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The Bibliometric Analysis of Literature on Museum Studies

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ABSTRACT:

Museum studies, is the study of museums, museum exhibitions, and how and why museums developed into their institutional role in education and culture through scientific, social, political and other related forces. The purpose of this study is to shed light on the application trends of the international literature related to museum studies on the SCIE and SSCI databases between 1997 and 2016 using a bibliometric technique and clustering analysis of keywords. The results of this study reveal that influences of museum studies on other subject areas continue to expand. Considering the publication of major countries, subject areas, journals, institutions and authors, the results also discussed that the trend through analysing the most frequency keywords.

Key Words: *Museum studies, Museology, Bibliometrics*

INTRODUCTION

Academic research is the process of knowledge transfer, accumulation and innovation, while it also motivates and measures the importance of one discipline development. Through its development, the academic research can lift the veil of one discipline dynamics and speculate about the future trend. It also exerts its influence and demonstrates the value of one discipline through the dissemination of scholarly research results. Furthermore, academic spread is the process that scholars in various disciplines communicate through formal and informal dissemination of information. The research results have been presenting and developing chronically in all subject areas with different forms of the published literature. Among published results, papers that have novel and fast-spreading characteristics, is the most important scholarly communication pipeline spread. Providing the most valuable information in the research process, journal articles also help the researchers in forming their academic achievement. Therefore, we can observe the development of one discipline could be observed from the journals published literature and publishing research results. Moreover, its future trend and evolution can be explored through spreading of journal articles in various disciplines.

Thus, Canadian Museum of Civilization shares its Research Policy with various museums. It also has set the policy to perform studying and researching to enhance the responsibility and obligation of the museum, which should actively encourage researchers to publish their performances through the exhibition, publishing, electronic media , lectures and other activities (Brandon & Wilson, 2005). Whether museum studies can be recognized in the world as a subject area, its professional literature is an issue that measures the significant growth in the museum world and should be obtained more attention(Lorente, 2012). The number of published literature

is the important measure of the development of one discipline. Increasing related published works is another important phenomenon that shows the booming of museum studies. Especially, the journal articles published in scholarly communication is an important pipeline, and a measurable standards and quality of a research disciplines through the evaluation and analysis of relevant research and development.

Bibliometric methods analysing academic development have been existed for many years, and mainly uses the quantitative and statistical analysis of published literature. It also shows various disciplines characteristics and model of development. Thus, the future trend of one discipline could be forecasted by examining the origins and progress of one discipline.

The explorations of the museum studies literature have seen vigorous development in the last decade owing to the convenience and advancements of museum studies tools. There is little review on museum studies. Some researchers reviewed on family experience on museums(Athique, 2008; Pickstone, 1994; Pieterse, 1997; Ponder, Carter, Flemons, & Chapman, 2001), while (Graham, Ferrier, Huettman, Moritz, & Peterson, 2004) focused on the museum marketing and its impacts. Pieterse (1997) reviewed family learning through a web survey of art museum educators and a comprehensive literature. W. Burgard et al. (1999) discussed the museums development through bibliometric methods However, information and computer technology (ICT) rapidly developed in recent year, especially in 10 years. For example, web 2.0, social networking, cloud computing, smart phones, big data, internet of things, etc will change our experiences on museum. This paper explored the trends of museum-related studies by means of bibliometric reviews of the literature in the SCIE (Science Citation Index Expanded) and SSCI (Social Science Citation Index) databases between 1997 and 2016. Standard bibliometric indicators such as the number of papers, number of authors, productivity by country, institutional collaboration, and most cited articles would be analysed. Moreover, the paper uses VOS viewer tools to discover the keyword-map on the museum-related studies.

DATASET

The dataset used in this study was derived from the SCIE (Science Citation Index Expanded) and SSCI (Social Sciences Citation Index) databases of the Web of Science, created by the Institute for Scientific Information. Thus, this dataset cover science, social science, art and humanity fields. SCIE covers more than 8,500 notable journals encompassing 150 disciplines. Coverage is from the year 1900 to the present day. SSCI covers more than 3,000 journals in social science disciplines.

An empirical search command was used by “Topic= ("museum stud*") OR Topic= ("Museology") OR Title= ("museum*") refined by Document Type= (ARTICLE OR REVIEW)” to retrieve data related to museum studies. The documents specifically included articles and reviews in the study. Book reviews, papers of the proceeding, letters, notes, and meeting abstracts were not taken into consideration. A total of 2,828 papers published between 1997 and 2016 were found.

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RESULTS OF BIBLIOMETRIC ANALYSIS

A total of 2,828 papers related to museum studies were retrieved from the SCIEand SSCI databases. Figure 1 shows the number of published papers on the topic of museum studies between 1997 and 2016. According to the numerical data, a large number of research papers published more than 200 about 2011-2016 have been catalogued in the databases. It has also been observed that a down turn trend in these numbers appeared from 2005 to 2007. Figure 2 shows the number of citations of published papers related to museum studies made each year. The figures suggest that the number of these citations has growing. Museum-related articles seem to render volume slightly increasedtrend,and the number of annual citation increased stable, indicating that these museum-related articles are widespread to influence the other disciplines.

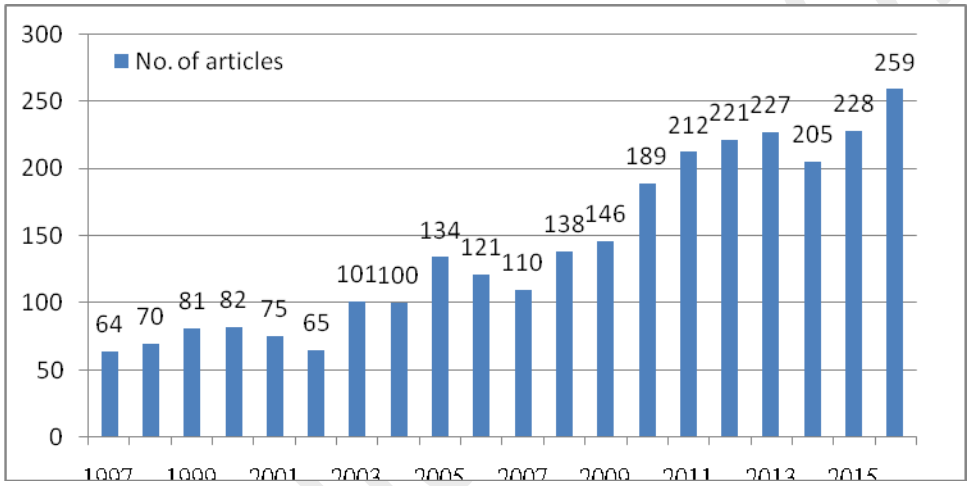

Figure 1. Number of published papers from 1997 to 2016

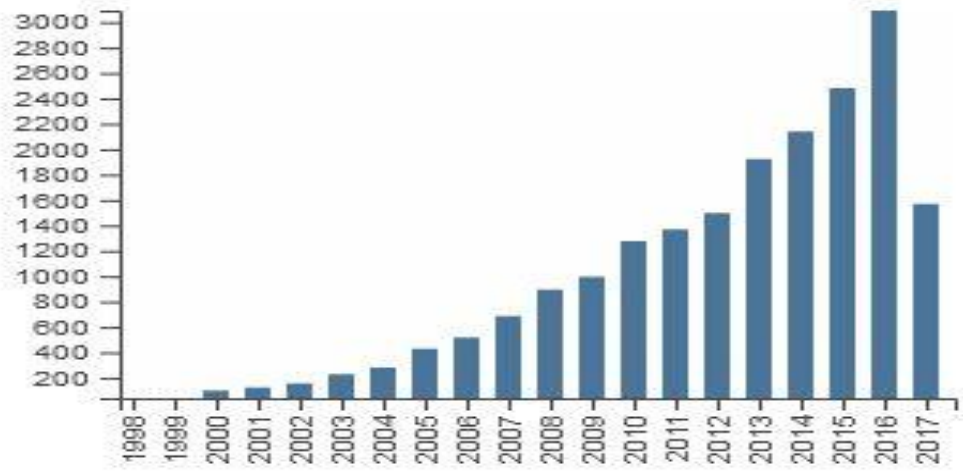

Figure 2.The annual citations of the published papers (retrieved on Aug. 8, 2017 from Web of Science)

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Figure 3 illustrates the ten countries ranked as the top publishers of catalogues in the databases. The figure shows that the USA was the dominant country, followed by England, Italy and Germany.

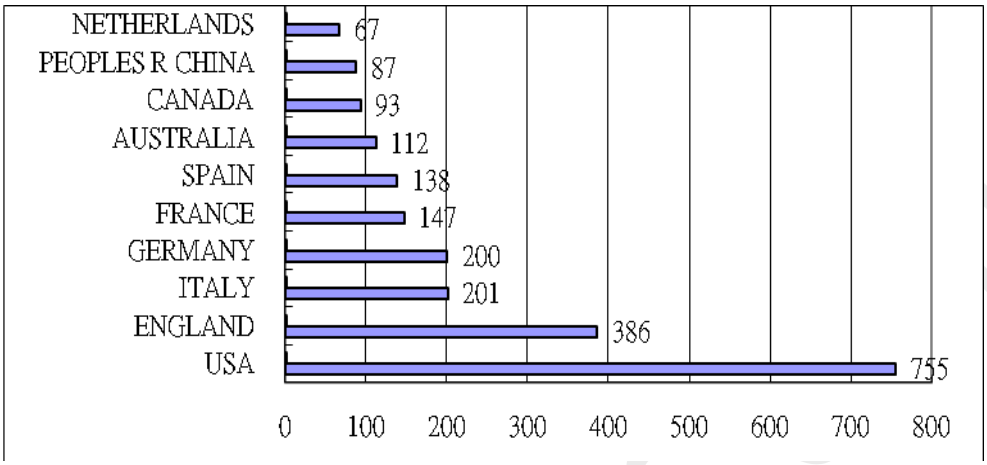

Figure 3. The top 10 most productive countries with regard to publication

Table 1 presents a more detailed account of the top 10 institutions by which indexed papers were submitted, with the University of London, Natural History Museum London, and University of California System as the top three most productive institutions. The data also show that the corresponding ratios for the institutions in the England, France and Italy are much greater than those in the USA, indicating that the institutions in their countries dominate the academic research in the museum-related studies field.

Rank	Institution Name	Count	%	Country	% of country
1	University of London	72	2.55%	England	18.65%
2	Natural History Museum London	69	2.44%	England	17.88%
3	University of California System	65	2.30%	USA	8.61%
3	Sorbonne Universites Comue	57	2.02%	France	38.78%
5	French National Museum Of Natural History	56	1.98%	France	38.10%
6	Centre National De La Recherche Scientifique Cnrs	50	1.77%	France	34.01%
7	Smithsonian Institution	35	1.24%	USA	4.64%
8	University College London	34	1.20%	England	8.81%
9	Consiglio Nazionale Delle Ricerche Cnr	33	1.17%	Italy	16.42%
10	State University System of Florida	31	1.10%	USA	4.11%

Table 1. Top 10 most productive institutes.

ISSN NO.2395-0692
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Figure 4 provides the top ten subject areas in which museum studies were most widely studied. The most highly ranked subject area was zoology, with 324 (approximately 17%) of total, followed by environmental sciences ecology, andeducation& educational research.

Table 2 offers an investigation into the authors who have written more than eight papers in museum studies during 1997-2016. The most 3 productive authors are Hollier J (Switzerland), Van Grieken R(Belgium) both with 17papers, and Plaza B(Spain) with 11papers. The data also show that the most productive author seems to be distributed widely in many countries against to the productive institutions in some specific countries.

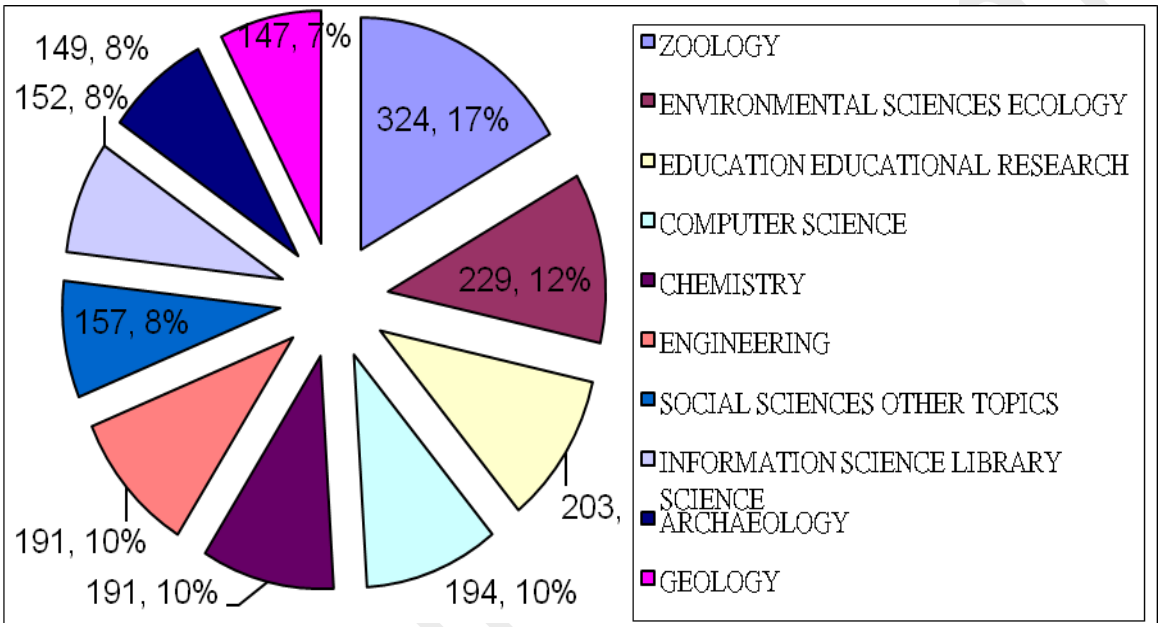

Figure 4: Top 10 subject areas

Rank	Author	Count	%	Institution	Country
1	Hollier J	17	0.60%	Museum Hist Nat	Switzerland
1	Van Grieken R	17	0.60%	Univ Antwerp	Belgium
2	Plaza B	11	0.39%	Univ Basque Country UPV EHU	Spain
3	Marty PF	10	0.35%	Florida State Univ	USA
4	Lecroy M	9	0.32%	Amer Museum Nat Hist	USA
5	Cao JJ	8	0.28%	Chinese Acad Sci	Peoples R China
5	Feldmann H	8	0.28%	Univ Munster	Germany
5	Hajek J	8	0.28%	Natl Museum	Czech Republic
5	Kuflik T	8	0.28%	Univ Haifa	Israel
5	Razowski J	8	0.28%	Polish Acad Sci	Poland
5	Schwedt G	8	0.28%	Tech Univ Clausthal	Germany

Table 2. The most productive authors

ISSN NO.2395-0692
IJAHMS International Journal of Arts, Humanities and Management Studies

Table 3 shows the 10 articles yielding the most citations. The results revealed that Graham et al. (2004) was an icon in museum studies, with the most citations and highest average citations per year, indicating that it was also the most influential paper. These articles, although not specifically studied on museology itself, but highlight that the museum research will located on the topics about biodiversity, robot tour-guide, museum collections, museum members, species, etc. Among these articles, the two articles especially discussed the robot tour-guiding application on museum (Wolfram Burgard et al., 1999; Thrun et al., 2000), indicating that the future trend of museum adopting new gadgets .

Articles	TC[1]	ACPY[2]
Graham et al. (2004) New developments in museum-based informatics and applications in biodiversity analysis	491	35.07
Wolfram Burgard et al. (1999) Experiences with an interactive museum tour-guide robot	226	11.89
Wandeler, Hoeck, and Keller (2007) Back to the future: museum specimens in population genetics	218	19.82
Suarez and Tsutsui (2004) The value of museum collections for research and society	214	15.29
Wandeler et al. (2007) Probabilistic algorithms and the interactive museum tour-guide robot minerva	197	10.94
Ponder et al. (2001) Evaluation of museum collection data for use in biodiversity assessment	157	9.24
Chown and Gaston (2000) Areas, cradles and museums: the latitudinal gradient in species richness	143	7.94
Elith and Leathwick (2007) Predicting species distributions from museum and herbarium records using multiresponse models fitted with multivariate adaptive regression splines	138	12.55
McKenna and Farrell (2006) Tropical forests are both evolutionary cradles and museums of leaf beetle diversity	113	9.42
Newbold (2010) Applications and limitations of museum data for conservation and ecology, with particular attention to species distribution models	107	13.38

Table 3.The 10 most cited articles (data retrieved on Feb. 5, 2015);[1]TC: times cited; [2]ACPY: average citations per year

Table 4 specifies the 10 leading journals, which have published the most research papers related to museum studies according to the data distribution. Zootaxa is the top within the list, which has 79 published papers (2.79%) against the total 2,828 articles. The second journal, Journal of Cultural Heritage (59 papers, 2.09%), has more impact on the times of citation rather than the first. It is also observed that the most influence journal is Science Education, the 5th journal in number of publication, with 720times of citation.

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Rank	Journal title	count	%	times cited
1	Zootaxa	79	2.79	215
2	Journal of Cultural Heritage	59	2.09	499
3	Revue Suisse De Zoologie	40	1.41	87
4	Studies in Conservation	39	1.38	125
5	Science Education	33	1.17	720
6	International Journal of Heritage Studies	33	1.17	64
7	Lecture Notes in Computer Science	29	1.03	0
8	Technology and Culture	28	0.99	14
9	Zookeys	27	0.96	132
10	Energy and Buildings	21	0.74	137

Table 5. The 10top journal titles and their statistics

This paper used VOSviewer mapping software of Centre for Science and Technology Studies, LeidenUniversity, The Netherlands(van Eck & Waltman, 2010). Using the VOSviewer and thresholds of minimally 10 fractionally counted papers for each term, a term-map of museum-related research papers including 1052 terms out of total 48530 terms. Eachterm meet the threshold over at least 10 timesfrequency, a relevance score will be calculated and based on the score, the most631 relevantterms about 60% in 1052 termswere selected. For mapping the terms about museum-related research papers, maps created based on title and abstractfield.

Figure 5 demonstrates the network of frequently used terms in museum-related research papers. Colouredregions show subject areas of researches. The figureprovides different views, and provides the focuses either onthe map's macro structure or on its more microproperties.Figure 5 also shows that each of the four clusters has a moreor less central term around the other terms. The four central terms are **Vistor's Experience, Museum Collection, Natural History, and Concentration** The font size used to display a term and the size of a term's circle indicate the term's frequency in the field. For instance, "collection" term has more publicized than "natural history" term. Some common terms between the borders of the major region refer to common research fields like "sample" term.

Figure 6 depicted in the density view of Figure 5. Theterm "painting" connects the most prominent both themes of visitor's experience and collection. This account for the fact of a muchdiscussed and widespread museum's collection pays attentions to visitor's experiences. In addition, painting cast in tworoles in the literature, which explains its prominence here:First as a media in which the most museums displays and second as the focus museum-related research paper discussed.

CONCLUSION

To sum up, this bibliometric study provided an overall picture of museum studies research articles published in the SCIE and SSCI databases. The results are as follows:

ISSN NO.2395-0692
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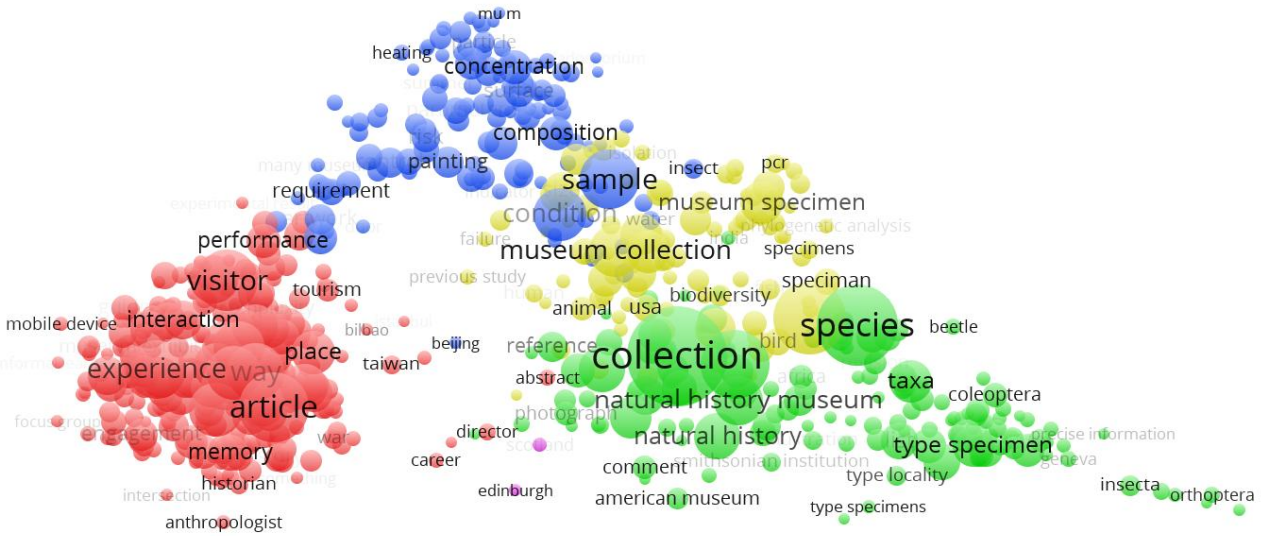

Figure 5.Map of 631 key terms in museum-related research (label view).

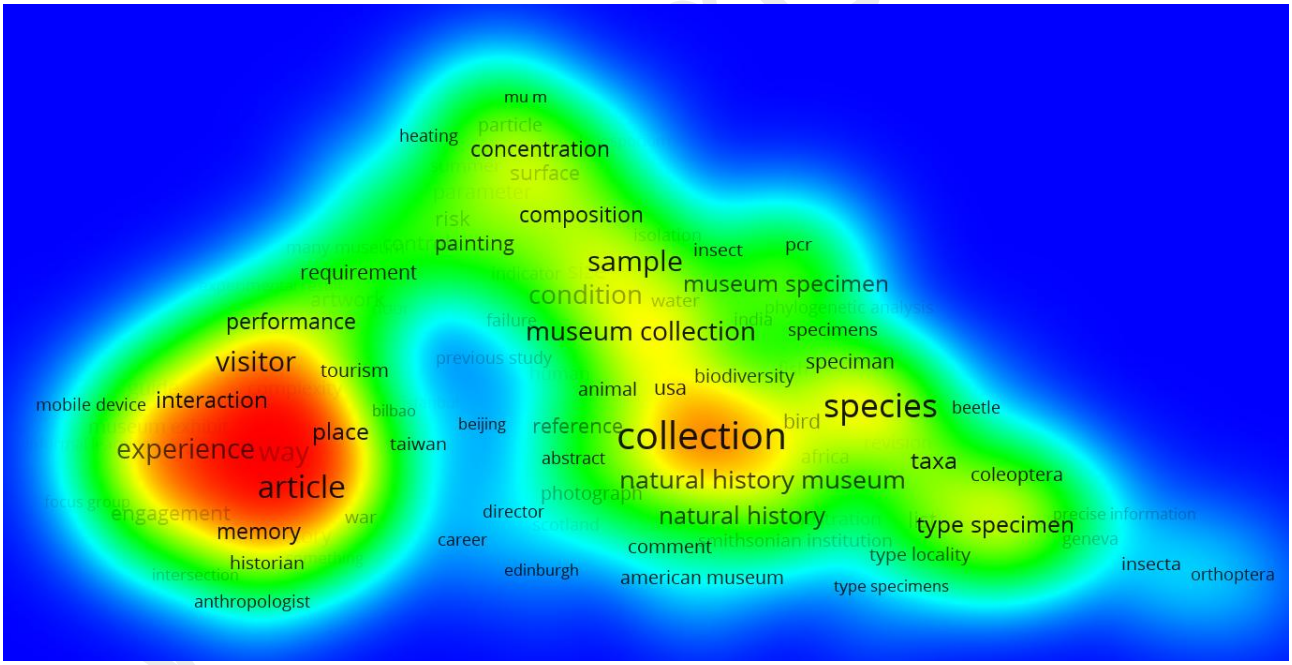

Figure 6. Map of 631 key terms in museum-related research (density view).

1. The literature related to museum studies seems to grow slowly, but its citations grow fast year by year, indicating that its influences spread to other subject areas.

2. The research institutions and the productive output of the main bulk of the affiliation are located in the USA, Britain, Italy, and Germany, while the most productive institutions are the University of London, Natural History Museum London, and University of California System.

3. The data about top 10 most productive authors shows that author number spreading averagely in the top five countries such as USA, England, Italy and France, while the major subject areas include zoology, environmental sciences ecology and education &educational research. The museum-related research will focus on the topics about biodiversity, robot tour-guide, museum collections, museum members, species, etc.
4. The VOSviewertool had all of the benefit of clustering analysis, in providing term-maps about the museum studies research, as well as providing a global view showing the relationship among four major topics like **Vistor's Experience, Museum Collection, Natural History, and Concentration**. The topic map illustrated the delicate intertwining of subject areas and provided a more explicit illustration of the concepts within each major topic.

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