implementation of a new KOHA library system, which will allow the creation of a single national catalog and other management modules, statistics, and reports that will solve the entire library management. The cost of the entire consultancy is $14,000.

In January 2023, the consultancy was concluded, leaving 45 days of adjustments, and it is in April of this year that officially and with the authorization of national authorities, the implementation and opening to the public of the SIGB KOHA is carried out. This consultancy was supervised and coordinated by personnel from the Central Library, La Paz headquarters, in the area of librarianship and by CNTIC in the technical area.

3.2.1. Expected and Finished Products

First Phase: "Implementation of Modules"

Product: "Report of the implementation of the KOHA online SIGB"—verifiable at the following link: https://bibliotecas.ucb.edu.bo.

Product: "Act of delivery of conformity of the operation of the loan and return of bibliographic material of the libraries in each academic site."

Product: "Record of delivery and conformity of the reception of the KOHA interface according to UCB's institutional graphic line."

Second Phase: "Training"

Product: "Report of the general training process directed to all the librarians of the academic branches of the UCB," attaching a list of participants.

Third Phase: "Migration to SIGB KOHA"

Product: "Act of delivery and conformity of migration and import of records in MARC21 format—KOHA," based on 315,500 records in MARC format in SIGB KOHA.

Product: "Report on the specific training process aimed at IT technical personnel from each academic branch of the UCB," attaching a list of participants.

Fourth Phase: "Various Adjustments, Support, and Maintenance of KOHA"

Product: "Final report on the implementation, start-up, and proper functioning of the SIGB KOHA in the libraries of each UCB academic branch."

Product: "Act of delivery and conformity of the SIGB implementation."

Product: "Adjustment report made to SIGB KOHA."

The system began production on March 3, 2023, at all UCB locations. Adjustments, which allow the user to identify the date of the return more accurately, were made in the customization of loan vouchers, date and time, and thermal printer configuration in all sites, for example:

- User group import
- Creation of external user accounts
- Incorporation of an image to identify St. Andrews School and EPC students
- Correction of incorrect data of imported users
- Adjustments in circulation policies
- An "item type" online thesis was added
- Changes in the OPAC image
- Creation of the Cochabamba Library Group to solve the loan problem at the headquarters
- Migration of a batch of 129 theses cataloged in ABCD to the ABCD database
- Thesis at KOHA, carried out by the technical processes staff
- Enabling tag 130 in the monograph worksheet
- Enabling in label 245 of subfield $h
- Enabling in the 504 tag of the subfield $b
- Enabling in label 092 of subfield $l
- Entitlement in label 952 of subfield $7
- Enabling in tag 952 of the subfield $d
- Qualification on label 675
- Worksheet created with RDA fields
- Configuration of labels and barcodes
- Correction in the book inventory

3.2.2. Training, Guidance, and Orientation

Two face-to-face training sessions have been held for La Paz headquarters staff and three virtual meetings with headquarters staff; however, orientation and guidance are continuous, depending on the needs

and the appearance of problems, doubts or findings. Several formats have been created for users of the new OPAC:

Several formats have been developed for the use of the users of the new OPAC:

- Video tutorial: https://drive.google.com/file/d/1t3q-JVzjMWcmwzmUqqxPHE4v_NGmj_vUl/view?usp=drive_link.
- Press release: https://www.ucb.edu.bo/la-u-c-b-cuenta-con-un-nuevo-sistema-de-gestion-de-libraries-koha/.
- Infographics:

3.2.3. Circulation Module

Figure 3 shows the number of loans made by each library during the 2023 trial period.

Figure 3. Number of loans in KOHA (quarterly).

3.2.4. Technical Processes Module

Figure 4 shows a summary of the number of records modified and/or added to the bibliographic description and authority control database in KOHA.

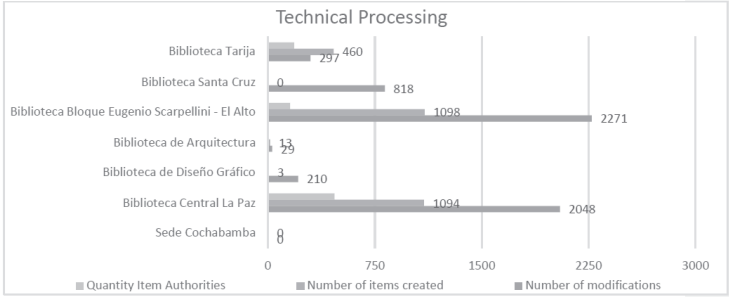

Figure 4. Number of records created and modifications in KOHA (quarterly).

3.2.5. Integration of the KOHA User Module with UCB Institutional Accounts

The integration of KOHA with the institutional Google accounts used by UCB was an indispensable requirement

for the success of the project. As a technological policy, UCB uses Google accounts as a means of authentication for all its services and technological systems. This helps to improve security with the management of users, with blocking through preset rules and the double authentication factor, among other important factors.

Due to this policy, special emphasis was given to the integration of KOHA users with Google accounts, a specialized technical work of great effort and importance since there are no examples or references of use cases in the KOHA community. However, following the basic KOHA documentation, Google documentation, and a lot of trial and error, the integration of Google accounts in the KOHA-UCB system was put into production.

The KOHA central authentication service (CAS) was worked on following the required recommendations and configurations, and the Google OpenID Connect was configured based on the Google development console documentation. A project was created, OAuth 2.0 credentials were generated, the API access management for Google identities was configured, and finally these credentials were used in the KOHA CAS to accept Google as an identity provider.

3.3. SINAB-UCB Website

The website is developed with WordPress version 6.4.2 using the template scientia.themerex.net according to the colors of the institutional brand of the UCB hosted in the domain https://ucb.edu.bo/biblioteca/. Key features of this website are as follows:

- Multi-language website
- Website with social media integration

- Responsive web design (responsive website design)
- Website with plugins for people with disabilities (visual and hearing)
- Integration of repositories (journals and intellectual property) and subscription resources
- Video tutorials and guides

4. CONCLUSIONS

Within the framework of the objectives set, the project has achieved 90% of its objectives, and it remains to call a consultant for the creation of the national web page, which would be the conclusion of the work carried out. However, it is undoubtedly the implementation of the SIGB KOHA, the heart of the project. This meant the strengthening of SINAB-UCB. The statistics of use, both in loans and in the modules of users, cataloging, are clear examples of the operation of the system. The collaborative work required by the KOHA has transformed the way of working of the staff of SINAB-UCB. This is the first tangible product that shows us as a system, providing collective standards, but without neglecting the particularities of each site.

This process was very interesting, with online discussion sessions and proposals from each of the sites, ending in a consensus regulation that has already been approved by the Research Administrator and the National Academic Vice Rector's office. The creation of the national web page is still pending, another very important challenge, since it will be the portal that visualizes the UCB libraries. The terms of reference have been drafted; however, it requires a technical adjustment.

Another pending aspect is the formal conformation of the head of the system, which is why a national unit is

proposed to direct the SINAB-UCB, from which resources should be managed for national training, training at headquarters, virtual resources, updating of the SIGB, and other activities.

The technology project: libraries will conclude in 2023; however, the challenges that it has left us are many. We believe that the path has already been traced and now we must move forward with difficulties but also with a more robust system, strengthened by the commitment of the members.

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Virtual communities and the challenge of connecting with audiences

Leslie Diaz Monserrat
Editora Vanguardia, Santa Clara, Cuba.
Email: lesliediazmonserrat@gmail.com

Liena María Nieves Portal
Editora Vanguardia, Santa Clara, Cuba.
Email: liena6.8.86@gmail.com

ABSTRACT
The first communication studies were born flawed by the obsession to control the behavior of audiences. However, as the North American school of communication consolidated, they understood that there were social components that influenced the response of broadcasters and that the media could exert an overall influence with the rest of the social institutions. The media of the 20th century, designed for mass communication, could not fulfill the dreams of a hypodermic theory that ensured that every member of the audience was "attacked" by the media message. Digital social networks have come to revolutionize every aspect of modern society. Now, the messages arrive in a personalized way to each subject of communication, and artificial intelligence dominates the production of content. This paper proposes a review from the classical theory of networks to the particularities of digital social networks. In addition, it approaches the virtual community as a way to create niches of resistance in the cultural struggle, through the segmentation of audiences that allows to achieve a connection between audiences and the posts published by the media, in this specific case, the newspaper *Vanguardia*.

Keywords: communication, cyberjournalism, digital social networks, virtual communities

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1. INTRODUCTION

In the times of the fourth industrial revolution, where reality is constructed virtually, as a kind of parallel world to physical space, there is more and more talk of social networks. For many, this is a new issue, but those who consider it so are unaware of a powerful previous theorization, which lays the foundation for understanding how even social networking sites work on the Internet.

The origins of social network theory can be traced back to the 1930s and 1940s. However, already at the end of the 19th century, sociologists Émile Durkheim and Ferdinand Tönnies noted the importance of interactions between subjects in understanding social phenomena and assumed a non-individualistic explanation of the social fact. At the dawn of the next century, the German philosopher, sociologist, and critic Georg Simmel elaborated a contemporary concept of network, which asserts that society exists when a series of individuals interact. Already in the 1970s, a consolidated network theory assumes the analysis of networks as a method for the structural study of groups, through the use of various means, such as algebraic models and the computational development of graph theory.

After the advent of the triple W and especially of digital social networking sites, the world experienced a momentous change, which transformed the social fabric irreversibly. As a result, Cuba implemented a government policy that enhances the use and access to technologies. In a short time, WiFi access points began to be enabled, and in 2018, free trials were carried out for data service in

Internet access. Thousands of users have rapidly reached the network of networks to such an extent that, according to the report "Digital 2023: Cuba," there are 7.97 million users in the country so that more than 70% of the Cuban population is online.

During the quarantine imposed by COVID-19, these digital social networking sites reaffirmed their role in the social construction of reality[1] and provided all the information about that physical reality to which we did not have access.

From that moment on, Facebook became the favorite of the Cuban public. This is understandable if we take into account that, according to the article A census of the use of social networks in Cuba, published on the Cubahora website (https://www.cubahora.cu/ciencia-y-tecnologia/un-censo-del-uso-de-las-redes-sociales-en-cuba), the average age of the Cuban population is around 41 years old, right in the middle of the age range of Facebook users (from 30 to 45 years old). Therefore, it is important to study this social networking site, specifically from institutional media profiles. This is because today audiences are on these platforms, which become a space of dispute for the attention of recipients. Connecting with users depends on the effectiveness of the media and the quality of its influence.

Any study on the subject faces the challenge of taking on an almost unexplored topic. However, it is enough to

1 Just as radio in its early days managed to create a kind of collective hysteria with the broadcast of the novel "The War of the Worlds," which led people to commit suicide after believing that it was a real alien invasion and not a radio episode, the public has not yet managed to create, for the most part, a critical stance to protect themselves against media manipulation and fake news in the midst of an unprecedented cultural war.

review the classical theories on the concept of social network and all the production[2] to find the functional bases of the modern platforms embedded in the network of networks. We can conceptualize social networks as a well-defined set of actors—individuals, groups, organizations, communities, global societies, and so on—that are linked to one another through one or a set of social relationships. The author Mitchell (1969, p. 2, cited in Miralbell, n.d.) states that the "characteristics of these ties as a totality can be used to interpret the social behaviors of the people involved".

Just such a description, although created long before the massive irruption of the Internet, reflects exactly what happens in a digital social network created to connect people and establish relationships.

Now, as never before, the media message could fulfill the dream of reaching audiences individually. This was the obsession of the first communication studies, which emerged in the United States at the beginning of the 20th century and focused on the effects they could have on audiences. However, as the American school consolidated, they understood that there were social components that influenced the response of broadcasters and that the media could exert a joint influence with the rest of the social institutions. The media of the 20th century, designed for mass communication, could not fulfill the dreams of a hypodermic theory that ensured that each member of the audience

2 Its origins can be traced back to the 1930s and 1940s. The term "social network" is attributed to the social anthropologist John Arundel Barnes, who began to use it systematically in an article published in 1954, to bring together traditional social science concepts such as delimited social groups (e.g., tribes or families) and social categories.

was "attacked" by the media message. Digital social networks have come to revolutionize every aspect of modern society. Now, the messages arrive in a personalized way to each subject of communication, and artificial intelligence dominates the production of content.

The pandemic stage, with a peak of users connected to the Internet and a boom of new users on Facebook, demonstrated that groups on this social network manage to connect people with related interests, who collaborate in the function of a common goal (Strickler, 2019).

Since the 1970s, a current of study focused on unraveling the long-term effects of the media,[3] understood that the social categories (age, sex, school level, etc.) that the first researchers saw as a hindrance that limited the homogeneous effects they longed for, actually allowed reaching segments of the audience with success. In fact, since 1940s, those same empirical field studies[4] assured that a group of people with common social categories would also choose the same radio programs and have similar tastes.

If we take all this theory to the virtual space, which is the other geography, the network society that sociologist Castells (1999) talks about, we have to take advantage of

3 Studies on long-term effects that return to the interest in investigating the power of the media on audiences ensure that the effects of exposure to messages act in the area of knowledge and are sedimented over time. The media begin to be assumed as constructors of reality, through the provision of knowledge of realities that are only accessible in the media.

4 This current relates communicative processes to the social context in which they are produced. It is developed in two areas (Wolf, 1987): the study of the differentiated composition of audiences and their consumption patterns and research on the social mediation that characterizes such consumption. Its main figure is Paul Lazarsfeld.

these Facebook groups as a way to segment our audiences[5] to create communities[6] where users with common interests connect.

Therefore, we start with the following research problem:

- How do we generate virtual communities from the processes of participation of *Vanguardia*'s audiences on Facebook?

We assume the hypothesis:

- The virtual community is generated from the participation of the public in closed Facebook groups.

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5 Latin American researcher Guillermo Orozco, who has devoted himself to the study of television reception and audiovisual literacy, speaks of the existence of a multi-segmented audience with a personal and collective history that does not feel deprived of that legacy in front of the television set.

6 The Center for Community Studies of the University of Las Villas—in the work of 2004: "El autodesarrollo comunitario. Críticas a las mediaciones sociales recurrentes para la emancipación humana," as well as in several articles and research results—considers the community as: a social group that shares a space where the participation and cooperation of its members make possible the conscious choice of transformation projects aimed at the gradual and progressive solution of the contradictions that enhance its self-development. (…) "One of the features that distinguishes this conception of community is that it is not limited as a scenario of its existence to a space of immediate relations of the population, but the community is considered as a type of link in which participation, cooperation and involvement are combined in a way that facilitates the gestation of development and emancipation projects" (Camellón & Olivera, 2009). Moreover, this shared scenario can occur not only in the physical space but also in the virtual one.

We set as our general objective:

- To substantiate the processes of participation and the creation of virtual communities on the digital social network site Facebook.

2. METHODOLOGY

Social network analysis is assumed as the methodology. Data are collected through digital tools for the formal representation of a social network, in which data on nodes and their links are the result of interactions. This information would be visualized by means of graphs and seeks to explain not the relationship established between two users but between each user and a post or publication. In addition, we will use content analysis and participant observation. The results presented below are only the result of participant observation and Facebook's own statistics, which are not remotely sufficient to explain the magnitude of the phenomenon.

3. RESULTS AND DISCUSSION

The *Vanguardia* newspaper was born on August 9, 1962, as a newspaper of the Communist Party of Cuba in Las Villas. Since 2000, it has had a presence on the Internet, and its website is one of the first in Cuba. More recently, it has reached social networking sites: Facebook and Twitter.

During the beginning of the pandemic, due to poor management of the official Facebook page, it was not possible to take advantage of the boom in new followers that other national and provincial media did achieve. After July 11, 2021, digital social networks became a priority for the publisher, and one of the best journalists was placed

in its administration. Since then, the number of followers has doubled to over 10,000. The page stands out for the quality of each publication; however, we did not manage to encourage a participation that exceeds the reactions (I like it, I love it, and I am angry) or comments that go to a deeper or constructive dialogue. Such behaviors validate what was exposed by Strickler (2019) when it assured that users were fleeing from profiles and pages to take refuge in groups, more comfortable places to connect with users with similar interests.

Institutional profiles fail to connect people with similar interests and only generate mere interaction, translated into "likes" or comments. Users express their opinions when a topic interests them and affects their social reality or aspirations. The pandemic stage demonstrated that groups in this digital social network manage to connect people with similar interests who collaborate towards a common goal. Users in social networks do not participate[7] in social network profiles if they do not make use of the message they offer and if it does not respond to their interests and needs, even if the message is elaborated, taking into account good practices. To connect users, audiences must be segmented, and subjects with

7 "Participation, understood as the 'active involvement, individual or collective, of people as subjects of the activity' (Alonso et al., 2015: 4), implies a series of requirements (Caballero and Yordi, 2004) also comparable to the Latin American approach and national contributions on participatory communication: individuals have to handle adequate and timely information, the community is conceived as the subject of development, and it must be a constructive, popular and encompassing process of multiple interests, capable of becoming an effective mechanism of socialization, to convince and motivate all sectors of a locality" (Nieves, 2021).

similar interests must be grouped together in groups associated with the main profile to generate communities and participation.

However, we cannot assume a position of pure gratification[8] to the communicative needs[9] of users, since as public media we have the mission of educating audiences and transforming them into active subjects of reception. We cannot be disconnected from their interests and needs. It is therefore essential to collect data on the topics that our target audience relates to before designing groups and their contents. This will enable us to create groups that offer our target audience the topics they seek and like, while also allowing them to appropriate the messages through the process that activates Latin American popular communities in the face of foreign forms of culture, consumer goods, and organizational structures. This process implies the allocation of new meanings, filtered through their own code and in a context of resistance (Neüman, 2008).

8 The gratification of audience needs is one of the postulates of the Uses and Gratifications Hypothesis, the high point of mass communication research, which asserted that the media were effective if the audiences attributed such effectiveness to them, through the gratification of communicative needs experienced by the receivers. Although it assumes the active role of the audience, it does not weigh the power of the media and their influence on audiences, even in the formation of their own needs and tastes.

9 According to the Uses and Gratifications Hypothesis, the media satisfy five kinds of needs: cognitive (acquisition and reinforcement of knowledge), affective-aesthetic (emotional), integrative at the personality level (security and emotional stability), integrative at the social level, and escape (relaxation of tensions).

4. CONCLUSIONS

Institutional profiles fail to connect people with similar interests and only generate mere interaction, translated into "likes" or comments. Users express their opinions when a topic interests them and affects their social reality or aspirations. The pandemic stage, with a peak of users connected to the Internet and a boom of new users on Facebook, demonstrated that groups on this social network manage to connect people with related interests, who collaborate in function of a common goal (Strickler, 2019).

Users in social networks do not participate in social network profiles if they do not make use of the message offered and if it does not respond to their interests and needs, even if the message is elaborated taking into account the particularities of the social network and good practices. To connect users, audiences must be segmented, and users with similar interests must be grouped together in groups associated with the main profile to generate communities and participation.

Knowing the interests of the audiences is a defining starting point to achieve communicative products that connect with the audiences and make an effective segmentation of audiences, where virtual communities are generated. However, we cannot return to a merely complacent position with the audiences. We must go beyond the approach of gratification to the communicative needs to achieve a critical user before the media message that manages to activate a process of appropriation through the allocation of new meanings, filtered through a code of its own and in a context of resistance.

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