Scientific and technological research article

How to cite: Jiménez Pérez, G. A., Jiménez Sánchez, L., Ardila Suárez, J. D., & Santana Finalé, H. M. (2026). Scientific production on heritage education from a university research group in Matanzas: bibliometric analysis. *Estrategia y Gestión Universitaria*, 14, e9233. https://doi.org/10.5281/zenodo.24054284

Received: 08/09/2026
Accepted: 26/10/2026
Published: 16/11/2026

Corresponding author:

guillermo941019@gmail.com

Conflict of interest: the authors declare that they have no conflict of interest, which may have influenced the results obtained or the proposed interpretations.

Guillermo Alfredo Jiménez Pérez [1]
Universidad de Matanzas
https://orcid.org/0000-0002-4430-1871
guillermo941019@gmail.com
Cuba

Lissette Jiménez Sánchez [2]
Universidad de Matanzas
https://orcid.org/0009-0006-6042-5395
lissettejimenez.1963@gmail.com
Cuba

Juan David Ardila Suárez [3]
Universidad de Bogotá Jorge Tadeo Lozano
https://orcid.org/0000-0003-4718-8787
jdardilas@unal.edu.co
Colombia

Helen María Santana Finalé [4]
Universidad de Matanzas
https://orcid.org/0009-0007-5874-2292
santanahelen61@gmail.com
Cuba

Scientific production on heritage education from a university research group in Matanzas: bibliometric analysis

Producción científica sobre educación patrimonial de un grupo de investigación universitario en Matanzas: análisis bibliométrico

Produção científica sobre educação patrimonial de um grupo de pesquisa universitário em Matanzas: análise bibliométrica

Abstract

Introduction: heritage education is an expanding field within pedagogy, museology, and cultural management. The scientific output of research groups working in this area in Caribbean university contexts has received little systematic analysis. **Objective:** to characterize, through bibliometric methods, the scientific production of a research group at the University of Matanzas during the period 2014-2026. **Method:** a descriptive and retrospective bibliometric study was conducted in four phases: corpus definition, data normalization, indicator calculation, and content analysis. **Results:** the findings reveal a sustained research trajectory with recent growth, authorship concentrated in a stable core group, a high level of collaboration, predominance of regional journals, and increasing presence in international databases. Thematic axes evolved from local identity studies toward museums, urban heritage, the science, technology and society approach, digital technologies, and creative economies. **Conclusion:** the research group has consolidated a recognizable research program and identifies international visibility as its main challenge. The study provides a replicable model for evaluating the scientific production of university research groups and offers guidance for science policy decision-making.

Keywords: bibliometric analysis, heritage education, scientific production, scientific visibility

Resumen

Introducción: la educación patrimonial constituye un campo en expansión dentro de la pedagogía, la museología y la gestión cultural. La producción científica de los grupos que la practican en contextos universitarios caribeños carece de análisis sistemáticos.

This is an Open Access article under the license CC BY-NC-SA 4.0 (https://creativecommons.org/licenses/by-nc-sa/4.0/)

Objetivo: caracterizar, mediante métodos bibliométricos, la producción de un grupo de investigación de la Universidad de Matanzas (2014-2026). **Método:** se realizó un estudio bibliométrico descriptivo y retrospectivo, en cuatro fases: definición del corpus, normalización, cálculo de indicadores y análisis de contenido. **Resultados:** muestran una línea sostenida, con crecimiento reciente, autoría concentrada en un núcleo estable, colaboración elevada, predominio de revistas regionales y presencia creciente en bases internacionales. Los ejes temáticos transitan desde la identidad local hacia los museos, el patrimonio urbano, el enfoque de ciencia, tecnología y sociedad, las tecnologías digitales y las economías creativas. **Conclusión:** el grupo consolidó un programa reconocible y considera que la visibilidad internacional es el desafío principal. El estudio aporta un modelo replicable de evaluación de la producción de grupos universitarios y orienta decisiones de política científica.

Palabras clave: análisis bibliométrico, educación patrimonial, producción científica, visibilidad científica

Resumo

Introdução: a educação patrimonial constitui um campo em expansão na pedagogia, na museologia e na gestão cultural. A produção científica dos grupos que atuam nessa área em contextos universitários caribenhos carece de análises sistemáticas. **Objetivo:** caracterizar, por meio de métodos bibliométricos, a produção científica de um grupo de pesquisa da Universidade de Matanzas no período de 2014 a 2026. **Método:** foi realizado um estudo bibliométrico descritivo e retrospectivo, desenvolvido em quatro etapas: definição do corpus, normalização dos dados, cálculo dos indicadores e análise de conteúdo. **Resultados:** os resultados evidenciam uma trajetória de pesquisa contínua, com crescimento recente, autoria concentrada em um núcleo estável, elevado nível de colaboração, predominância de periódicos regionais e presença crescente em bases de dados internacionais. Os eixos temáticos evoluem dos estudos sobre identidade local para os museus, o patrimônio urbano, a abordagem ciência, tecnologia e sociedade, as tecnologias digitais e as economias criativas. **Conclusão:** o grupo consolidou um programa de pesquisa reconhecível e identifica a visibilidade internacional como seu principal desafio. O estudo fornece um modelo replicável para a avaliação da produção científica de grupos universitários de pesquisa e orienta decisões de política científica.

Palavras-chave: análise bibliométrica, educação patrimonial, produção científica, visibilidade científica



Introduction

Over recent decades, heritage education has taken hold as a field closely tied to didactics, museology, social studies of science, cultural management, and related areas. Its institutional development gained traction through international instruments, beginning with the 1972 UNESCO Convention, which called for educational programs that would encourage respect for cultural and natural heritage. The Council of Europe Framework Convention, for its part, places people and their values at the center of a broad understanding of heritage (Council of Europe, 2005; Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura [UNESCO], 1972).

The role of technology in heritage management is also widely recognized, with applications in teaching (Chernbumroong et al., 2024), community engagement (Alnaim, 2026), recreation, science (Fazenda et al., 2025; Galindo Durán et al., 2026), economic development (Ale & Ayeni, 2026), and conservation (Fontal et al., 2024, 2025). Taken together, this work shows how far the topic reaches across fields of knowledge. These authors approach heritage education from different angles, but all of them stress its connection to technology and artificial intelligence (AI).

Fontal et al. (2023) mapped the documents indexed in Scopus and Web of Science between 1991 and 2022 and found only five thematic networks, with qualitative methodology predominating. In that study, teacher training and instrumental research appeared as emerging areas. Its findings confirm that heritage education has developed its own body of concepts, methods, and debates. That body of work, however, has been described mostly at the global scale, with little attention to the trajectories of the groups that produce it.

Bibliometric studies connected to heritage education have also been published. They link the field to built heritage (Adegoriola et al., 2021; Talib et al., 2026; Yu et al., 2026), identity and site management (Hamidy et al., 2024; Lin & van Ameijde, 2026; Newsome & Dowling, 2025), underwater heritage (Bulut & Yüceer, 2023), natural heritage (Piano et al., 2024; Silva et al., 2025; Peng et al., 2026), and the integrated management of heritage through new technologies (Huang et al., 2025; Li et al., 2023; Waqar, 2026). Some of them also turn toward education (Rashevska & Semerikov, 2026) and tourism (Tamim et al., 2025; Ksissou et al., 2024).

Bibliometric studies in this area and in neighboring ones show a genuine interest in mapping the conceptual and social structure of knowledge. Monteagudo Fernández et al. (2021), for example, analyzed publications on heritage education in museums from 2000 to 2019, examining their conceptual, social, and intellectual structure.

Another article, published in Web of Science, examines research on training in museum mediation and education (Álvarez Rodríguez et al., 2019). Both studies rely on international databases, a choice that largely leaves out the work published in Ibero-American regional journals.

Heritage education in this region has deep roots of its own, and recent contributions stand out. Studies published in the past few years address the

relationship among heritage, schooling, and intercultural communication in Brazil, new developments in heritage education there, and learning at precolonial archaeological sites (da Silva, 2022; Quijano, 2022; Scifoni, 2022). These works reflect a field attentive to local contexts and to the diversity of educational settings. The output of university groups in the insular Caribbean, by contrast, is rarely documented in the international syntheses consulted.

Matanzas offers a distinctive setting for this discussion. The city has a historic urban center of great heritage value and a network of museums with a long educational tradition. For more than a decade, the university has run a line of research on comprehensive heritage management, which has addressed heritage education in communities, museums, and public spaces (Hernández de la Cruz et al., 2021; Jiménez Pérez, 2023; Peñate Villasante & Jiménez Pérez, 2020). The line connects the training of sociocultural managers with heritage interpretation and science education. Its trajectory has yet to be systematized through bibliometric indicators.

In recent years, the group's agenda has taken in digital technologies and the science, technology, and society (STS) approach. Some of its studies examine the benefits and challenges of artificial intelligence in heritage education, and others address the tensions surrounding the metaverse in the social sciences (Jiménez Pérez, 2024a, 2024b). Further publications link digital museum management to the creative economy, a recent area concerned with making heritage accessible to younger generations, people with special educational needs, and other groups (Jiménez Pérez & Hernández Manso, 2025).

Over the past five years, the literature on heritage education has produced international reviews, mostly focused on museums and technological applications (Chiurco et al., 2025; Clinker & Friesen, 2026). None of the sources consulted includes bibliometric analyses devoted to university heritage education groups in Latin America and the Caribbean.

The literature shows a second gap: no studies relate collaboration, productivity, visibility, and thematic evolution within a single research group. Without them, it is hard to understand how knowledge is built where editorial and technological resources are limited. The gap is theoretical, because evidence on regional production patterns is missing, and practical, because decision makers lack the information they need.

From the standpoint of university management, knowing a research group's scientific output is a prerequisite for steering science policy. Here, a research group is understood as a collective of faculty members and undergraduate and graduate students organized around a line of research. That knowledge informs decisions on doctoral training, publication support, interinstitutional collaboration, and journal selection. Bibliometric analysis is a rigorous method for exploring large volumes of scientific data, identifying emerging areas in a field, and studying collaboration patterns (Donthu et al., 2021). Applying it to a mid-sized group calls for adjustments, because citation indicators lose stability with small corpora.

The study's novelty is, theoretically, that it reads a line of research in

heritage education through its bibliometric structure rather than through its content alone. Practically, it provides a cleaned data matrix and a set of indicators that other university groups can replicate. It also corrects discrepancies between a preliminary analysis and the verified list of publications, and in doing so proposes a self-assessment procedure that links science management with better editorial quality. The general objective of this article is to characterize, through descriptive bibliometric methods, the scientific output on heritage education produced by a research group at the University of Matanzas between 2014 and 2026.

Methods and materials

The study followed a descriptive, retrospective bibliometric approach. It drew on quantitative indicators of productivity, authorship, indexing, and dissemination, together with a content analysis of the group's main publications. The research design is nonexperimental and exploratory in scope: the corpus comes from a single group, and the study makes no claim to statistical generalization.

The bibliometric method was chosen for its capacity to analyze scattered records and compare them. The choice reflects the aim of describing this group's trajectory, not of assessing the quality of each document. The units of analysis were articles published in serial journals between 2014 and 2026, and they were checked against the group's list of publications on heritage education associated with local history, cultural management, museology, and the STS approach.

The authors compiled the list themselves from their personal records. Every document with at least one member of the group's core among its authors was included. The final corpus comprised the 36 initial documents, each of which had at least one group member as an author and addressed heritage, and heritage education in particular.

The procedure had four phases. The first defined the corpus and the inclusion criteria. The second standardized the data, which meant unifying variant forms of author and journal names. The third calculated the bibliometric indicators, and the fourth carried out the content analysis of the published works.

Data collection relied on document analysis. For each document, the authors recorded the year of publication, authors, title, journal, country of publication, and the databases in which it was reported as indexed. The data were organized in a spreadsheet matrix with one row per document. Country of publication was assigned according to each journal's record. Indexing was noted on a nonexclusive basis, since a single journal may appear in several databases.

Productivity indicators were the number of documents per year and per stage. The stages were delimited by changes in publication rhythm: 2014-2018, 2019-2022, and 2023-2026. Author participation was calculated by full counting, so each document adds one participation for every signatory. The collaboration index was defined as the proportion of documents with more than one author, and the mean number of authors per document was calculated as well. Dispersion was quantified by journal, country of publication, and database.

The thematic analysis rested on manual coding of titles. Recurring terms and concepts were identified across the publications and grouped into six thematic axes by conceptual affinity. A document could be assigned to more than one axis when its title and abstract warranted it, and the main results and conclusions were also taken into account. Thematic evolution was studied by comparing the presence of each axis across stages. This interpretive procedure does not replace an automated analysis of term co-occurrence. Validation combined three strategies. Source triangulation contrasted the original list supplied by the authors with a preliminary analysis of the same research group, and all indicators were recalculated from the data matrix.

Discrepancies in the total number of documents, their annual distribution, and author participation were resolved in favor of the list's records and checked against sources identified in Scopus, Web of Science, Redalyc, and other databases. Peer review involved the different members of the research team, who examined the thematic categories and the assignment of documents to them. The theoretical contrast compared the findings with international studies on heritage education from the past five years. The study used publicly available information and open-access articles.

The study did not require approval from an ethics committee, as it involved no human participants. Authorship was respected in every document through proper citation of the source. The authors state that they belong to the groups analyzed and acknowledge a possible self-assessment bias. To mitigate it, they documented the rules for inclusion, standardization, and calculation so that other teams can replicate the procedure.

Results and discussion

The corpus consisted of 36 documents published between 2014 and 2026 in 23 journals from nine countries. The series spans 13 years, with a gap between 2016 and 2017, when no documents were located. Authors were ranked by participation, and those at the top form a stable core across the period. The corpus brings together documents of varied kinds, chiefly research articles, outreach texts, and book chapters. The results are presented in the order of the objectives pursued in this article.

Annual output began modestly, with a single document in 2014 and another in 2015. Publication then paused in 2016 and 2017, resumed in 2018 with one document, and rose to three in 2019. Only one document appeared in 2020, and output returned to three in 2021. Production peaked in 2024 with seven documents, followed by six in each of 2022 and 2025. In 2026, up to the time of writing, four documents had accumulated within the period analyzed, although the authors report that more than eight additional manuscripts have been submitted to scientific journals.

The distribution by stage points to gradual, sustained growth. Only three documents were produced between 2014 and 2018; the total reached 13 for 2019-

2022 and 20 for 2023-2026. The last stage accounts for more than half of the corpus, a pattern that describes a line of research consolidating over time and picking up pace in the most recent years. Two figures stand out in author participation: Jiménez Pérez, with 18 documents, followed by Jiménez Sánchez, with 16.

Another member of the group, Peñate Villasante, has seven participations. Hernández de la Cruz and Castañeda Paz each appear in four documents, and Ballester Quintana, Hernández Campos, Santana Finalé, and Osuna Torriente in two each. Ten documents have a single author and 26 are coauthored, which yields a collaboration index of 0.72; in other words, seven of every 10 documents have more than one author. The mean number of authors per document is 2.2. Single authorship includes Jiménez Sánchez's early documents and Jiménez Pérez's reflective texts on emerging technologies and urban spaces. The documents with the most signatories, four and five authors, appear between 2019 and 2022.

Coauthorship patterns outline identifiable working clusters. Jiménez Sánchez collaborates repeatedly with Castañeda Paz, Osuna Torriente, Ballester Quintana, and Hernández Campos on theoretical foundations, professional training, and the relationship between museum and school. Jiménez Pérez works regularly with Peñate Villasante and Santana Finalé on community, public spaces, and cultural management. Hernández de la Cruz and Peñate Villasante form a stable coauthoring pair, with documents on museums and interpretive practices. The two central figures coincide in a single document, from 2023, on interpretation and heritage education in the training of sociocultural managers.

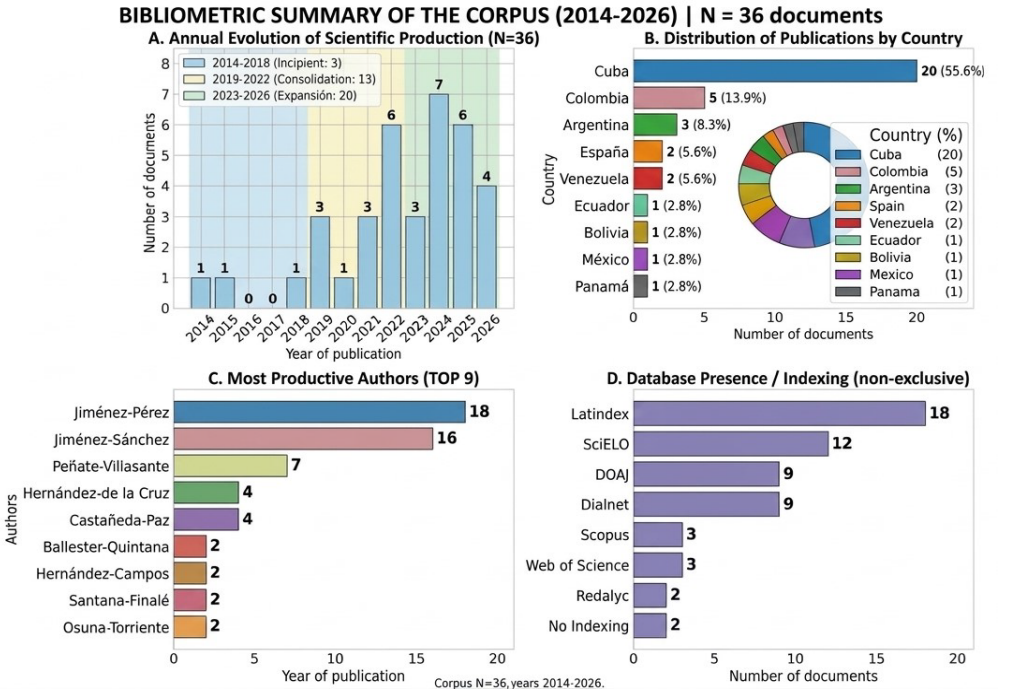
Dissemination is spread across 23 journals. Revista Atenas is the most frequent venue, with four documents, followed by Revista Cubana de Educación Superior with three. Eight other journals each carry two documents, among them Conrado; Arte, Individuo y Sociedad; Opuntia Brava; Universidad y Sociedad; and Utopía y praxis latinoamericana. The remaining 13 appear once each, and the top two journals account for almost a fifth of the corpus.

Cuba accounts for 20 documents, Colombia for five, Argentina for three, Spain and Venezuela for two each, and Ecuador, Bolivia, Mexico, and Panama for one each. The first stage is limited to journals from Cuba and Colombia. Between 2021 and 2022, journals from Spain, Ecuador, and Bolivia appear, and from 2023 onward, journals from Mexico, Panama, Argentina, and Venezuela join in. Foreign journals hold 16 documents, nearly half the corpus.

As for indexing, Latindex is the most frequent database, with 18 documents, followed by SciELO with 12. DOAJ and Dialnet each list nine documents, and Redalyc two. Scopus and Web of Science coincide on three documents, published in 2021, 2023, and 2025 in two journals, Arte, Individuo y Sociedad and CIMEXUS. Thirty-four of the 36 documents appear in at least one database. The remaining two, from 2014 and 2018, were published in an institutional outlet at the provincial level. Figure 1 presents a summary of this analysis.

Figure 1

Bibliometric characterization of the analyzed corpus (2014-2026, N = 36)



Source: Authors' own elaboration.

The analysis of titles identified six thematic axes. The first groups identity and local history. It includes the earliest documents in the series, centered on Matanzas identity, and a later work on the study of slavery and its legacy in history teaching. This axis appears in all three stages, with less relative weight in the most recent one. Its role is to supply the territorial and symbolic anchor of the line in a context marked by Afro-descendant heritage resources.

The second axis covers museums and educational mediation. It includes the use of thematic museums in social science teaching, art and heritage education in the city's museums, the relationship between museum and school, and heritage communication at sites such as the San Severino Castle and the Firefighters Museum. It also covers the design of an elective course on the museum heritage of Matanzas and the study of interpretive practices in out-of-school settings. This axis is concentrated between 2019 and 2022 and reappears in 2025 with digital museum management.

The third axis brings together urban heritage, community, and public spaces. Its documents study heritage education among community members in the Urban Historic Center of Matanzas, the values of built heritage as educational content, the dissemination of heritage in urban contexts, and the resident community in public spaces. It also incorporates the sociocultural manager in the role of heritage educator. The axis is present from 2020 through 2025.

The fourth axis links the STS approach to the pedagogical foundations of heritage education. It starts in 2015 with a study on local history and STS education,

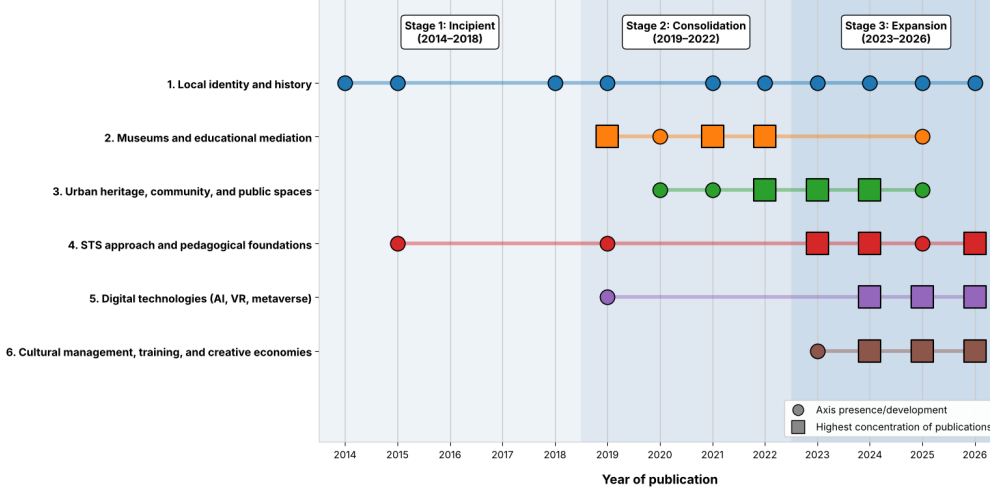
continues in 2019 with the relationship between heritage and the sciences, and is renewed in 2023 and 2024 with work on heritage education in urban spaces and on heritagization. In 2026, one study presents the line of cultural heritage and STS as an emerging line of research at the university. Theoretical reflections on the educational debate around heritage and on pedagogical research in heritage education in Cuba are also included, along with a model of a socioemotional approach for the Colombian coffee cultural landscape.

The fifth axis concerns digital technologies. It begins in 2019 with heritage education through virtual reality in museums, resumes in 2024 with artificial intelligence, the metaverse, and virtual reality in relation to cultural heritage, and continues in 2025 with digital museum management and the universal accessibility of Afro-Matancero heritage. In 2026, a study appeared on the contribution of AI to the heritage education of tour guides. This axis has grown steadily since 2024.

The sixth axis covers cultural management, professional training, and creative economies. It includes studies on cultural management at the Sauto Theater, tour guide training with a business orientation, and heritage education for developing creative economies in the historic center. Comparing the stages reveals a shift from identity and local history toward museums and urban heritage, and from there toward digital technologies and creative economies. The STS approach runs through all three stages. Heritage education occupies the center of the thematic network, and museums act as the link among heritage, community, and school. Figure 2 below summarizes the temporal evolution of these axes.

Figure 2

Structure and temporal evolution of the thematic axes in the corpus (2014-2026)



Source: Authors' own elaboration.

The results show a line of research sustained for more than a decade, with accelerated growth since 2019. This is consistent with the general expansion of the field internationally, where, according to the mapping by Fontal et al. (2023), scientific output intensified from 2005 onward. The coincidence suggests that the

University of Matanzas group responded to international demand and cannot be read as an isolated initiative. The comparison concerns trend rather than magnitude, since scale and unit of analysis differ.

The group's thematic structure is largely compatible with the networks identified in the international literature. The global mapping found networks on heritage education in formal education, cultural heritage, and educational innovation. It also found studies on archaeological heritage, case studies, and historical awareness, which are likewise tied to technologies in nonformal contexts.

The group's scientific output sits mainly in nonformal settings such as museums, communities, and public spaces. Heritage education in the school curriculum and archaeological heritage receive little attention. This specialization is both a strength of focus and a limitation, one that corresponds to the context in which the researchers publish.

The weight of museums in the group's output echoes bibliometric studies on heritage education in museums. One mapped their conceptual, intellectual, and social structure from 2000 to 2019 (Monteagudo Fernández et al., 2021). Another analyzed, in Web of Science, high-impact research on training in museum mediation and education (Álvarez Rodríguez et al., 2019). The difference is that those works describe the field worldwide, while the present study describes what one group contributes to a specific territory. The museums of Matanzas provide an empirical case that can enrich those syntheses with Caribbean evidence (Hernández de la Cruz et al., 2021).

The classification of research genealogies proposed for this field helps show the group's contribution in greater depth. That classification distinguishes lines that have been reconceptualized from didactic-contextual and educational ones, to which teacher training and instrumental research were later added (Fontal & Ibañez Etxeberria, 2017; Fontal et al., 2023).

The group's documents on the conceptual debate over didactic design in museums and urban spaces, together with those on the assessment of key competencies, fit within the first three genealogies (Castañeda Paz & Jiménez Sánchez, 2024; Hernández de la Cruz et al., 2021). The training of sociocultural managers and tour guides also comes close to the genealogy of professional training.

The international mapping points toward the construction and validation of documents. Nothing of this kind appears in the titles supplied by the authors or in those identified in the international databases consulted, which marks a pending line of development. The same mapping concluded that qualitative methodologies, case studies, and narrative reviews are the most frequent in this field, with few quantitative studies to complement them (Fontal et al., 2023).

This analysis did not examine the methodological design of each document these authors have published, so it cannot say whether the group reproduces that pattern. The titles of the articles suggest a predominance of studies on institutions and specific public spaces, which is consistent with the international trend.

An analysis of the content of the methods would resolve the question; until

then, the absence of such an analysis is both a limitation and an opportunity to explore. The Latin American perspective requires its own discussion, since the term heritage education has been tied to research in Brazil, within an Ibero-American tradition that has shaped a field associated with memory, identity, and multicultural studies.

Recent research adds to this picture by analyzing what is new in heritage education and its relationship with schooling, intercultural communication, and other topics, often associated with the figure of Paulo Freire. Authors such as da Silva (2022) and Scifoni (2022) recognize this. The Matanzas research group shares the emphasis on identity and territory but stands out for its concentration on urban public spaces and resident communities. That difference reflects the broad diversity of settings represented in the region.

Digital technologies, for their part, place the group within one of the most active trends in the field. Recent international literature evaluates quality requirements for augmented reality in heritage spaces from the teachers' perspective (Aso et al., 2021), a concern the group's authors address. Research on artificial intelligence and the metaverse is also present, as the titles, abstracts, results, and conclusions of their publications show. The group's output also includes reflective and review studies, above all those by Jiménez Pérez (2024a, 2024b).

This difference points to an opportunity, namely a move from conceptual reflection to design and to the empirical evaluation of digital experiences in museums and urban public spaces in Matanzas. The universal accessibility of Afro-Matancero heritage offers a favorable setting for such work, according to Jiménez Pérez and Hernández Manso (2025).

The study of communities and public spaces is another essential axis and matches the international attention to citizen participation in heritage safeguarding. One study analyzed the informal education of Chinese embroidery crafts from the perspective of civic participation (Yan & Chiou, 2021). The group's documents examine heritage education among communities living in a historic center and in public spaces (Jiménez Pérez et al., 2025). Both approaches give participation by communities a central place. This conceptual convergence appears in other international publications, though in different contexts, since intangible craft heritage and urban heritage pose different challenges.

The STS approach is also a distinctive trait of the line when set against the international literature reviewed (Kyropoulou et al., 2025; Liu et al., 2026). The thematic networks of the global mapping do not show this approach explicitly. The group applies it through the study of heritagization and heritage education in public spaces (Jiménez Pérez, 2023; Santana Gil et al., 2026). This link places heritage within the public understanding of science and local development. Consolidating it will require more dialogue with other social studies of science and with the journals in that field.

The high collaboration index points to the teamwork typical of a consolidated group. The participation of researchers from other institutions, including Spanish and Colombian universities, widens the reach of this network. Even so, output is concentrated mainly in two authors, who appear in most of the

documents. From the standpoint of university management, this concentration is a strength in terms of leadership but also a risk of dependence. Training new researchers and bringing early-career PhD holders into authorship would reduce that risk, and the group is already moving in that direction through coauthorship with researchers in doctoral and master's training.

The shift from regional journals to international databases is a meaningful change for the group's visibility. The three documents indexed in Scopus and Web of Science are concentrated in two journals, which indicates a route of access that is still narrow, although the authors report having submitted four articles to journals indexed in those databases for evaluation. Dispersion is high, particularly across regional databases, which favors circulation in the Ibero-American sphere.

The study suggests that an editorial strategy could combine quality regional journals with international journals in education, museology, and heritage studies to widen visibility. The geographic expansion of the journals used shows a gradual reopening toward the Ibero-American sphere. Even so, most documents continue to appear in Cuban journals, which reflects access to the local reader and the editorial conditions in the country. The absence of journals from the Anglophone sphere limits dialogue with the international literature.

International mappings rely on Scopus and Web of Science, so documents indexed only in regional databases fall outside those maps (Álvarez Rodríguez et al., 2019). This representation gap justifies the authors' efforts to broaden their presence in international databases.

The study makes several contributions. It reads heritage education through the trajectory of a research group and shows a shift from local identity toward approaches centered on STS, digital tools, and creativity. It provides a cleaned matrix and a replicable procedure for evaluating scientific output. It also corrects discrepancies between a preliminary analysis and the verified list supplied by the authors, which reinforces the need to check records before any institutional analysis. These contributions respond to the aim of characterizing this line of research and engage with methodological recommendations for bibliometric analysis (Donthu et al., 2021).

The study has some limitations that need to be stated. The corpus is based on the list supplied by the group itself and corroborated through searches and analysis in various databases, so some published sources may have been omitted and a self-assessment bias is likely. The analysis includes no citation data or impact indicators, and indexing was recorded according to the information each journal provides.

Thematic coding drew on the titles, abstracts, results, and conclusions of the published works, which summarizes the content of the documents only in a limited way. The documents are of diverse kinds, including research articles, outreach texts, and book chapters.

The study did not consider papers presented at international events, participation in panels or roundtables, theses defended or supervised, and other channels that also carry this group's results to wider audiences. News items and

websites of Cuban state institutions report the awards the group has received on topics associated with heritage education, which reflects scientific progress and recognition locally and nationally.

Prospects for future research are broad. The corpus should be completed with data from Scopus, Web of Science, and Google Scholar, and citation indicators should be incorporated. Bibliometrix and VOSviewer would allow coauthorship and keyword co-occurrence maps to be built with more rigor than manual coding permits (van Eck & Waltman, 2010; Aria & Cuccurullo, 2017).

Comparative studies of this group with others devoted to heritage education face the same limitations. Such groups have been identified at Cuban universities (University of Cienfuegos, University of Havana), in Latin America (Autonomous University of Chile, Pedagogical and Technological University of Colombia), and in Europe (Public University of Navarre, University of Valencia, University of Oviedo, University of Barcelona, and the Spanish Observatory of Heritage Education at the University of Valladolid). Output cannot be quantified by stage because not all members of these collectives can be identified, several databases are not visible, or the topic appears disaggregated.

Even so, a content analysis of the methods in each document would allow the group's output to be placed within the international genealogies, and comparison with other Latin American heritage education groups would provide a regional frame of reference.

Conclusions

The bibliometric analysis characterizes the scientific output on heritage education of the University of Matanzas research group as a sustained, collaborative, and growing line of work. The temporal evolution, authorship structure, dissemination channels, and thematic axes meet the stated objectives and describe a shift from local identity toward museums, urban heritage, the STS approach, digital technologies, and creative economies. Heritage education acts as the articulating axis of the whole. The main challenge the study reveals is to widen international visibility and to share scientific leadership among more researchers.

The study offers a verifiable reading of the trajectory of a Caribbean group in a field dominated by global syntheses. It documents the connection between research and the training of sociocultural managers and tour guides, and it places the community and the urban heritage of Matanzas at the center of knowledge production. For university management, it also supplies a self-assessment procedure that can be built into institutional science and innovation systems.

The study's extensibility is high methodologically and moderate in terms of results. The procedure can be replicated in other university groups, museums, and heritage management networks, provided that the inclusion criteria are adapted and the records verified. The results, in contrast, describe a single group and cannot be generalized to other contexts. Future research should incorporate citation data, coauthorship and co-occurrence maps, analysis of the methods used, and comparisons with groups in other countries of the region. Such an agenda would

make it possible to assess the real impact of heritage education on the transformation of museums and educational institutions.

References

Adegoriola, M. I., Lai, J. H., Chan, E. H., & Darko, A. (2021). Heritage building maintenance management (HBMM): A bibliometric-qualitative analysis of literature. *Journal of Building Engineering*, *42*, 102416. https://doi.org/10.1016/j.jobe.2021.102416

Ale, T. A., & Ayeni, D. A. (2026). Fostering sustainable tourism in Nigeria through stakeholder evaluation of heritage sites for conservation and economic development. *Frontiers of Architectural Research*, 15(6), 2257-2277. https://doi.org/10.1016/j.foar.2025.12.015

Alnaim, M. M. (2026). Cultural tourism as a driver for sustainable urban development in Hail City, Saudi Arabia. *Environmental and Sustainability Indicators*, 30, 101135. https://doi.org/10.1016/j.indic.2026.101135

Álvarez Rodríguez, D., Marfil Carmona, R., & Báez García, C. (2019). Impact research on training in mediation and education in museums: Analysis of the Web of Science. *Revista Electrónica Interuniversitaria de Formación del Profesorado, 22*(1), 121–144. https://doi.org/10.6018/reifop.22.1.357731

Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics, 11*(4), 959–975. https://doi.org/10.1016/j.joi.2017.08.007

Aso, B., Navarro Neri, I., García Ceballos, S., & Rivero, P. (2021). Quality requirements for implementing augmented reality in heritage spaces: Teachers' perspective. *Education Sciences, 11*(8), 405. https://doi.org/10.3390/educsci11080405

Bulut, N., & Yüceer, H. (2023). A literature review on the management of underwater cultural heritage. *Ocean & Coastal Management*, *245*, 106837. https://doi.org/10.1016/j.ocecoaman.2023.106837

Castañeda Paz, P., & Jiménez Sánchez, L. (2024). Heritage and heritage education: An issue for educational debate? *Punto Educativo. Revista Científica Especializada en Ciencias de la Educación, 1*(1), 33–47. https://revistas.up.ac.pa/index.php/punto_educativo/article/view/5654

Chernbumroong, S., Worragin, P., Wongwan, N., Intawong, K., Homla, P., & Puritat, K. (2024). Digitization of myth: The HimmapanVR Project's role in cultural preservation. *Heliyon*, *10*(9), e30052. https://doi.org/10.1016/j.heliyon.2024.e30052

Chiurco, A., D'Augusta, V., Longo, F., Nervoso, A., Solina, V., & Talarico, S. (2025). Leveraging Personal Assistants for Enhanced Access to Cultural Knowledge: A Case Study. *Procedia Computer Science*, *253*, 3309-3317. https://doi.org/10.1016/j.procs.2025.02.055

Clinker, S. D., & Friesen, T. M. (2026). Hands-on Heritage: 3D artifact replicas as tools for connecting Inuinnait youth with Elder Knowledge and archaeology. *Arctic Science*, *12*, 1-12. https://doi.org/10.1139/as-2026-0004

Council of Europe. (2005). *Council of Europe framework convention on the value of*

cultural heritage for society (CETS No. 199). Council of Europe.

da Silva, R. (2022). Education, heritage and intercultural communication in public schools in southern Brazil. *Educação & Sociedade*, 43, Artículo e255256. https://doi.org/10.1590/ES.255256

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070

Fazenda, P., Modeliar, R. S., Covão, N., Baeta, L., & Lopes, M. (2025). A sailing simulator for the revival of the Tagus River nautical heritage. *Digital Applications in Archaeology and Cultural Heritage*, *39*, e00475. https://doi.org/10.1016/j.daach.2025.e00475

Fontal, O., & Ibañez Etxeberria, A. (2017). Research on heritage education. Evolution and current state through analysis of high impact indicators. *Revista de Educación*, 375, 184–214. https://doi.org/10.4438/1988-592X-RE-2016-375-340

Fontal, O., Ibañez Etxeberria, A., Arias, V. B., & Arias, B. (2024). A calibrated scale to measure heritage learning in digital environments. A network analysis approach. *Heliyon*, *10*(21), e39466. https://doi.org/10.1016/j.heliyon.2024.e39466

Fontal, O., Ibañez Etxeberria, A., Gil Biraud, V. E., & Arias, B. (2025). Knowing and understanding cultural heritage in digital environments: An approach using MIMIC and network models. *Revista de Psicodidáctica (English ed.)*, *30*(2), 500169. https://doi.org/10.1016/j.psicoe.2025.500169

Fontal, O., Martínez Rodríguez, M., & García Ceballos, S. (2023). The educational dimension as an emergent topic in the management of heritage: Mapping scientific production, 1991–2022. *Heritage*, *6*(11), 7126–7139. https://doi.org/10.3390/heritage6110372

Galindo Durán, A., Oliver López, C. P. de, & Bernal Bravo, C. (2026). A methodological protocol for the generation and evaluation of AI-generated cultural heritage content. *Journal of Cultural Heritage*, *81*, 370-381. https://doi.org/10.1016/j.culher.2026.08.010

Hamidy, M. E., Errami, E., & Elkaichi, A. (2024). An overview of scientific research on geoheritage in Morocco. *Proceedings of the Geologists' Association*, *135*(2), 162-180. https://doi.org/10.1016/j.pgeola.2024.01.002

Hernández de la Cruz, J. M., Rivero, P., García Ceballos, S., & Peñate Villasante, A. G. (2021). La educación artística y patrimonial en los museos de Matanzas, Cuba. Evaluación de competencias clave. *Arte, Individuo y Sociedad, 33*(4), 1211–1234. https://doi.org/10.5209/aris.71381

Huang, Y., He, X., Lian, Z., & Yang, Z. (2025). Mapping the landscape of digital cultural heritage research: A quantitative and visual bibliometric study. *Library Hi Tech*, *43*(2), 1157-1187. https://doi.org/10.1108/LHT-09-2023-0465

Jiménez Pérez, G. A. (2023). La educación patrimonial desde un enfoque de ciencia, tecnología y sociedad en espacios urbanos. *CIMEXUS*, *18*(1), 27–46. https://doi.org/10.33110/cimexus180102

Jiménez Pérez, G. A. (2024a). Beneficios y desafíos del uso de la IA en la educación patrimonial. *EthAIca,* 3. https://doi.org/10.56294/ai2024102

Jiménez Pérez, G. A. (2024b). El metaverso en tensión: Líneas de estudio y futuro del campo desde la perspectiva de las ciencias sociales. *Metaverse Basic and Applied Research*, 3. https://doi.org/10.56294/mr2024.98

Jiménez Pérez, G. A., & Hernández Manso, T. (2025). Articulación entre gestión museística digital y economía creativa para la accesibilidad universal del patrimonio afromatancero. *Arte, Individuo y Sociedad, 37*(4), 811–821. https://doi.org/10.5209/aris.102556

Jiménez Pérez, G. A., Hernández de la Cruz, J. M., & Peñate Villasante, A. G. (2025). La comunidad residente en los espacios públicos urbanos y su patrimonio. *Región Científica, 4*(2). https://doi.org/10.58763/rc2025484

Ksissou, K., Kadri, A. E., El-Khodary, M., & Trid, S. (2024). The tourism attractiveness of the Moroccan archaeological site of Volubilis: An analysis of the determinants through analytic hierarchy process (AHP). *International Journal of Geoheritage and Parks*, *12*(4), 606-620. https://doi.org/10.1016/j.ijgeop.2024.11.007

Kyropoulou, D., Karalis, P., Dotsika, E., Rizou, F., Raptis, I., Drosou, A., Tzovaras, D., Ainian, A. M., & Kolofotia, E. (2025). A 3D geospatial platform and AI tour application for visualizing archaeological, analytical, and conservation data: The case of the Vryokastro archaeological ensemble, Kythnos Island. *Journal of Archaeological Science: Reports*, *68*, 105480. https://doi.org/10.1016/j.jasrep.2025.105480

Li, Y., Zhao, L., Chen, Y., Zhang, N., Fan, H., & Zhang, Z. (2023). 3D LiDAR and multi-technology collaboration for preservation of built heritage in China: A review. *International Journal of Applied Earth Observation and Geoinformation*, *116*, 103156. https://doi.org/10.1016/j.jag.2022.103156

Lin, S., & van Ameijde, J. (2026). The impact of urban renewal on place attachment: A framework to enhance social structures and resident satisfaction. *Cities*, *172*, 106894. https://doi.org/10.1016/j.cities.2026.106894

Liu, Z., Ji, X., Cui, Y., Zhang, T., & Yao, J. (2026). ArchiBuilder: A virtual reality-based gamified experience design for architectural images in Dunhuang murals. *Frontiers of Architectural Research*, *15*(2), 663-683. https://doi.org/10.1016/j.foar.2025.07.002

Monteagudo Fernández, J., Gómez Carrasco, C. J., & Chaparro Sainz, Á. (2021). Heritage education and research in museums. Conceptual, intellectual and social structure within a knowledge domain (2000–2019). *Sustainability, 13*(12), 6667. https://doi.org/10.3390/su13126667

Newsome, D., & Dowling, R. K. (2025). Geotourism. En *Reference Module in Social Sciences*. Elsevier. https://doi.org/10.1016/B978-0-443-27698-9.00005-2

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura [UNESCO]. (1972). Convention concerning the protection of the world cultural and natural heritage. UNESCO.

Peng, Y., Nijhuis, S., Wu, Z., & Yu, Y. (2026). Beyond scenic views: An integrative review of visual research on heritage landscapes—Themes, methods, and typologies across scales. *Landscape and Urban Planning*, *276*, 105742. https://doi.org/10.1016/j.landurbplan.2026.105742

Peñate Villasante, A. G., & Jiménez Pérez, G. A. (2020). La educación patrimonial en los miembros de la comunidad del Centro Histórico Urbano de Matanzas.

Revista Atenas, *2*(50), 66–84. https://atenas.umcc.cu/index.php/atenas/article/view/295

Piano, E., Mammola, S., Nicolosi, G., & Isaia, M. (2024). Advancing tourism sustainability in show caves. *Cell Reports Sustainability*, *1*(3), 100057. https://doi.org/10.1016/j.crsus.2024.100057

Quijano, I. E. (2022). Heritage education in pre-colonial settlements: Are there differences in learning according to presentation models of archaeological sites? *Revista Electrónica Educare*, *26*(2), 150–173. https://doi.org/10.15359/ree.26-2.9

Rashevska, N. V., & Semerikov, S. O. (2026). From philosophical immersion to digital reality: A unified theoretical framework for understanding and classifying immersive technologies in education. *Computers & Education: X Reality*, *8*, 100147. https://doi.org/10.1016/j.cexr.2026.100147

Santana Gil, A., Zamora Díaz, A., & Jiménez Sánchez, L. (2026). Estudios sobre patrimonio cultural y enfoque ciencia, tecnología y sociedad (CTS): Una línea de investigación emergente en la Universidad de Matanzas. *Revista Cubana de Educación Superior*, 45. https://revistas.uh.cu/rces/article/view/12673

Scifoni, S. (2022). Heritage and education in Brazil: What is new? *Educação & Sociedade*, 43, Artículo e255310. https://doi.org/10.1590/es.255310

Silva, J. G. da, Filho, R. E., Campos, J. B., Miziescki, M., Ladwig, N. I., Back, Á. J., Rosado González, E. M., & Sá, A. A. (2025). The Caminhos dos Cânions do Sul UNESCO Global Geopark (Brazil) in scientific literature: A review. *International Journal of Geoheritage and Parks*, *13*(2), 220-238. https://doi.org/10.1016/j.ijgeop.2024.10.002

Talib, M. A., Ibrahim, I., & Abusirdaneh, M. A. (2026). Reusability and benchmarking potential of architectural cultural heritage datasets for generative AI: An analytical study. *Expert Systems with Applications*, *309*, 130916. https://doi.org/10.1016/j.eswa.2025.130916

Tamim, Z. H., Akter, B., Rahman, M. S., Kaiser, M. S., Rahman, M. A., Ogliari, E., & Tanasiev, V. (2025). Exploring equitable opportunities and cultural preservation in smart tourism through sustainable and accessible Virtual Reality. *Sustainable Cities and Society: Advances*, *1*(1), 100007. https://doi.org/10.1016/j.scsadv.2025.100007

van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2), 523–538. https://doi.org/10.1007/s11192-009-0146-3

Waqar, A. (2026). Performance benchmarking of scan-to-HBIM workflows for cultural heritage (2012–2025). *Automation in Construction*, *184*, 106848. https://doi.org/10.1016/j.autcon.2026.106848

Yan, W., & Chiou, S. (2021). The safeguarding of intangible cultural heritage from the perspective of civic participation: The informal education of Chinese embroidery handicrafts. *Sustainability*, *13*(9), 4958. https://doi.org/10.3390/su13094958

Yu, Y., Wang, Z., Oosterom, P. van, Pottgiesser, U., Verbree, E., & Peng, Y. (2026). Reframing the "H" in HBIM: from systematic review to UML-based conceptual modeling. *Frontiers of Architectural Research*. https://doi.org/10.1016/j.foar.2026.02.007

About the main author

Guillermo Alfredo Jiménez Pérez: is a tenured professor and assistant researcher at the University of Matanzas, where he serves as President of the Scientific Council for Social Sciences. He is also the lead specialist in international cooperation at the Office of the Conservator of the City of Matanzas. Holding a PhD in Educational Sciences and a degree in Sociocultural Studies, he has eight years of teaching and research experience in heritage education, cultural management, and digital technologies. He has led and participated in various innovation and international cooperation projects.

Declaration of author responsibility

Guillermo Alfredo Jiménez Pérez 1: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Supervision, Validation/Verification, Visualization, Writing – original draft, and Writing.
Lissette Jiménez Sánchez 2: Data curation, Formal analysis, Investigation, Resources, Supervision, Validation/Verification, Visualization, Writing/original draft, and Writing, review, and editing.
Juan David Ardila Suárez 3: Data curation, Formal analysis, Investigation, Resources, Validation/Verification, Visualization, Writing/Original draft.
Helen María Santana Finalé 4: Data curation, Formal analysis, Investigation, Resources, Validation/Verification, Visualization, Writing/Original draft.

Special Acknowledgments:

Financing:

Own resources