



Digital Transformation of the Cultural Heritage: A Management Platform for the Heritage of the Universidad de Oriente

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Abstract—University heritage includes all the results of the academic, research, and extension activities of the university community, bequeathed in values, knowledge, and modes of action of a higher level education institution. The Universidad de Oriente, the second institution of its kind in Cuba, treasures an extensive collection of its heritage bequeathed by its researchers, teachers, and students; however, inefficiencies are detected that limit the use of heritage assets and documents in undergraduate and postgraduate courses, despite the institution's extensive trajectory, the extensive existing collection and the historical, architectural and heritage values it possesses are unknown.

To this end, in this paper we propose and present a cultural heritage management platform that, in addition to disseminating the institution's heritage values, promotes the use of the results of research on the nation's cultural heritage in the training processes in different degree courses, research, and relations with institutions in the cultural sector. Theoretical methods, empirical techniques, the Extreme Programming software development methodology and the use of expert criteria and heuristic evaluation for its validation has been applied to assess its impact.

Index Terms—Cultural Heritage, Management, Education, University Heritage

I. INTRODUCTION

The legacy of previous generations to the new generation in the context of the university is concretized in the existence of "all the material and immaterial vestiges of human activities linked to higher education... a reserve of accumulated wealth related to beliefs, values, and results with a social and cultural function, transmitters of knowledge and related to innovation" [1] assumed as the university heritage.

University heritage has been approached from different perspectives: from the point of view of the communication of the symbols that identify it [2], its potential for the promotion of tourism [3]; the conservation of university heritage [4], [5], and the use of technologies in the dissemination and conservation of university heritage [6], [7], [8], [9], [10], [11]. As we can see, the subject has been dealt with from different theoretical positions, which, despite the variety of approaches, all agree that disseminating and conserving university heritage is essential for the future of nations, given that universities

shape the training of those who will carry the banner in the future.

The University of Oriente, Cuba's second official public university, has emerged as the Alma Mater of the eastern region. Since its beginnings (1947), it has had an intense history linked to the development of the nation and has played an outstanding role in different academic, scientific, cultural, socio-political and artistic events. This institution has been able to research, disseminate and promote the rich cultural tradition of a region in which all the identity roots of Latin America and the Caribbean are integrated. The inventory of patrimonial assets within the areas of the Universidad de Oriente includes works of art, furniture, documents, photographs, files of relevant personalities in the history of Cuba, the foundational buildings and three collections of the University History Museum, the Archaeology Museum and the Natural History Museum, all of which are evidence of the trajectory of the University in the political and cultural events of the region and the country.

Based on the historical discoveries associated with the Universidad de Oriente and its influence on the progressive movements, the cultural identity of the nation, the passage of outstanding personalities through its classrooms and cloisters, and in different historical moments of the nation in its 75 years of foundation, the dissemination of these results is encouraged among the university community through science, as a result of research from different disciplines. As part of the management of this dissemination objective, the project "Safeguarding the cultural heritage of the Eastern region of Cuba" was created with the collaboration of the VUro Programme financed by the Flemish universities of Belgium. As part of the results of this project, we created a database of notarial documents from the 17th, 18th and 19th centuries from the different provinces of the Eastern Region, which considers the traditions and forms of expression of the time; creating a survey of the documentaries made in the Eastern Region from 1986 to 2016, which provides an important database for the study of the documentary production of the region; There was also a survey of the built heritage of the Vista Alegre district, incorporating data from the architectural perspective as a whole with other

audiovisual information as a result of the techniques applied for the structural analysis of the buildings; Also captured the file for the declaration of the Universidad de Oriente as a National Monument.

As can be seen, the existing results were of a high scientific level, however, in order to be put to good use, they had to be used by students, researchers, and teachers in the study of cultural heritage. To achieve such objectives, we have use the technology to make possible to consult all the existing information and obtain its relationships to make inferences and obtain new results. Such technology is presented and validated in this paper.

II. MOTIVATION AND OBJECTIVES

It was recognized that the university heritage of the mentioned institution has a significant value from all the substantive processes that are developed in it, up to the investigations that from the Universidad de Oriente contribute to the study of the cultural heritage of the Eastern region. Nevertheless, insufficiencies are detected that limit the use of the patrimonial goods and documents in the undergraduate and postgraduate, despite the wide history of the institution the university community does not know of the broad existing collection and the historical, architectural, patrimonial values that they possess.

These inadequacies encouraged multidisciplinary research with the aim of developing a platform for the management of heritage documents of the Universidad de Oriente that allows staff, researchers, and students to:

- Manage, store and index heritage documents from the different university processes (files, minutes of the different governing bodies, photographs, events, personalities, etc.).
- Process the existing information associated with the cultural heritage of the university, and the eastern region, for its study in training processes.
- Obtain statistical reports on the information stored.
- Disseminate research and education associated with the study of the heritage of researchers at the Universidad de Oriente.

III. MATERIALS AND METHODS

For research-related and the development of the digital heritage management platform, we used theoretical methods such as Analysis-Synthesis, Systemic-Structural approach, and Modelling.

We use research techniques to collect primary data: interviews with specialists, observation of the heritage document management process, document review, heuristic evaluation of computer systems that allowed us to understand the problem to be solved.

Finally, we applied the Extreme Programming (XP) methodology for the development process of the digital platform system.

The methodology employed consisted of four phases:

- Requirement analysis: in which research methods were applied and allowed us to search background information

on the digital platform in the national and international context, to capture requirements based on interviews with specialists from different areas of the University (Archive, Architecture, Heritage, Literature, History, Law).

- Design of the architecture of the digital platform: based on multidisciplinary teamwork in which the content, functionalities, and users with their levels of privilege were established.
- Implementation of the digital platform: in which the entire coding process was carried out according to the requirements and approved design.
- Evaluation of the impact and transformation of the digital platform in terms of the valorization of the university heritage and its use in the academic, research, and extension processes of the University.

In order to comply with this methodology, data collection techniques such as surveys, interviews, and document analysis were applied. For the tasks related to the implementation and evaluation of the platform in the digital transformation, heuristic evaluation methods and the Delphi method of expert judgement were used.

A. Requirement analysis

To perform a comprehensive requirement analysis, we have consulted specialists from the Departments of Linguistics, Sociology, Art, Law, Architecture, Computer Science and the Department of Heritage of the Universidad de Oriente, and other beneficiaries of the City Curator Office and the Directorate of Provincial Cultural Heritage. From such consultation with the aforementioned specialists, the following functionalities required for the digital platform were identified:

- To catalogue, index and manage the information on the university and cultural heritage of the eastern region such as archive documents, files, records, minutes, rector's resolutions, minutes of constitution of the different working bodies and faculties, outstanding personalities, rectors since their foundation, events, cultural assets).
- Enable the processing of the inventory of university museum collections.
- Disseminate the scientific production associated with the cultural heritage of the University and the Eastern territory.
- Management of image, video, and PDF files and their interrelation.
- Establish different users with access and information management permissions according to read-only and edit-only privileges.
- Visible for the whole eastern region of Cuba
- Ensure that it is accessible to different operating systems and types of users.
- Statistical reports of all available information.

The platform would then integrate functionalities of information management systems, document management and geographic information management.

B. Architecture Design

To design the architecture of the system, namely, the knowledge modules, we discussed with the multidisciplinary team of specialists what and how should be stored and processed per area of expertise. For the design of the contents, the requirements derived from the consultation of specialists were taken as references. The information provided for the construction of a prototype was analyzed that allowed the maximum optimization of information management following the guidelines and recommendations for document management systems and geographic information systems based on all the contents to be processed. Moreover, other similar systems such as Arches¹, omeka², collective access³ were analyzed to obtain the recurring functionalities that contribute to the usability and management of information.

The prototype was consulted with the specialists who participated in the analysis of the requirements, who validated the proposal after issuing criteria and adapting it to the stated needs. The resulting architecture is shown in Figure 1. We now proceed to describe the content of the modules.

1) *Documentary heritage*: Seventy seven notarial documents from the Provincial Archives of History of the eastern provinces, twelve normative documents that regulate the use and protection of cultural heritage in Cuba, documents from the history of the Universidad de Oriente classified according to the following data: Name, Origin of the Document, Year, Type, Period, Value, Description, Transcription, Containers, Measurements, State, Photocopy, Comments, Belongs to the UO.

2) *Built heritage*: It has data on nine hundred and two buildings in the Reparto Vista Alegre, where the highest bourgeoisie of the republican period settled in the city of Santiago de Cuba and where prominent political, historical and cultural personalities of the city lived. The data processed are the following: Street, Property, Period, Year, Century, Stylistic Information, Levels, Current Use, Identifier, Housing Type, Construction Type, Roof, Constructive State, Current Situation, Interior Façade, Façade Type, Original Use, Subdivision Property, Building of Value, and Comments.

3) *Audiovisual heritage*: It has four hundred and thirty-nine documentaries from the eastern region of Cuba described considering information related to: Title, Year, Duration, Direction, Production, Photography, Script, Editing, Sound, Producing Centre, Type of Producing Centre, Producing Centre Location, Film Location (Specific), Film Location (Province), Camera, Initial Format, Current Format, Genre, Characters, Jhon Corner Mode, Bill Nichols Mode, Michael Renov Mode, Scenography, Lighting Quality, Lighting Direction, Lighting Source, Lighting Source, Lighting Source, Set Design, Framing Angle, Framing Zoom, Framing Mobility, Level, Distance, Handheld Camera, Long Shot, Editing, Sound Dialogue,

Sound Music, Sound Effect, Interview, Voice-over, Intertitles, Commentary, Belongs to UO.

4) *Scientific heritage*: The results achieved by cultural heritage researchers are shown in this module, whether they are scientific works by undergraduate or postgraduate students, articles in journals, books, presentations at scientific events that can be consulted as references for other research. In this case, the following data are processed: Title, Author, Area, Line of Research, Date, Summary, Subject, Other Data.

5) *Universidad de Oriente heritage site*: The module lists the foundational buildings that constitute the University's heritage complex. They are described considering: Name, Year, Architect/Artist, Original Use, Current Use, Others.

6) *Cultural assets*: This module contains the inventory of movable assets that are part of the heritage of the Universidad de Oriente. The processed data allow us to describe in the digital platform the following: Cultural Asset, Author, Value, Location, Quantity. In this case, they can be updated by the different areas of the University according to the patrimony that they treasure.

7) *Prat collection*: This module is dedicated to processing the data of Francisco Prat Puig's art and archaeology collection donated to the Universidad de Oriente for the study of Art History and History degrees. It is a valuable collection of two hundred and seventy-two pieces of ancient art, numismatics, decorative arts and personal items of the prominent professor. The data processed describe each object in the collection according to the technical data sheets found in the university museum: Inventory, Image, Title or Denomination, Institution owner, Author, Date_Date, Country, Materials, Measurements, Technique, Description, Location, State of conservation, Degree_Value, Appraisal, Relation, Origin Title, Section in which it is found, Specialist who looks after the piece, Date of Modification.

This data structure is common to all university museums and other museums under the direction and supervision of the Provincial Heritage Commission in the province of Santiago de Cuba. So it can be used by these types of institutions.

8) *Personalities*: This module groups the data of the different people who, because of their relevance in history, politics, culture, research, science and sport, have passed through the Universidad de Oriente. The data processed are: Name(s), Surname(s), Period, Social Class, Origin, Context, Facts, Transcendence.

9) *Archives*: Enables the management of the different documents in the Historical Archives of the Universidad de Oriente. The documents are classified according to the substantive process to which they belong, considering the following data: Title, Date, Value, Classification, Type, Document Series, Class, Description, and Guide.

From a legal perspective, the platform identifies for each document (in all types of heritage) its legal status, identifying whether it is registered and its level of registration, whether it is intended for registration or whether it is in the process of registration.

¹ www.archesproject.org

² www.omeka.org

³ www.collectiveaccess.org

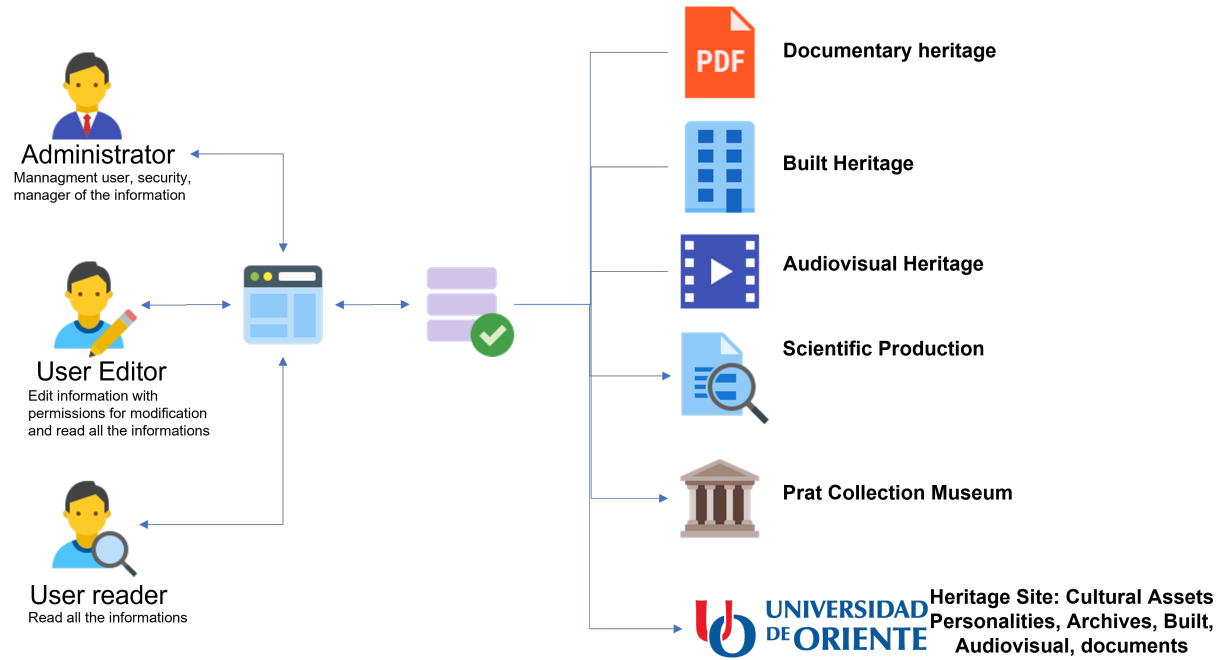


Fig. 1: Modular system architecture of the digital platform

Attached files are classified by type to enable them to be located quickly. It offers other functionalities that allow the user to obtain statistical reports of all the information found on the Platform, as well as the relationships that can be established between the different contents. All of which can be represented graphically.

Finally, it offers functionalities to facilitate interaction and usability, including identifying a document as a favourite, sharing documents with other users of the platform, taking screenshots, exporting the lists of the different assets in xls format and the files of each processed element in PDF, sending report tickets to the platform administrators and messages between users, as well as displaying help options to guide users to the screen they are on.

For the system administrator, it provides tools for the control of information security with the visualization of security logs, user management and the editing of permissions according to the interests of each user. It also allows for updating of data classification and interface help messages.

C. Digital Platform Implementation

We carried out the implementation of the digital platform following the view-controller model. We used tools such as i) Symfony 5 as development framework, ii) Bootstrap for the visualization of the interface components, iii) JQuery, used in the interactions and views, iv) OpenLayers allowed us the creation and interaction with maps and the socio-economic information of the objects in it, and we used v) PostgreSQL as database manager and the PostGIS extension of PostgreSQL was used for the management of geospatial data.

Figure 2 shows the Landing webpage of the Digital Platform, where users can interact with the different modules described in the previous sections. Moreover, some functionality such as advance search (Figure 3), Map representation (Figure 4) and the relation among documents and files (Figure 5) are also illustrated in this section.

IV. EVALUATION OF THE IMPACT AND TRANSFORMATION OF THE PLATFORM

A. Heuristic evaluation

For the evaluation we used heuristic evaluation to determine the level of usability of the interfaces based on Jakob Nilsen's ten usability principles [12]. We found that:

- The system provides the user with the information required for orientation in navigation: registered user, number of heritage documents registered in each content, page that is in the foreground, information on all available functionalities, help messages to guide the user in navigation, notifications when a message is received or a heritage document has been shared, and feedback with administrators.
- The language used is clear and easy to understand for users, while respecting the technical vocabulary of cultural heritage management. The user has control of the system. Actions can be cancelled without affecting the stability of the system and can be exited at any time, with navigation options visible at all times.
- The interface design is consistent and there are well-defined guidelines that guarantee the homogeneity of the screens. The wizard component is used in the creation of a new record, which allows the succession of steps to

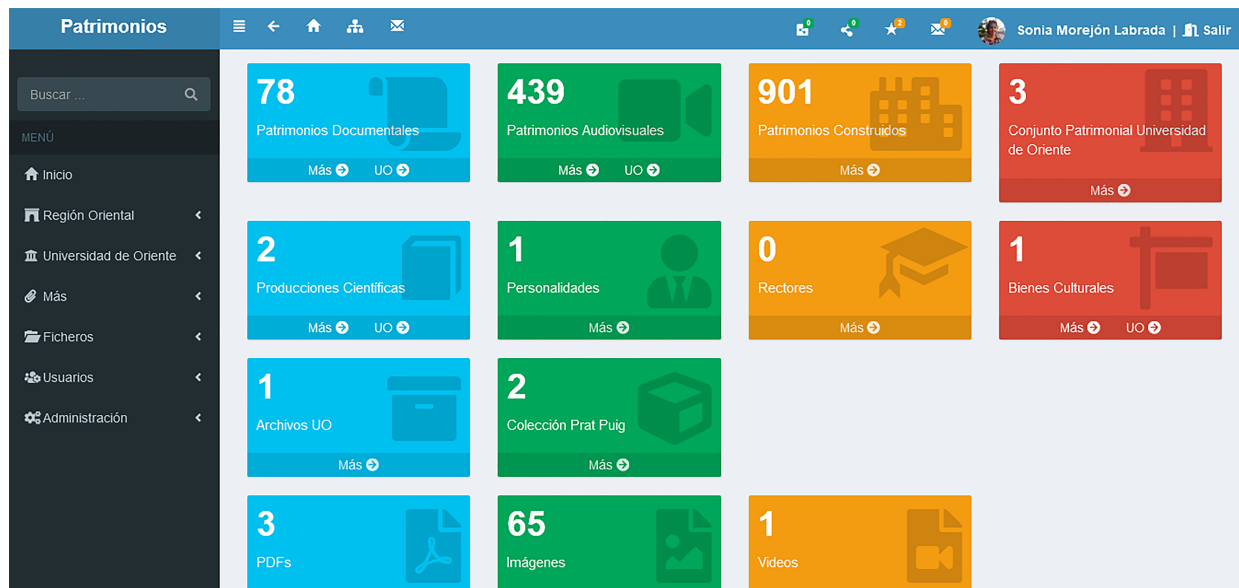


Fig. 2: Landing page of the digital platform

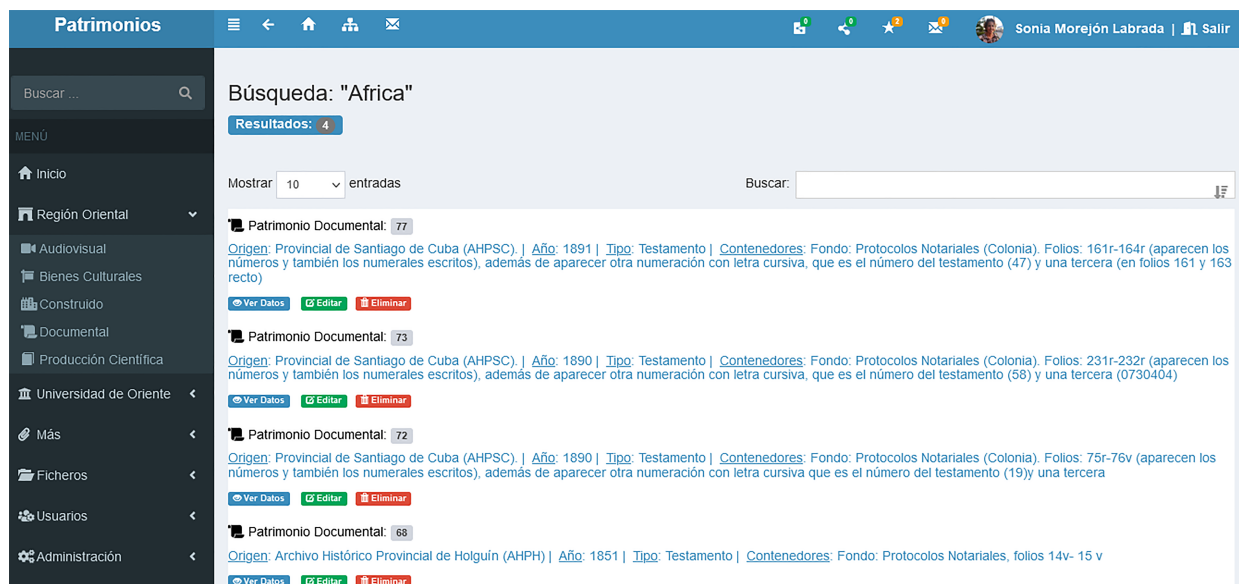


Fig. 3: Advanced search

achieve the complete process by validating the data as they are recorded. Icons are adjusted to the actions that have been applied.

- Error messages are devised to communicate to the user that something is wrong, this applies to the authentication of users and the validation of mandatory data.
- Avoids memory overhead for users with consistency in the location of on-screen options, help messages, bread-crums, etc.
- It allows for flexibility in user interaction by assigning permissions to users who will only consult information for some contents and in others they will be able to create, edit and update information.

- There is no overload of elements on the screens. The components of the interface have been arranged so that there is a good economy of space and that the organization of information is appreciated. The design is responsive and adapts to the screens of different devices (mobiles, tablets, and computers) and accordingly displays the elements on the screen by adjusting its components.
- It has no operating errors. When an action is carried out, interaction messages are generated with the users to guide them on the status of the information being consulted or managed.
- There is a user manual describing all the functionalities and providing information on the technical requirements

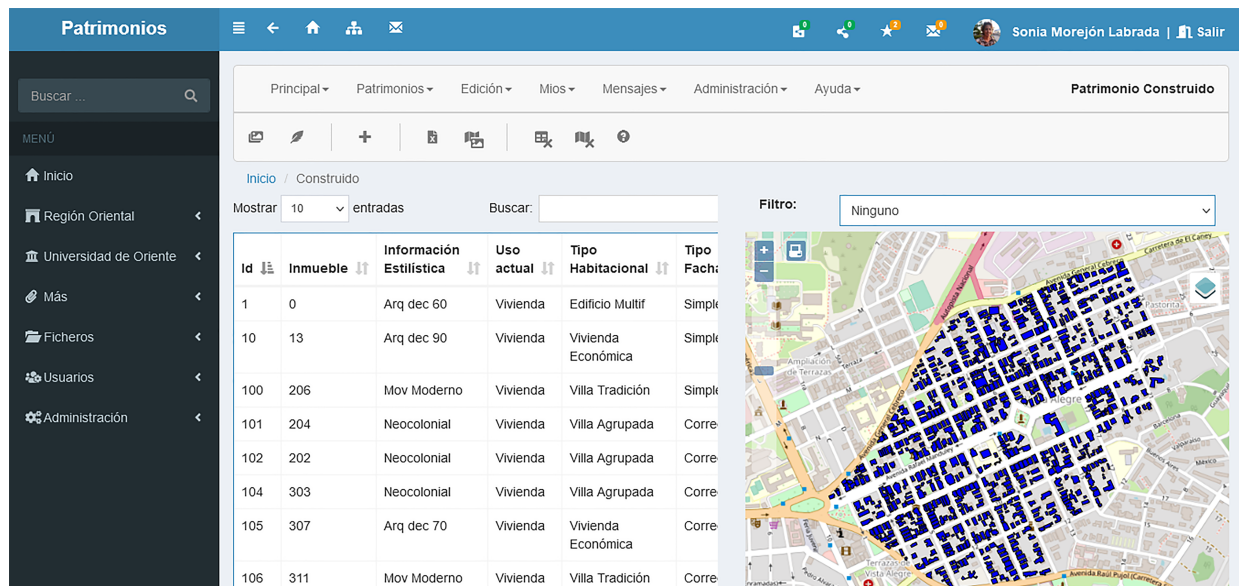


Fig. 4: Map representation

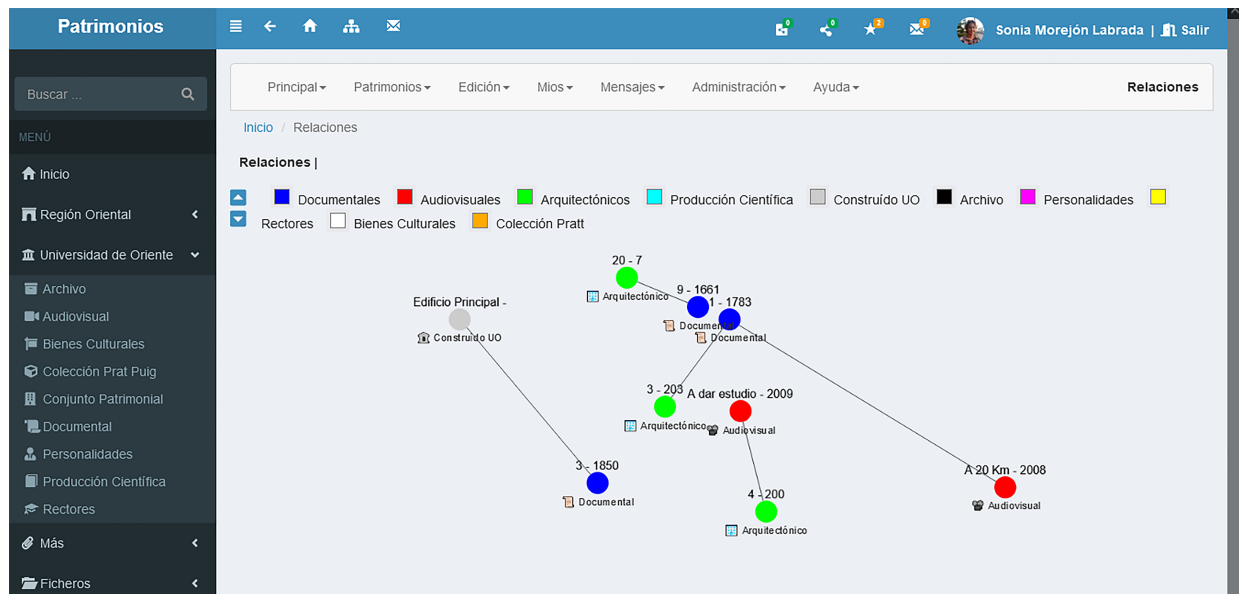


Fig. 5: Document relations

for installation and deployment.

B. Experts-based evaluation

Another form of evaluation of the platform was through the criteria of experts. Eighteen experts from different areas of knowledge were consulted and selected based on their experience in cultural heritage management processes from different perspectives. 83.3% have more than 10 years of experience and hold the scientific degree of Doctor of Science, while the other 27.7% hold the degree of Master of Science, of which 16.6% are in the process of doctoral training and have between 5 and 7 years of experience in heritage management. The 83.3% work at the Universidad de Oriente and the others

belong to institutions associated with the Provincial Heritage Council and the Office of the City Conservator of Santiago de Cuba.

The indexes considered for the evaluation of the platform by the experts were the following:

- Relevance of the platform in cultural heritage management processes.
- Feasibility for undergraduate and postgraduate training processes.
- Feasibility for research processes associated with cultural heritage.
- Ease of use.

As it can be observed in Figure 6, most experts rate the

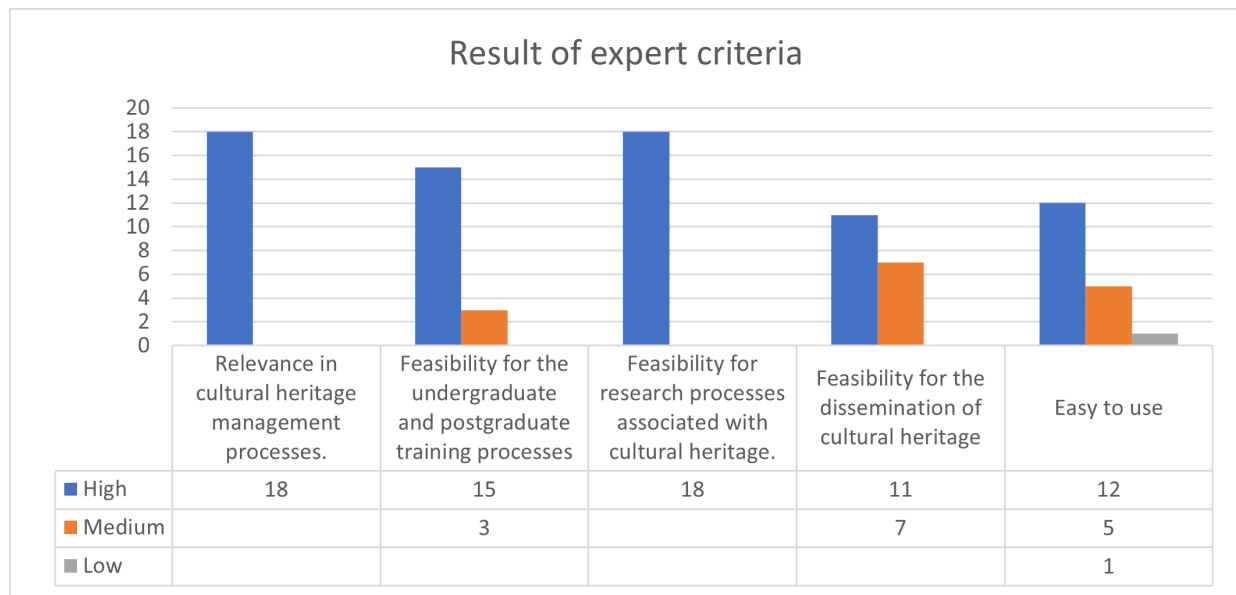


Fig. 6: Experts evaluation

indexes evaluated as high. The statistics were applied to find the Median, a function that returns the central number of a set of data, its value reached was 15 for the High level, 5 Medium level and 1 Low level for all indexes, demonstrating the predominance of the experts' assessment. It is worth noting that two indexes reached all the evaluations at the High level: Relevance of the platform in cultural heritage management processes and Feasibility for research processes associated with cultural heritage. In the case of the Relevance for the undergraduate and postgraduate training process, the three experts who evaluated at medium level are those who belong to cultural and heritage institutions and do not teach.

In this sense, we can affirm that the developed platform is relevant for heritage management processes, it is feasible for undergraduate and postgraduate training and research processes, and it is easy to use for users.

For the evaluation of the use of the platform in the undergraduate training process, an enquiry was made with the experts and the different curricula of the university careers were reviewed, and it was determined that the platform can be used in the careers of Architecture and Urban Planning, Industrial Engineering, Bachelor's Degree in Law, Bachelor's Degree in History, Bachelor's Degree in Sociology, Bachelor's Degree in Social Communication, Bachelor's Degree in Sociocultural Studies, Bachelor's Degree in Art History, Bachelor's Degree in Letters. This does not detract from the fact that it can be used in other degrees as part of student scientific and extension work in the promotion of the study of cultural heritage.

Table I presents the use possibilities and benefits that the digital platform may bring to the different degrees.

C. Potential Curriculum Design - Bachelor of Architecture and Urban Planning

We have selected the bachelor of Architecture and Urban Planning degree for the design of teaching activities using the platform. This work was driven by the lecturers/experts in the subject.

1) Activity 1:

- Year: Second year, Day shift.
- Module: Work Practice
- Objectives: To investigate the characteristics of the foundational buildings that constitute the Heritage Complex of the Universidad de Oriente using ICT for information processing.
- Teaching assignments: Characterize the Heritage Assets of the Universidad de Oriente considering: the architectural style used, data on the building project, the use given to the building in its original conception, modifications made to its structure, compilation of images and documents showing the use of the building in its history and evolution.

To process the information compiled in the cultural heritage management digital platform of the eastern region of Cuba at: <http://patrimonio.uo.edu.cu/public> in the module for the Heritage Site of the Universidad de Oriente.

- Once the information has been processed, export the data in PDF format.
- Capture the image of the processed building map.
- Use these data in the elaboration of the report of the integrative project of the work placement.

2) Activity 2:

- Year: Third year, Day shift.
- Module: Design VI

TABLE I: Potential content for different degrees enabled by the digital platform for cultural heritage management

Degree	Content within the Digital Platform
Bachelor of Architecture and Urban Planning	Development of architectural and urban planning solutions at project level. Knowledge of the characteristics and behaviour of different urban, architectural, structural and constructive typologies. Develop project solutions from the urban to the architectural scale in different project themes of constraint conditions. Development of intervention planning strategies for the rehabilitation of buildings and urban complexes. These skills can be worked from the use of implemented maps and information processing in heritage areas.
Bachelor in Law	Treatment of legal provisions for the protection of cultural heritage
Bachelor in History	Analysis of heritage documents on the development of society in the different economic, political, social and cultural spheres in eastern Cuba, as well as preserving and increasing knowledge of the social life, politics and cultural heritage of the nation.
Sociology	The diagnosis, evolution, and prognosis of existing problems related to cultural heritage that allow the design of alternatives for social change in the local community and territorial sphere.
Bachelor in Social Communication	Creation of a communication product focused on the preservation, conservation, and dissemination of cultural heritage.
Bachelor in Art History	Treatment of the evolution of art from its origins to the present day based on the documentary heritage and the treatment of the art and archaeology collection of Francisco Prat Puig. Analysis of the audiovisual and documentary heritage on the platform.
Bachelor in Literature	Treatment of the research and bibliographic retrieval work based on the contents of the platform.

- General objectives of the subject: To develop intervention projects in the built environment, attending to the aspects of design and construction, providing solutions to problems of degradation of cultural heritage and its physical context to contribute to its enhancement and safeguarding of cultural values, local and national identities according to their social, economic and political importance, through the conception of urban-architectural conservation/regeneration (revitalization) processes, considering the conditioning factors of a cultural, economic, social, legal, climatic, technological, protection and technical, historical, symbolic and formal infrastructure.

Exercise 1- Intervention project on urban pieces in areas of heritage value in the city.: Objective - To develop design proposals in small urban pieces in areas of heritage value, providing a solution to problems of degradation of the cultural heritage and its physical context in order to contribute to its enhancement and safeguarding of cultural values and local identities, considering the conditioning factors.

Exercise 2: Architectural renovation: Objectives - To develop a building renovation project at a technical and partially executive level, designing the furniture and equipment elements, both inside and outside the building, in accordance with a design line defined in the conceptualization phase of the project. Design the interiors and the immediate exterior areas of a building according to a well-defined conceptual purpose, and act accordingly. Select and specify the component elements of the interior spaces: shapes, materials, chromatic schemes, surface treatment, carpentry features, climatic and lighting solutions, furniture and equipment, textiles, works of art and vegetation, among others.

Specific objectives The platform is a tool for calculating and processing built heritage data. It can be used to identify quantitatively and qualitatively through diagnosis:

- Areas of concentration of high heritage values.
- Landscape degraded areas.
- Areas with high, medium, and low deterioration value.
- Areas with irreversible transformations.

Students can determine areas of high value, differentiate them and with them make an analysis for a proposal of urban intervention for the preservation of the values of Historically Compromised Areas.

By classifying the lots in the inventory, it is possible to identify areas that have been intervened at present, some of them hastily, to determine the functioning problems of areas of high heritage value.

The exercise also provides access to historical documentation that enriches the students' experience and helps them to identify with heritage conservation.

The platform not only serves the student as a calculation tool, it can also be a representation tool, since each of the components described above are graphically represented on the map of the territory.

The planned activities demonstrated the relevance of the platform in the teaching activity, exemplified in the degree of Architecture and Urbanism in the subjects: Work Practice and Design IV. With this demonstration, together with the heuristic evaluation following Jakob Nielsen's principles of usability, the application of expert evaluation has allowed us to corroborate that the cultural heritage management platform not only favours research, but is also a resource for the treatment of the contents of different careers associated with the management, conservation, and dissemination of cultural heritage from different angles.

We can also confirm that the platform in itself constitutes a thematic digital library for the treatment of heritage content that can be consulted by researchers, lecturers, and students. In the same manner, the visibility and accessibility of this platform throughout the national territory allows the different cultural and heritage institutions to find in it a place for the dissemination of the information of the collections in museums and galleries of the territory, promoting the preservation of the information to be consulted by other users of the network and expanding their relations with other sites and specific contents that enrich the cultural heritage of the population.

V. CONCLUSION

We deployed the management platform on the servers of the Universidad de Oriente with the address: <http://patrimonio.uo.edu.cu/public/>. The architecture is developed based on the analysis of existing documents of a methodological nature and the catalogues prepared by the Archive department, which were validated with the university's heritage specialists.

We made the platform available to the researchers of the project, which made it possible to index 77 documents, 439 audiovisuals and 902 buildings in the city of Santiago de Cuba; related to the university heritage, there are 9 foundational buildings, documents of 5 personalities, 19 collections of cultural goods of value I, II and III, 272 exponents of the Francisco Prat Art and Archaeology collection.

Among the advantages recognized by the users are the following: The platform constitutes a thematic library of university heritage and of the eastern region of Cuba, capable of offering students and researchers accurate and up-to-date information on cultural heritage. It guarantees the accessibility to information and therefore the valorisation of the university heritage not only in the university community of the institution but also in the whole eastern region. The information is presented in an interactive, graphic, spatial and audiovisual form, which contributes to the training of undergraduates in different university careers. It allows the cataloguing, indexing, management and dissemination of university heritage and thus its valorisation in academic, research and extension activities.

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REFERENCES

- [1] File of Declaration of the Heritage Complex of the Universidad de Oriente 2019.
- [2] Fonseca-Martínez, A., Brull - González, M., & Guerra - Casanellas , AM (2020). Knowledge management model for the sustainable development of the symbolic heritage of the Universidad de Oriente. Santiago, (152), 279-292.
- [3] Touceda Jimenez, M. (2022). Potential of tangible heritage beyond tourism. The Cartuja Campus and its heritage college.
- [4] Rivera Rivera , DR (2021). The documentation of the digital image in the conservation and diffusion of the university patrimony.
- [5] Gant , MLB, Melero, FJ, & Fernández-Moreno, A. (2018). University heritage and ICTs . Current experiences in Granada. New technologies and interdisciplinarity in the communication of cultural heritage, 32.
- [6] Múnera Torres, MT (2005). Reflections, methodology, proposals and experiences on information and documentation of documentary heritage at the university.
- [7] Lahera, YM, del Toro Iglesia, G., & Medina, YG (2021). Visibility and accessibility to the documentary heritage of the University of Havana: SCRIPTORIUM institutional repository. Libraries . Annals of Research , 12 (1), 30-40.
- [8] Rodríguez, UL, & Pacheco, MF (2022). Conservation and socialization of the documentary heritage of the library of the University of Matanzas. Libraries . Annals of Research, 18 (2).

- [9] Pascual, AIG (2017). The Zaragoza university archive: cooperating to advance. RUIDERAE : Magazine of Information Units . (ISSN 2254-7177), (11).
- [10] Camús Serra, M. (2013). The value and dissemination of documentary heritage in archives.
- [11] Martínez, GC, & Díaz, MP (2016). The documentary heritage of the University of Havana: proposals for its safeguarding and dissemination// University of Havana documentary heritage : proposals for their safeguard and diffusion. Magazine Cuban Information and Communication, 5 (9), 62-78.
- [12] Nielsen, J. (1994, April). Usability inspection methods. In Conference companion on Human factors in computing systems (pp. 413-414).
- [13] Ruiz-de-Lacanal , MD (2018). Museums and collections of the University of Seville in evolution. Cajas, 20, 1-6.
- [14] Godoy, MJ Visibility, linkage and identity of university heritage. ExT : UNC Extension Magazine , 3(2).
- [15] Gant, MLB, & Lirio , MG (2018). The heritage of the University of Granada: buildings, collections, conservation and dissemination. Art notebooks of the University of Granada , 49 , 109-125.