




Article

Heritage Education and Research in Museums. Conceptual, Intellectual and Social Structure within a Knowledge Domain (2000–2019)

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Abstract: Heritage and museums have constituted two fundamental axes of heritage education research in recent decades. This can be defined as the pedagogical process in which people can learn about heritage assets in formal or informal learning contexts. Museums, as centres of reference in informal education, are in constant and fluid contact with schools and produce different and varied didactic materials related to heritage. This paper provides results concerning the development and shaping of the knowledge domain known as heritage education between 2000 and 2019 on the Web of Science (WoS). To this end, different techniques and tools have been used: R-package Bibliometrix and VOSviewer. This analysis has identified five clusters with the topics underpinning heritage education as a specific field of knowledge. Our inquiry has highlighted the fact that there has been an increase in production regarding research topics associated with heritage education and museums in this period, particularly between 2015 and 2019. The inclusion of ESCI journals has led to a greater visibility of WoS-indexed academic production in some countries. Finally, the concepts “heritage”, “museum” and “education” are the axes around which the research paradigms related to heritage education research seem to have been developed.

Keywords: bibliometric analysis; heritage education; museum research; research review; science mapping



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1. Introduction

1.1. Heritage Education Research

In the past two decades, there have been many studies which have investigated the links and reciprocities between heritage education, history education, the construction of a critical citizenship and non-exclusive identity education [1]. Examples of this attempt at integration can be found in different internationally published studies [2–8] ratified via the investigations of many consolidated research groups which are working to analyse the connections between formal and non-formal education with regard to heritage, identity and citizenship education. The same situation has been observed in countries where there has been a significant increase in such research over recent years, as is the case of Spain where studies [9–16] have established a systemic, participatory, interactive, complex and socio-critical vision of both heritage and heritage education [17].

A recent monograph directed by Olaia Fontal and Álex Ibáñez in *Revista de Educación* specifically demonstrates the strength of this line of research. It brings together, among other issues, a study on the relationship between heritage, citizenship and the construction of identity [18] and research in which a rigorous bibliometric study of scientific production regarding heritage education was carried out [19]. Thus, it can be observed how there are ever more frequent and richer experiments and research being carried out concerning the use of objects and material remains from the past. Along these lines, a decade ago, the journal *Teaching History* published a paper which made a positive evaluation of the articles

published on this issue since the 1990s, emphasising the methodological changes which had taken place thanks to the incorporation of these positions [20], as evidenced, via their own experience, by different authors in recent times [21–27].

However, when speaking of heritage, it is also necessary to make reference to museums, particularly due to the extremely close relationship which exists between the two realities [28,29]. In the second half of the 20th century, museums underwent a great transformation (at least in the Western world) due to an awareness of the limitations of the traditional formal education system and the growing importance of other sources of information and non-school education in the development of the knowledge society and lifelong learning [30].

Therefore, the growing importance of non-formal centres of education has led to the fact that one of the most important areas of action within heritage education is the establishment of relationships between schools and museums as the latter have a greater level of responsibility when putting forward educational proposals focused on heritage. Indeed, UNESCO itself has recognised the social function of museums, considering them to be a key tool for social development and integration [31].

Heritage education is a polysemic concept via which it is possible to refer to a pedagogical process in which people can learn about heritage assets in both formal and non-formal learning contexts [32], and also to a relevant line of research today, not only from the perspective of education, but also from a social point of view as far as identity and citizenship education is concerned [18]. This is connected with the possibilities that heritage education offers for the development of historical thinking due to the fact that the performative dimension of heritage leads people to become aware of the dialectics between the past and the present [33,34].

In spite of this relevance, and within the field of formal pedagogical processes, teacher training in terms of cultural heritage must be improved [35] in order to be able to implement critical and reflexive heritage education in the classroom which distances students from ethnocentric thinking [36]. In this context, research on the perceptions of both trainee and practising teachers regarding the use of heritage in educational contexts via active learning methods is fundamental in improving the teaching of social science contents in educational processes [37,38].

1.2. Nascent Research on Museums

Studies on museums are extremely diverse as they can be carried out from different perspectives [39,40]. However, by their very nature, museums have been educational institutions since the end of the 18th century, at least in Western Europe. Therefore, education is a central element in the endeavours of such institutions [41]. Nevertheless, it was not until the end of the Second World War, and even then it was with difficulty, that it began to be possible to speak of education in museums [42]. Indeed, even today, museums are torn between educating the public and showing their most significant contents from a technical, historical and artistic point of view, having to choose between the traditional criteria of academic canons and teaching and learning as their main objectives [43].

Research on museums has intensified over the last two decades. For example, in the United States there is a strong line of research which relates working with museums and the strengthening of citizenship education [44]. As areas of reference in informal education, the analysis of the educational materials elaborated by museums with relation to heritage shows, however, the absence of a heritage approach and a lack of coherence [45]. There has also been, at least until recent times [46], a low degree of interest in evaluative processes which could improve the quality of the exhibitions. Therefore, it is necessary to strengthen the school–museum relationship and, thus, the development of a form of heritage education which transforms museums into an opportunity for people with different capacities, enabling greater learning on the part of students and making visitors active elements, thereby helping to deal with other issues related to citizenship education [31] leading to changes which will improve society [43,47].

One such pathway of the new educational practice in museums is active learning, that is, learning by doing in collaboration with other people [48]. Active learning seeks to keep visitors active, both mentally and physically, by way of activities which involve handling information, reflection and problem solving [49]. By employing the objects held by museums, abstract ideas can be developed, or, in the opposite way, abstract ideas can take a specific form and become more easily understood. The original objects provoke wonder and curiosity, two good starting points for learning via comparison, discussion and the formulation of hypotheses, which also encourages emotional and social development [50]. Such experiments, based on object-based pedagogy, have shown good results [51], especially when they are combined with the use of new technologies and augmented reality applications [52].

In relation to the latter, another way of advancement for heritage education in museums is the use of information and communication technologies (from now ICT) [53–56]. These articles address the successes as well as the challenges, from technical glitches to issues in pedagogical approach faced by participants and suggest directions for the future of web-based museum programme delivery. Museums are not oblivious to the development of new technologies and take advantage of the emerging combination of formal and informal learning due to the great quantity of information available on the Internet [57] in order to establish their presence in digital environments [58].

Robotics, with its possibilities for increasing the effectiveness, navigability and interactivity of exhibitions [59], is one of the new technological resources, along with augmented reality mentioned above [32], which have opened up a set of growing opportunities for improving heritage education by offering alternatives in order to personalise, localise and contextualise learning. With the help of robotics, ICT can provide added value to the learning process of cultural heritage, as it can facilitate access to different heritage elements and enable the communication and exchange of knowledge, information and ideas between people [57].

Another way of employing ICT is the so-called “flipped museum”. This concept defines pre-visit work with information relating to the content of the museum, be it through videos, reading material or online conferences. Thus, the visit is oriented towards carrying out dynamic group activities, discussions and problem-solving tasks [60]. Although the results of this type of experiment have proved positive [61–63], it is not free from problems, such as the fact that the final visit to the museum, which cannot be covered only with online resources, can be considered as unnecessary or uninteresting [60].

On the other hand, the development of historical thinking in museums seeks not only to show but also to make history [64]. In this way, visitors, including students, are able to imitate the work of historians, becoming active and thinking elements capable of analysing historical sources and building their own narratives employing these sources, whilst being aware of the complexity of interpreting the past [65]. Thus, museums position themselves as promoters of historical consciousness, whilst contributing to more democratic and reciprocal relationships between themselves and their public [64]. Some of the studies carried out in this field have shown satisfactory results both with students [66] and with adults [67].

1.3. Present Study: Research Questions and Goals

In recent years, the research papers related to the field of heritage education and museums as a learning tool in formal and informal contexts has grown very rapidly. Recent papers about the dissemination of scientific knowledge in archaeological museums have shown this approach [68]. Therefore, the proposals for the interdisciplinary treatment of knowledge [69], the rise of computational thinking [70] and the role of new technologies in improving the museum experience, such as the reconstruction of cultural heritage through the use of 3D, augmented reality, or recreation in virtual museums have improved the research in this field of knowledge [71–74].

This increase in published studies on heritage education and museums justifies the pertinence and relevance of the study that we present due to the need to carry out a bibliometric analysis that allows us to know the essential, emerging or declining topics in this field of knowledge.

How did the conceptual structure of the field of knowledge known as heritage education and museums evolve and take shape over the period 2000–2019? In order to provide an answer to this research problem, the academic output published in journals indexed in the databases included in the Core Collection of the Web of Science (WoS) was analysed focusing on four specific objectives:

- SO1: To quantify and represent the evolution of academic output and its diverse phases.
- SO2: To identify the most productive countries, the outlets where articles were published and the authors with a stronger presence in this area of knowledge.
- SO3: To analyse the main topics addressed by the articles and their connections, and to visualise the changes in core and emerging subjects in this area of knowledge.
- SO4: To analyse the networks of collaboration between countries in this field of knowledge.

2. Materials and Methods

In this study, bibliographic network analysis and science mapping [75] were used in order to represent and analyse the conceptual and intellectual structure and the evolution of research on heritage education and museums. Three bibliometric techniques were used: visualisation of similarities (VOS) [76], thematic mapping and evolution [77] and visual analytics [78]. The combination of these techniques made it possible to obtain a more accurate and comprehensive, global and progressive representation of the knowledge domain [79].

In the following sections, details of each method and data extraction procedure will be discussed.

2.1. Data Extraction and Workflow

Systematic database searches were conducted on the Web of Science Core Collection: Science Citation Index Expanded (SCI); Social Sciences Citation Index (SSCI); Arts and Humanities Citation Index (AHCI); and Emerging Sources Citation Index (ESCI).

The WoS databases are widely accessed internationally and are typically used in bibliometric analyses of specific knowledge domains [80]. The search words were tailored to the main contexts within the target area of knowledge [12]: “museum”, “education” and “heritage”.

A total of 602 documents containing one or more such words in their titles, keywords or abstracts were exported. These 602 documents were individually checked for appropriateness to the field of knowledge of *Heritage Education and museums*, with 481 of them being found to comply with the established criteria. For publications to be included they had to be: (a) articles; (b) published between 2000 and 2019; and (c) specifically belonging to the knowledge domain of *Heritage Education and museums*.

2.2. Data Analysis

The analysis was conducted in two phases. During the first phase, the descriptive data were extracted so as to quantify the evolution of publications between 2000 and 2019 in terms of the most frequent subjects, journals, countries and authors. *The bibliometrix* v.1.9.4 R-package [81] was used in order to analyse the metadata in the bibliographic records. This software package has previously been used in the description of knowledge-specific domains [82].

The second phase included the analysis of the conceptual, intellectual and social structure of the knowledge domain under examination as well as its evolution. During the first stage of this second phase, bibliometric maps were constructed using VOSviewer [76], a tool specifically designed to build and visualise this kind of map. Co-word analysis [83]

was used as a means of identifying popular topics on heritage education and museum research. This tool has recently been applied to the study of the conceptual evolution and current trends in several fields, such as neuroscience [84] and health [85].

3. Results

3.1. Descriptive Analysis

The increase in academic output within the field of heritage education and museums between 2000 (two articles) and 2019 (72 articles) as reflected on the WoS is quite remarkable. In Figure 1, the growth in the number of publications throughout the period analysed is represented (the years are shown on the abscissa axis and the number of published articles on the ordinate axis). Three phases can be distinguished. The first (2000–2007) is characterised by an almost negligible production (2000–2007): 14 articles in 8 years on heritage education and museums. The second phase shows moderate growth: between 2008 and 2014 the number of articles was 83 in the 7-year period. However, this number is extremely low in comparison with other areas of knowledge. Indeed, similar studies [80] focusing exclusively on mathematics education journals indexed in SSCI [86] and publications on physical education in WoS-indexed journals exhibit much higher figures (between 250 and 300 per year) for the same period. Therefore, this phase can be described as a period of weakness with regard to the dissemination of results.

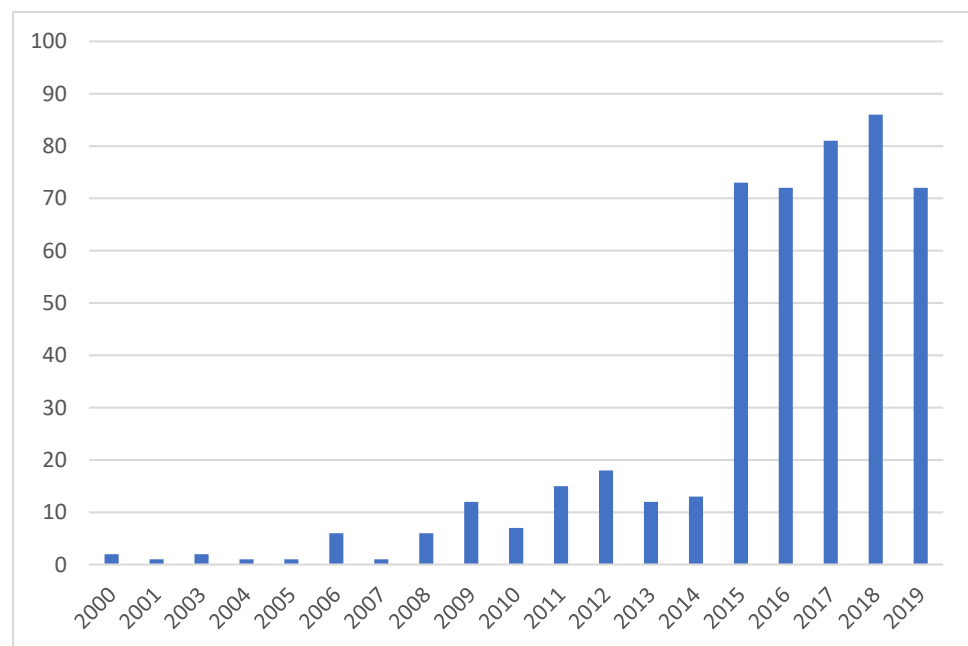


Figure 1. Annual Scientific Production.

The period between 2015 and 2019 shows a great increase in articles indexed on the WoS. From 13 articles published in 2014, academic production increased to an average of 76 annual papers between 2015 and 2019 (384 articles in 5 years). One of the causes for this large increase is the appearance of the ESCI database. This database has made journals from Spain, Italy, Russia and Brazil more visible and has, therefore, enabled the dissemination of the academic production of research groups in heritage education and museums from these countries.

Figure 2 shows the journals in which most studies have been published. The *Journal of Museum Education* brings together more than 25% of the sample, although it has only been in the WoS Core Collections for 5 years. The presence of the rest of the journals is small, thus demonstrating a great degree of dispersion of research in this field.

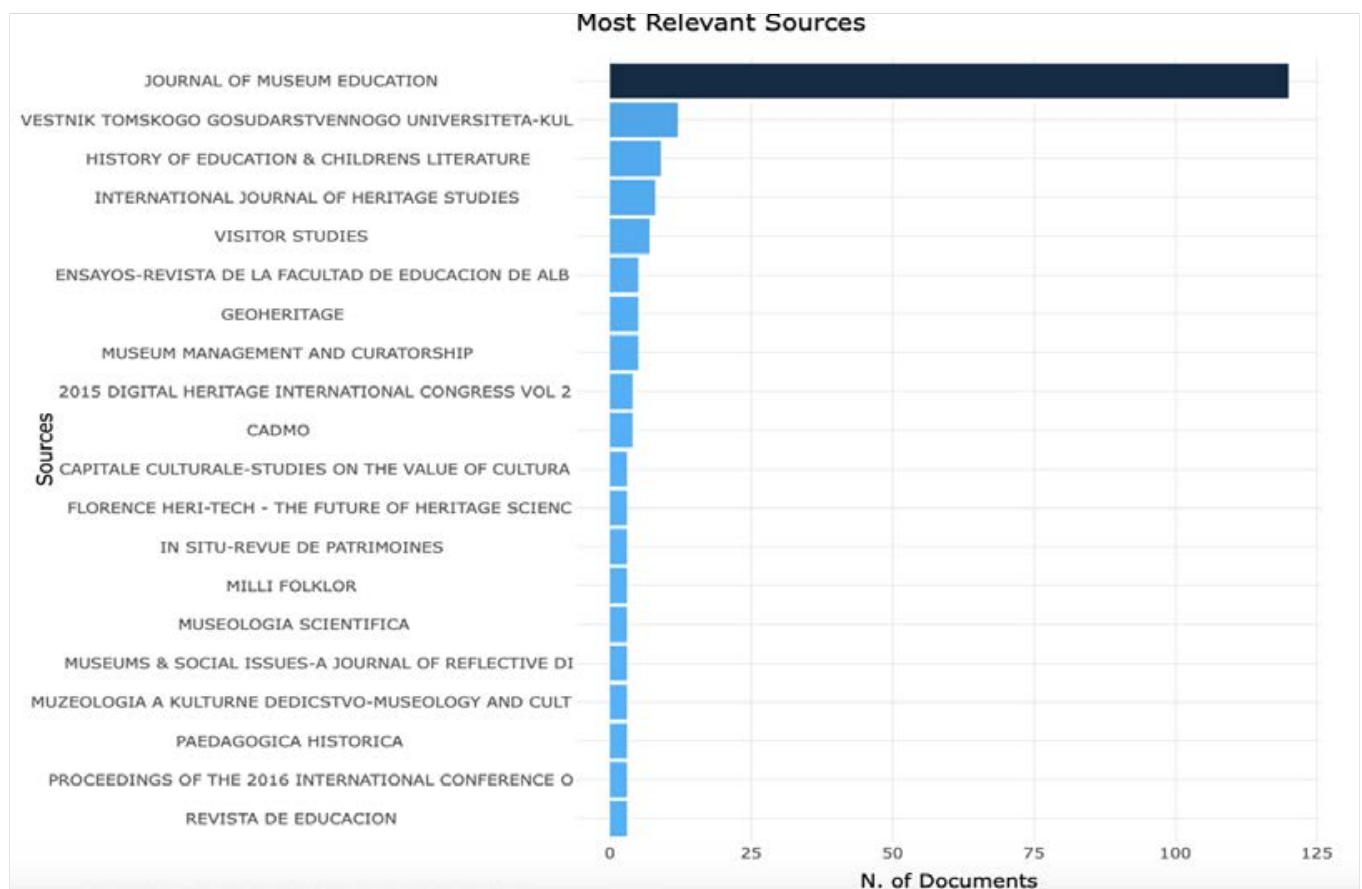


Figure 2. Most relevant sources.

Figure 3 shows the countries with the highest production during the study period. The country with the greatest presence on the WoS is the USA (27.8%). Spain and Italy follow with 9% and 8.5%, respectively. The following positions are occupied by the United Kingdom and Russia. The top ten is completed by Brazil, Australia, Canada, China and France. Publications with the participation of authors from institutions of different countries (Multiple Country Publications (MCP)) are not very common. In this case, the countries with the most articles written in collaboration with other countries are the United Kingdom (12), USA (11) and Australia and Canada (6).

In relation to the most cited countries (Figure 4), the US has a huge advantage over the rest. The United Kingdom and Israel improve their position in citations with respect to their production, while countries such as Russia and Portugal, which have a prominent position in terms of production, descend significantly in the list of most cited countries. Brazil disappears from the list.

Figure 5 shows the most productive authors during the study period. Only three authors (Olaiia Fontal-Merillas (7), Roser Calaf-Masachs (5) and E.I. Chernyak (4)), have a considerable number of articles. The remaining authors have three or fewer articles each, which shows a great deal of fragmentation of academic production.

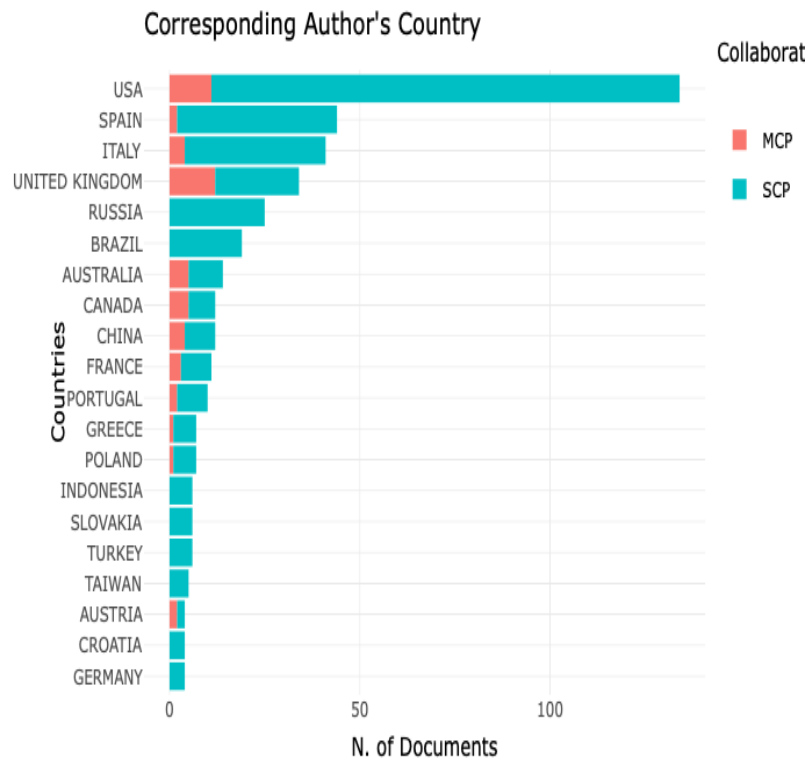


Figure 3. Most productive countries and total citations per country (of corresponding authors). Note. SCP = Single Country Publications; MCP = Multiple Country Publications.

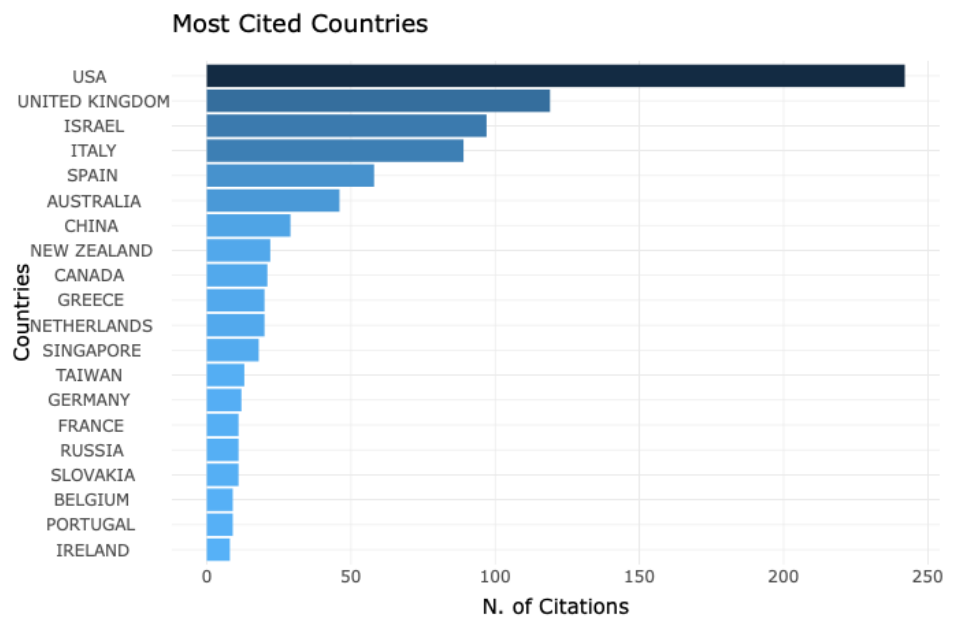


Figure 4. Most cited countries.

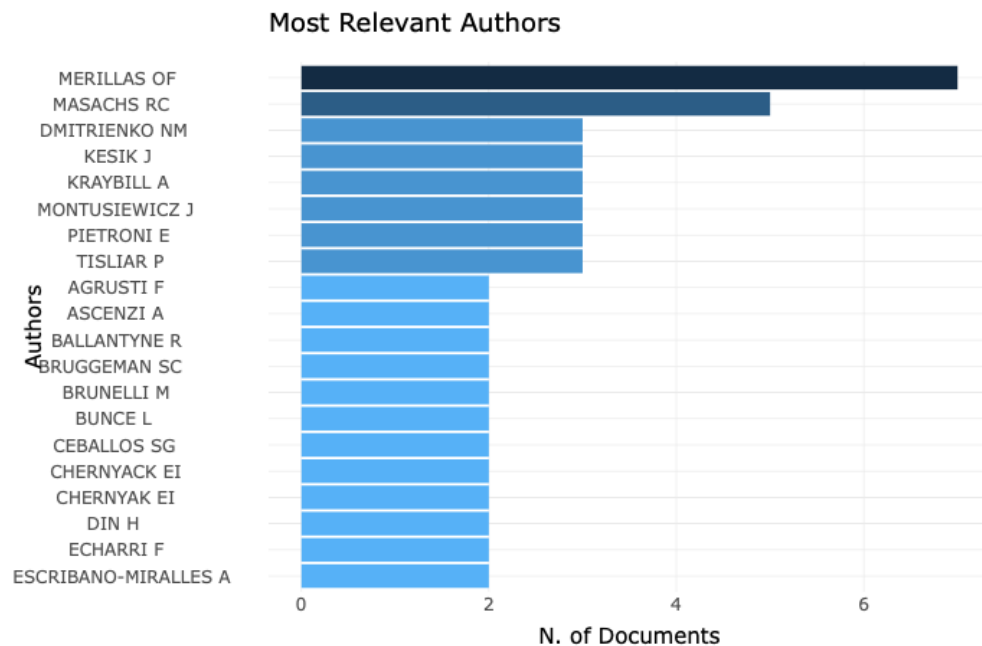


Figure 5. Most relevant authors.

There is a clear relationship with the production figures per country. Among the most relevant authors, five are from Spain: Olaia Fontal-Merillas (University of Valladolid), Roser Calaf-Masachs (University of Oviedo) Silvia García-Ceballos (University of Valladolid), Fernando Echarri (University of Navarra) and Ainoa Escribano-Miralles (University of Murcia); three are from USA: Anne Kraybill (Cristal Bridges Museum Armer Art), Seth Bruggeman (Temple University) and Herminia Din (Alaska University); four are from Italy: Eva Pietroni (CNR ITABC), Francesco Agrusti (Roma Tre University), Anna Ascenzi and Marta Brunelli (Macerata University) and two are from Russia: Nadezhda Dmitrienko and Eduard Chernyak (Tomsk State University). In spite of the fact that the UK and Australia occupy prominent positions in the list of academic production in the field of heritage education (10% of all publications on WoS), only one author from each country appears in the list of the most productive authors. Brazil, with 4% of all publications, has no author on this list. This reality shows a high degree of fragmentation in the production of these countries. On the contrary, in Spain, output is more concentrated among a small number of authors and research groups: five authors are responsible for 41% of the output on heritage education in the country.

Recalling part of the information that has been provided previously, if we relate the countries with the greatest amount of production, the journals that contain the greatest number of published studies and the nationality of the authors with the greatest number of publications, we see that there is a direct relationship. USA, Spain and Italy are the countries with the highest number of publications and the place of publication of the main journals with studies on heritage and museums. 6 of the 18 magazines with the largest number of publications are edited only in the UK or in cooperation with the USA, as the case of the most significant journal in this field. Italy is the second country with the largest number of journals among the top 18 in the ranking, with five publications, while Spain has two, followed by Russia, which has only one journal but is the journal with the second highest number of papers. Switzerland, France, Turkey and Slovenia have one relevant journal between them. In the latter case, it is not uncommon for this small Central European country to be above other larger countries, such as Germany, in terms of a greater number of researchers.

On the other hand, according to these data, it is not difficult to understand that there are the Anglo-Saxon countries which have the most publications and collaborations

between them. The American authors with more papers tend to publish in Anglo-Saxon journals, Italians authors in Italian or English journals, Spanish authors in Spanish journals, although they also do so in English journals, and Russians authors in Russian journals. It is not strange that non-English-speaking authors write in Anglo-Saxon journals in order to increase the visibility of their work, as these comprise the largest number of publications globally within WoS.

Figure 6 shows the keywords proposed by the authors for their papers. Words of a generalist nature are predominant, showing the lack of specialisation of articles on heritage education. Of the ten most frequently occurring keywords proposed by authors, five are so general in nature, related to education, museums and heritage, that interpreting the underlying issues of the paper proves a difficult task: heritage, education, museum, cultural heritage and museums (in plural). Furthermore, the most common topics according to the authors' keywords are practically the same: museum, cultural heritage, museum education, education and museums. There is a significant absence in the keywords of items regarding techniques and tools for evaluation which make it possible to analyse the methodological approaches of the studies: questionnaires, interviews, discussion groups, focus groups and statistical analysis. These results are in contrast with the study by Jamali et al. [86] on physics education, in which both the KeyWords Plus and the authors' keywords are more specific in nature and make it possible to visualise specific topics.

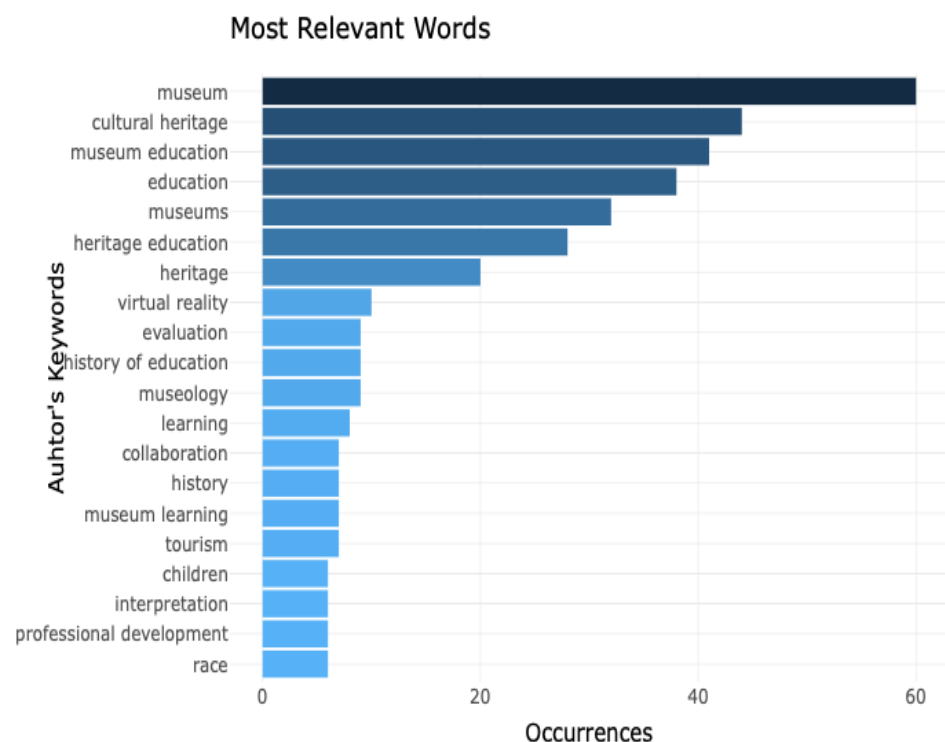


Figure 6. Most relevant authors' keywords.

The thematic evolution map (Figure 7) shows that "heritage" has played (and still does) a fundamental role in the conceptualisation of this area of knowledge, together with "museum" and "education", in spite of the fact that the latter loses significance in favour of the former. In addition, "engagement" loses significance in favour of "model", "science" and "history". On the other hand, "museums" and "cultural heritage" form another outstanding pair of concepts in this area of knowledge, far removed from words like "management" or "model" despite its great growth.

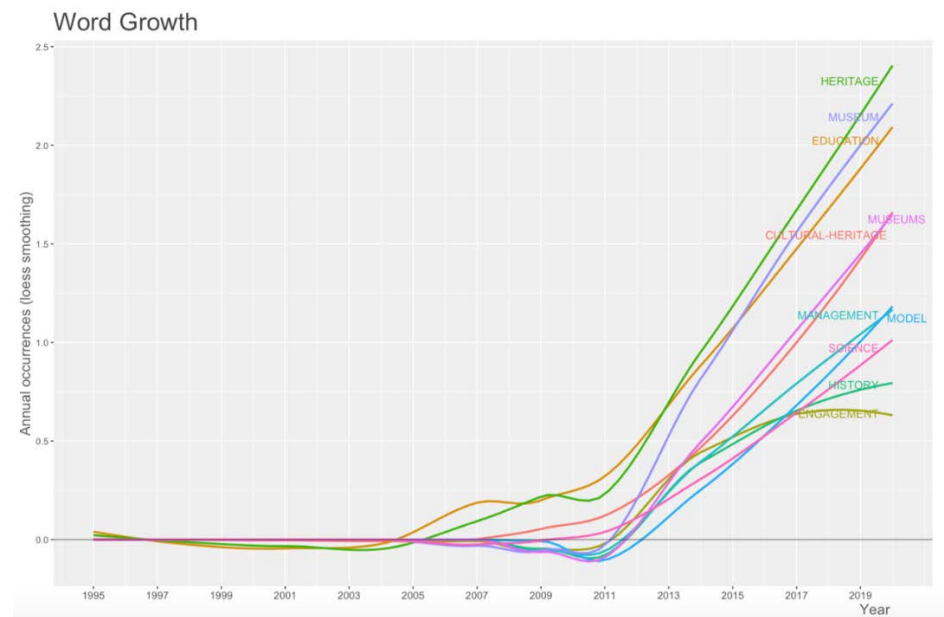


Figure 7. Evolution of keywords.

Figure 8 shows a strategic diagram that represents, based on density and centrality, the relative positions of the concepts within the map. Thus, the concept placed in the centre of the image has a greater transcendence in the map, while the concepts less centred have less transcendence in the conceptual map. Thus, we can observe that: (a) in the upper right quadrant there are the well-developed and essential topics to define the research area; (b) in the upper left quadrant highly developed themes appear, albeit with a certain degree of isolation; (c) emerging or declining themes appear in the lower left quadrant; (d) in the lower right quadrant there are general, transversal and fundamental themes.

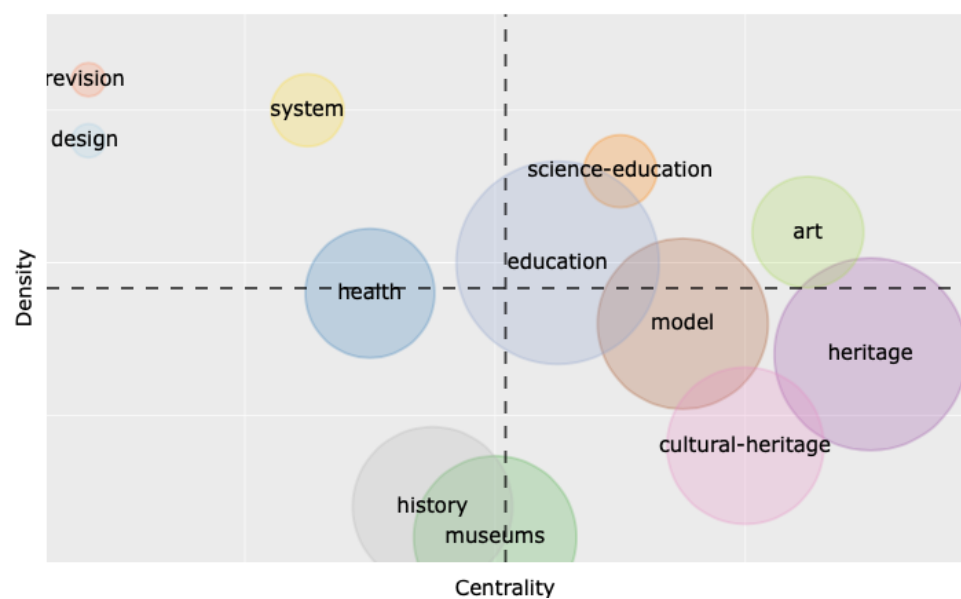


Figure 8. Thematic map of the field of heritage education.

Among the essential well-developed themes of the area, albeit without many publications, can be found “science-education”, which is usually related to the learning processes, exhibitions and heritage of science museums [87,88]. “Education” is the great subject of the area of knowledge, since there is a lot of bibliography referring to educational actions [89]

and digital development in museums and exhibitions [90] and the revitalisation of heritage education [91] among other topics, in which aspects related to “art” are also included, as there is a large number of articles on art museums and exhibitions [92,93], art, heritage and tourism [94], as well as education and the development of artistic sensitivity and expression [95].

Topics such as “design” and “health” are isolated insofar as they only relate to the design of electronic resources in museums to improve the transmission of messages [96] or the promotion of physical activity through excursions to museums [97,98].

On the other hand, “model”, “heritage”, and “cultural heritage” are essential topics in the area of knowledge. The latter two themes are fundamental and recurrent in this field of knowledge as they relate to a multitude of realities, such as the World Heritage of Humanity [99], military events [100], controversial issues [101] and different types of cultural expressions and manifestations [102,103], including documentaries [104].

Something similar occurs with the “model” theme, a polysemic concept that is related to participation models [105], different types of museums, including digital ones [91,106], or certain models of buildings employed for exhibitions and museums [107].

Figure 9 shows the connections between the authors (left), the keywords (centre) and the nationalities of the authors (right). The area of the rectangles is proportional to the number of publications, and shows the relevance of US, Australian and Spanish authors in the articles analysed.

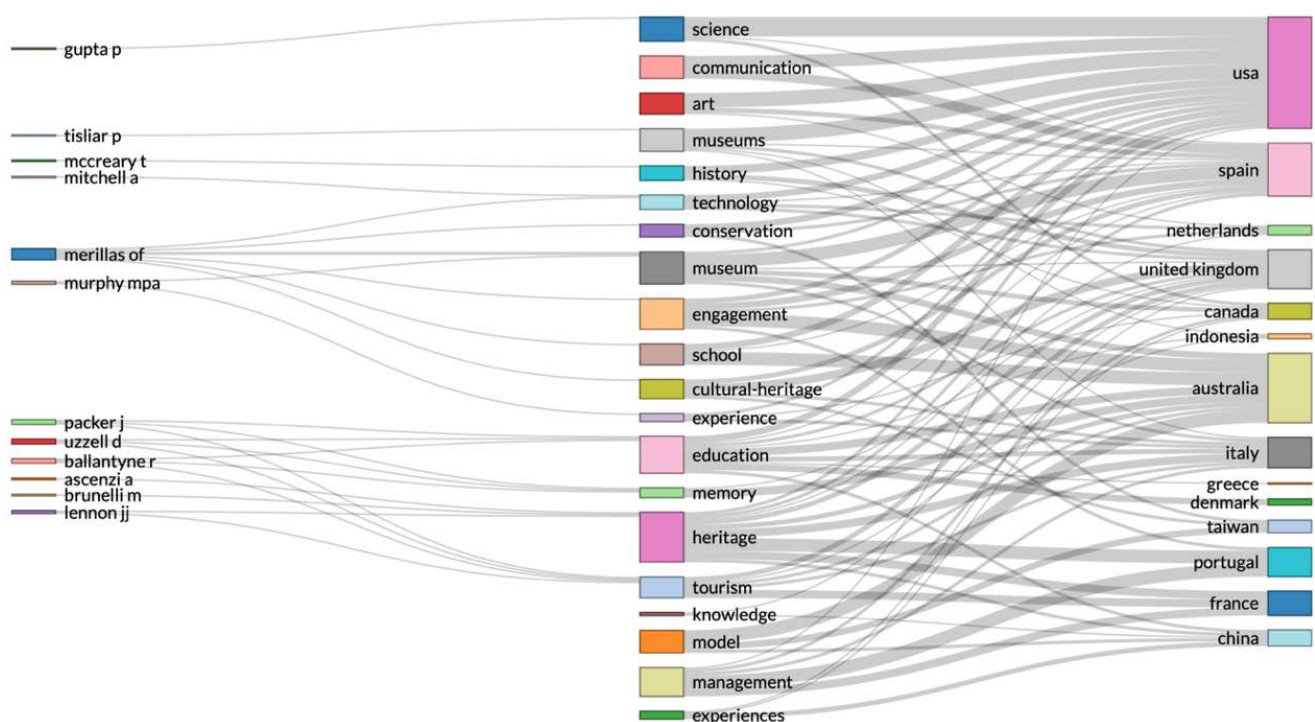


Figure 9. Relationship between authors, keywords and countries.

As can be seen, the author who has worked in most fields, by some margin from the others, is Professor Olaia Fontal-Merillas, who is particularly connected with the keywords of “museum” [108,109], “technology”, “conservation” and “school”, among others. On the other hand, the key concepts most present in the publications are those of heritage, education, museum, engagement and management. In an analysis by nationality, it can be seen that the authors from the USA, in addition to being responsible for a large proportion of the production, are connected with a great variety of topics, such as [110], communication [111], art and museums. A similar situation occurs in the case of Spain,

the third country in terms of production, behind Australia, although it surpasses the latter in themes of study, highlighting, above all, museums and communication [112]. Australian authors focus on issues relating to school [113], engagement and model [106]. It can also be observed that there are countries with lower production, related to fewer themes, but distributed in a much more homogeneous way. They pay the same attention to certain aspects, such as the cases of France, connected with heritage, tourism [114] and management, and China and its studies on experiences, education, heritage [115] and model.

3.2. Conceptual Structure of Field Domain

Figure 10 represents the network of keywords. In this figure, the diameter of the nodes is proportional to the number of articles in which each of the keywords appears, while the colour corresponds to the cluster to which each of them has been assigned. This figure shows the existence of five clusters. Cluster 1 (in red) encompasses 12 items and revolves around the central node “museum education”. It is related to issues that include “program evaluation”, “collaboration”, and “professional development”. These keywords are related in papers that collect multidisciplinary associations or collaborations of museum professionals on different topics, collaborations that can help professional growth through new approaches to their practice [116]. They also include research on improving the training of museum professionals and educators [106,117], as well as teachers [118].

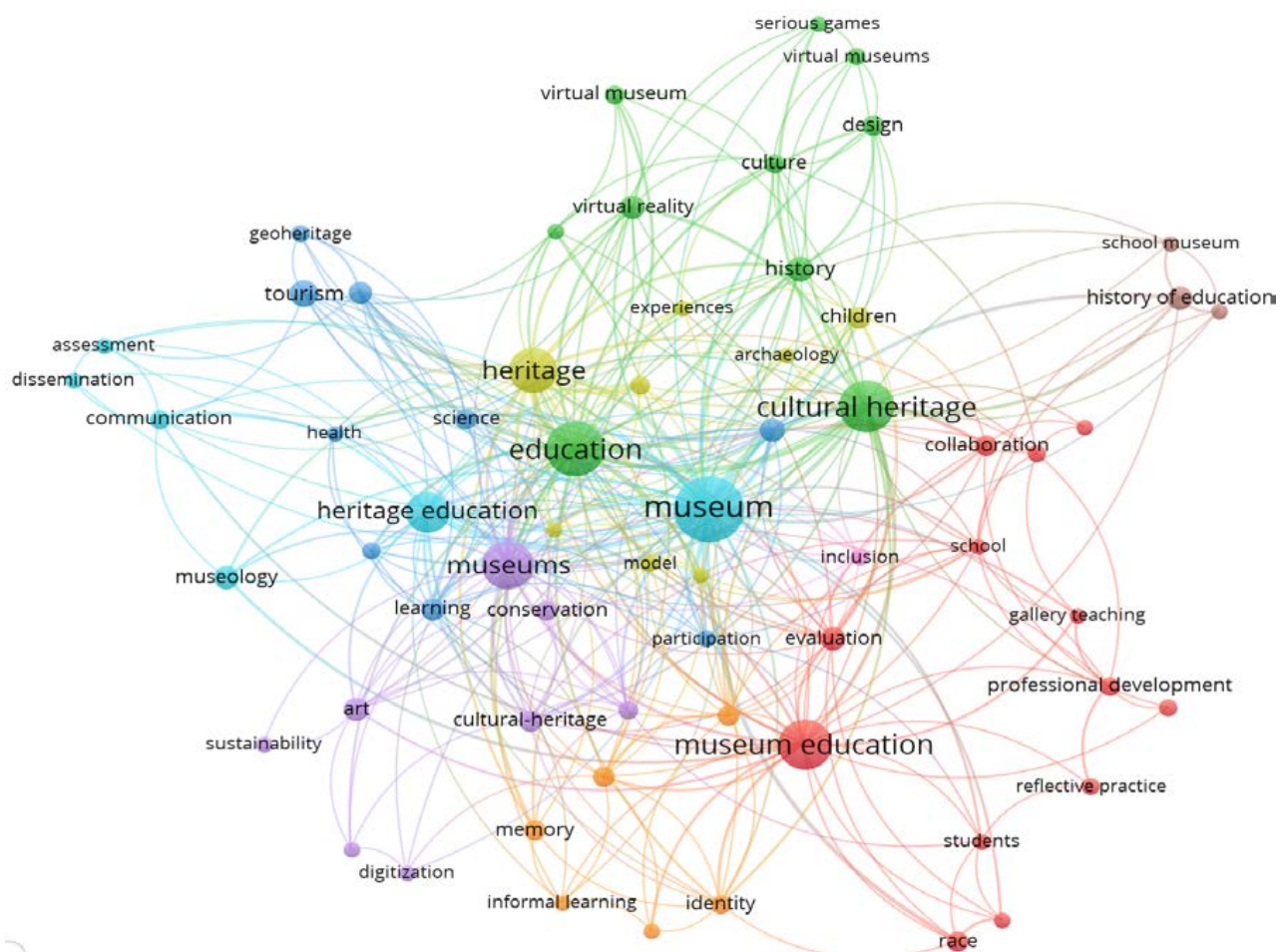


Figure 10. Thematic clusters.

Cluster 2 (in green) brings together eight items (history, virtual museums, virtual reality, etc.), the central node of which is provided by the keywords “education” and “cul-

tural heritage". Physical conservation is not enough for a resource as valuable as cultural heritage, which needs to be complemented with comprehensive digital preservation. Thus, at present, museums must digitise their collections to protect cultural heritage, for which new digital technologies can be used [119]. These new technologies also allow for the development of simulations [120], which, without abandoning their pedagogical aspect, improve the experience of visits, even among students and people with disabilities [121].

Cluster 3 (in purple) is organised around the central node of "museums" and is related to keywords such as "conservation", "art" and "cultural-heritage". These keywords are related since museums are places whose main function is to conserve the pieces and works of art that they house in order to protect them, maintaining and guarding, in this way, cultural heritage [122].

Cluster 4 (in orange), with six items, is related to "memory" and topics such as "identity", "informal learning" and "civic engagement". Museums are places of informal learning. Their exhibitions attempt to preserve the collective memory that gives individual and collective identity to citizens, a memory that must be committed to preservation, often around conflictive issues [100,123,124].

Finally, cluster 5 (in blue), structured around the keywords "museum" and "heritage education", accounts for four issues: "museology", "communication", "dissemination" and "assessment". The latter concept is related to museums and cultural education in papers that seek to gather information that allows for improvement in the training of educators, programs and educational designs of museums, usually associated with the results of surveys and tests [125–127]. In turn, the results of the evaluations are related to improving the dissemination and communication of museums. A correct communication of cultural heritage, found in museums and other places, helps it to be disseminated, known and preserved in a more effective way [128,129]. All of this helps to reflect on the characteristics of a more up-to-date museology [130].

3.3. Intellectual Structure of Field Domain

Figure 11 represents the intellectual structure of the field of knowledge: the nodes represent the papers most cited (>10 citations) by the articles included in this analysis, and the edges that join them indicate that the papers have been cited within the same article. The results show several nodes which provide the structure of the majority of the clusters: Murphy (2018), Rivero (2018) and Chernyak (2017). These three articles are central to the theoretical and methodological foundation of research on "heritage education" and "museums" as they bring together a lot of essential bibliography in this field of knowledge and become, in turn, works of reference. Almost all of the clusters of citations are related to these three topics: the studies around the cluster "flip museum" (red cluster), educommunication (blue cluster) and museum history (green cluster). The majority of the most cited studies in this bibliographic collection are from the USA, Spain and Russia, demonstrating very similar data to the countries with the highest bibliographic production in heritage education.

Due to the amount of work, the first two stand out. "Flip museum" is an innovative model in which students engage in online learning before and after a museum experience. Some of these papers show how the instructional design and content of a blended learning experience can increase learning outcomes, create emotional connections, and foster positive museum experiences for students [131], and how utilising a flipped learning model can foster individual and collective growth [63].

Historical Direct Citation Network

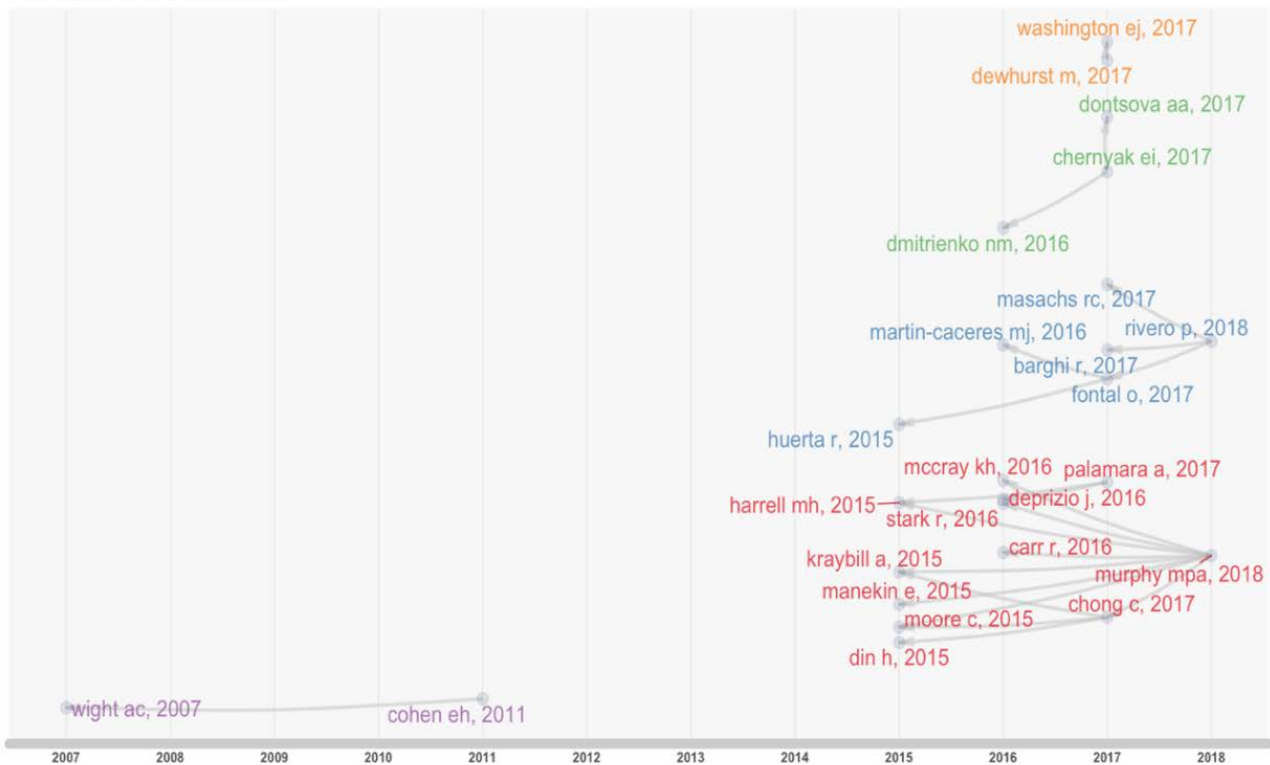


Figure 11. Thematic clusters. Historical direct citation network (Networks: Intellectual structure of the field of knowledge).

On the other hand, when speaking of educommunication, it is in reference to the policies and strategies of museum and heritage spaces which transmit messages and information to the public. This allows the public to learn, thus making the population aware of their legacy and the importance of education inspired by the values of respect and protection related to heritage. Its purpose is to define a profile of good educational practice in the museum field [108,132].

3.4. Social Structure of Field Domain

In order to complete the bibliometric analysis, the co-authorship network between countries has been analysed. While the analysis of keywords and references cited makes it possible to study the conceptual and intellectual evolution of the field, the analysis of co-authorship networks facilitates the analysis of its social structure. Longitudinal analysis, meanwhile, makes it possible to describe its dynamic aspects [133]. The relationships which link individual agents in a community are of prime importance [134]. Co-authorship networks are a particularly important part of the social structure of science [135,136]. The structural characteristics of the collaboration network are the result of a wide variety of organisational, disciplinary, geographic and cultural factors [137].

A detailed analysis of the evolution of the co-authorship network enables us to discover the presence of communities or groups which are more or less stable, given that the probability of a link increases among authors with similar interests. The basic nodal and structural properties of the collaboration networks between authors, degree centrality and coefficients of group and density were analysed. In the network, the nodes represent the authors, and the edges represent the co-authored works, in such a way that two authors are connected via an edge only if they are co-authors of a publication. The thickness of the nodes corresponds to the number of publications and the colour to the number of citations received. Figure 12 reflects the co-authorship networks for the period 2000–2019.

Country Collaboration Map



Figure 12. Country collaboration map.

There is a great deal of collaboration in the English-speaking sphere, where the United States exercises leadership and is the main nucleus, along with its collaborations with Canada and the UK. The connections between Canada, the UK and Australia, as well as Australia with New Zealand also stand out.

In Europe, relationships between Germany and the UK, France, USA and the Czech Republic can be noted. Spain, which, as has been seen, is one of the most productive countries, only has collaborations with French, Italian and Argentinian authors. In Asia, the connections of Chinese authors to the English-speaking world (Canada, UK and USA) stand out.

Finally, the weak presence of Latin America in this field of knowledge must be highlighted, where the countries of the Southern Cone (Argentina, Chile and Uruguay) are those that have collaborated with authors from Spain, France and South Africa. The latter, together with Egypt, is the only African state that presents associations with authors from other countries.

4. Discussion and Conclusions

The above results enable us to understand the conceptual, intellectual and social structure of the “heritage education” and “museum” knowledge domain on the basis of dissemination data for journals indexed on the Web of Science. It can be concluded, first of all, that research in heritage education has moved beyond a phase characterised by its scarce visibility on the WoS compared with other areas of knowledge such as mathematics or science education. The increase in output between 2015 and 2019 can be directly related to the incorporation of ESCI journals. It must be taken into account that there is a deficit in this field of knowledge, for which no specific journals are listed in the SSCI during the period 2000–2019. This constitutes a great disadvantage with regard to other branches of applied didactics (science or mathematics education), the study topics of which are widely covered by quite a number of SSCI-indexed journals.

The second conclusion which can be drawn deals with the distribution of research output by countries. The listing of journals in the ESCI has encouraged a greater visibility of WoS-indexed academic production in countries such as Spain, Italy, Brazil and Russia. The comparative analysis of the most productive authors makes it possible to define several emerging groups that currently support specific lines of research and greatly expand the number of publications on heritage education. Indeed, this is the case of the research team led by Olaia Fontal at the University of Valladolid, and of Roser Calaf at the University of Oviedo, in Spain; or the research groups at the Tomsk State University around Nadezhda Dmitrienko and Eduard Chernyak (Russia) and in Italy around Macerata University and the researchers Anna Ascenzi and Marat Brunelli. The US and Britain are both powerful countries in terms of scholarly output and number of citations received, even though their academic production shows a higher level of fragmentation across researchers.

The third conclusion to be drawn is that research on heritage education appears to have developed a paradigm for analysis and interpretation which is based on three concepts. The first, and most dominant, is “heritage”, followed by “museum” and “education” (the latter two with a very similar degree of presence). They are general, fundamental and well-developed concepts. After them, the words “cultural heritage” and “museums” can be found.

It is between these same five dominant concepts of the discipline that the most significant keyword connections are made. In addition, other concepts such as a “model”, “history” or “science” have gained presence in recent years. Finally, the social structure of research in heritage education demonstrates the typical weaknesses of an emerging, relatively unstructured, community [138]. Research is a social activity which advances exponentially when interactions are multiplied, and collaborative networks are formalised [139]. This is still a long way from being achieved in the field of heritage education. There is a scarcity of connections between researchers and research groups in different countries and even within the same country. Overcoming this problem should be taken as one of the immediate challenges for the advancement of knowledge. While there is a notable collaboration network in Spain between different research groups, there is still a lack of international collaboration that allows for cross-comparison. There is contrast with the collaborations that take place in the English-speaking world and in countries such as China and Germany.

In conclusion, the data examined in this paper show that the years ranging from 2000 to 2019 constitute a significant period for heritage education with regard to: (a) the increase in research output listed on the WoS; (b) the greater visibility attained by countries, journals and research groups involved in this sector of the academic community; and (c) the construction of paradigms that have been widely accepted and assumed by the community of scholars and have proved fundamental in understanding the conceptual structure of this area of knowledge.

5. Limitations and Perspectives

At this point, it is convenient to acknowledge the two main limitations of this study. The first is related to the fact that the search focuses on the WoS, which may mean that information from publications in non-indexed books or journals with less international circulation is lost.

Secondly, the quantitative analysis only allows us to appreciate general trends. Thus, it is necessary to carry out research in other directions, such as conducting a more intensive analysis through the proceedings of the International Congresses on Heritage Education, for example, or making a more intensive analysis of a selection of the most significant publications (techniques, themes, methodologies, etc.).

The results of this research open the door to new opportunities for improving the development of this field of knowledge through networking and interuniversity collaboration at a national level in different countries, as well as promoting internationalisation at a

European, Ibero-American and worldwide level on issues related to new methodological practices, program evaluation, multiculturalism, identity and controversial issues.

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