

Hotspots and trends of flamenco dance research: A CiteSpace analysis

Focos de interés y tendencias sobre la investigación en el baile flamenco: Análisis CiteSpace

Ningyi Zhang¹, Sebastián Gómez-Lozano^{1*}, Alfonso Vargas-Macías²

¹ Performing Arts Research Group-Faculty of Sport. San Antonio Catholic University. Murcia, España

² Telethusa Centre for Flamenco Research. Cádiz, España

* **Correspondence:** Sebastián Gómez-Lozano, sglozano@ucam.edu

Short title:

Analysis of flamenco dance

How to cite this article:

Zhang, N.Y., Gómez-Lozano, S., & Vargas-Macías, A. (2022). Hotspots and trends of flamenco dance research: A CiteSpace analysis. *Cultura, Ciencia y Deporte*, 17(53), 99-108. <https://doi.org/10.12800/ccd.v17i53.1861>

Received: 14 January 2022 / Accepted: 03 May 2022

Abstract

Flamenco dance, which is increasingly internationalized and globalized, has a huge market demand all over the world and it has been popular and valued by researchers nowadays. Thus, hotspots and trends research is essential to provide information for industrial development and further development lines. Based on 130 articles published from 1982 to 2021 (database updated on 4 December 2021) about flamenco dance in Scopus and Web of Science Core Collection, this research by using CiteSpaceV software explored the research hotspots and trends of the flamenco dance from the time horizon, collaborate network incorporates authors, institutions, regions, and keywords. Result: The number of publications shows an upward trend with fluctuations since 2008. 9 main research groups are formed. The University of Seville is the most prolific institution and the Saint Anthony Catholic University of Murcia ranks the highest centrality. Spain is the highest yield region. The hotspots included cultural aspects, which include identity and art in Andalusia, as well as biomechanical and physical aspects, including body, anthropometry, and physical activity focusing on dancers. The trend of this field will be physical and psychological aspects. Conclusion: future research may focus on the body and psychological aspects.

Keywords: flamenco dance, visualization analysis, CiteSpace, hotspots, trends.

Resumen

El baile flamenco se encuentra cada vez más internacionalizado y globalizado, teniendo una enorme demanda de mercado a nivel mundial. Actualmente es un campo de estudio para investigadores y profesionales del arte flamenco. Así, las zonas de referencia y tendencias en la investigación sobre el baile flamenco son esenciales para proporcionar información para el desarrollo industrial y futuras líneas de desarrollo. La muestra se basó en 130 artículos publicados desde 1982 hasta 2021 (base de datos actualizada el 4 de diciembre de 2021) sobre baile flamenco en las bases de datos de Scopus y Web of Science Core Collection. El análisis se realizó mediante el uso del software CiteSpaceV. Se exploraron los focos de interés y las tendencias de investigación en el baile flamenco desde el horizonte temporal. La red de colaboración incorpora autores, instituciones, regiones y palabras clave. Resultados: el número de publicaciones muestra una tendencia al alza con fluctuaciones desde 2008. Se forman 9 grupos de investigación principales. La Universidad de Sevilla es la institución más prolífica y la Universidad Católica San Antonio de Murcia ocupa el puesto de centralidad más alto. España es la región de mayor rendimiento. Los focos de interés incluyeron aspectos culturales, que incluyen la identidad y el arte en Andalucía, así como aspectos biomecánicos y físicos, incluidos el cuerpo, la antropometría y la actividad física centrada en los bailarines. La tendencia de este campo se basa en aspectos físicos y psicológicos. Conclusión: Investigaciones futuras pueden centrarse en aspectos corporales y psicológicos.

Palabras clave: baile flamenco, análisis de visualización, CiteSpace, focos de interés, tendencias.

Introduction

"Flamenco baile is a dance of passion, courtship, expressing a wide range of situations ranging from sadness to joy." (UNESCO, 2010). It has a history of more than 200 years and it is commonly considered that it is the result of the integration of multiple cultures which have developed in Andalusia (Machin-Autenrieth, 2015; Moon, 2015; Palma et al., 2017). It was listed as Intangible Heritage of Humanity in 2010 and has become the culture feature of Spain, which has been widely spread and recognized on the world stage and has attracted an increasing number of enthusiasts all over the world like United States, the United Kingdom, France (Cuellar-Moreno, 2016; De Santiago, 2018; Diamond, 2018). The impact of flamenco dance has been increasing by the international market demand (Aoyama, 2007), it has been proofed by universities' program between different countries, and activities or festivals and cultural tourism over continents (García et al., 2019; Palma, Palma, Rodríguez, Martín, & Cascajo, 2017). It also popular in Asia, like South Korea, the Philippines, Singapore, more and more practitioners are from China, and Japan has the largest number of amateurs and dancers of flamenco (Aoyama, 2007; Diamond, 2018).

Previous research studied the biomechanical aspect of flamenco dance generally related to footwork technique analysis with professional dancers as subjects described the average values of the vertical component of ground reaction force, analyzed the range of motion in lower limbs joints and pelvis (Forczek-Karkosz et al., 2021), demonstrated the smooth oscillations of the centre of mass in all three trajectory planes, which provide theoretical information to flamenco dancers and teachers (Forczek, Chicón, & Vargas-Macías, 2016). In terms of injury research, pains and injuries have been reported in professional flamenco dancers and students, and indicated knees, lumbar and cervical spine shows high incidence (Baena-Chicón et al., 2020). Already early studies such as those by Bejjani et al., 1988 suggested it may be caused by the huge vibrations accompanying the flamenco dance form. Considering physiological aspects, previous studies described the energy requirements of flamenco dancers by testing aerobic and anaerobic capacities, indicating flamenco dancers have those two both and have a substantial anaerobic power output, which is meaningful for developing training strategy (Pedersen, Wilmerding, Kuhn, & Enciñas-Sandoval, 2001). Meanwhile, the data on the average heart rate and maximal oxygen consumption of professional flamenco dancers have been described. It proved great physical workloads requirement in flamenco dance (González et al., 2011). However, there are still many limitations to applying flamenco in biomechanics or physiology, and fewer studies covered the holistic perspective of flamenco movement (Forczek et al., 2017). Some articles involved psychological analysis of flamenco participants. There is evidence that shows both students and professionals displayed higher levels of helplessness than those who were only students, and anxiety states which can be triggered by the artistic professional development on stage before spectators may relate to the levels of catastrophism (Baena-Chicón, Gómez-Lozano, Cano, & Vargas-Macías, 2021). Meanwhile, there is research that studied Brazilian female flamenco dancers and indicated 64.7% of participants were not satisfied with their bodies though they had high self-esteem (Nakamura, Juzwiak, de Almeida, & Montesano, 2012). Relating to the perspective of flamenco culture, tourists use the dance expression as a positive factor for self-esteem self-expression, and self-exploration, also, as a way

to differentiate themselves from other groups (Matteucci, 2014). One empirical study focused on ethnography recorded from a martial arts club and a flamenco class, observing, recording filming and participating in the classes they found trans-situational practice, matching and combining situations and communications, can explain ethnography to some extent, for better understanding other social practices for sociological reasons, and being able to reconstruct it (Schindler, 2018). However, there is few studies have looked at review of flamenco's academic research field which could enable us to better understand the development and phenomenon of flamenco dance.

Through Citespace software, we can make a comprehensive review of the academic research status and hotspot of flamenco field and infer future research trends and what we can see more clearly than other types of review is that this software shows the hotspots and trend in visualized analysis. CiteSpace, commonly advanced by Dr Chen Chaomei, is an intellectual visualization software for analysing and visualizing co-citation networks (Chen, 2006). It was designed to behaviour the visualization electric network. The collaborate networks incorporate authors, institutions, and regions; the co-occurrence network includes terminology, keywords, and categories. The collaborate network is to manifest the community connection with author, organization, and district in a study field; the co-occurrence network is to uncover the development of study hotspots and trends (Chen et al. 2014; Chen, 2005).

Therefore, the objective of this study, with using of the CiteSpaceV software is to analyse and review the flamenco researches, which enables the development of flamenco dance research since 1982 to 2021 to be reported precisely and visually and provides reference information for the further research of flamenco dance in the future.

Materials and methods

The information was gathered from the Scopus and Web of Science Core Collection. This study strategy is used for the research without publishing time limitation: TOPIC: (flamenco) AND TOPIC: (danc* OR baile) AND LANGUAGE: (English OR Spanish) AND DOCUMENT TYPES: (Article OR Review). After the initial screening, 114 related documents were retrieved in WOS, 107 in the Scopus. After removing duplicates and screening records, there are 130 publications in total, database updated on 4 December 2021.

CiteSpace# were used to parse the literature in this research. It is an intellectual visualization software commonly advanced by Dr Chen Chaomei. It was made use for behaviour visualization electric network. The collaborate network incorporates authors, institutions, and regions; the co-occurrence network includes terminology, keywords, and categories. The collaborate network is to manifest the community connection with author, organization, district in a study field; the co-occurrence network is to uncover the development of study hotspots and trends (Chen et al. 2014). Co-citation is defined as the third article citing two references, it can be one case of co-occurrence, which can include co-occurrence words, as well as co-author, co-region. A reference may be cited for many purposes or for different reasons (Chen, 2013; White & McCain, 1998). However, the cited literature may be cited in a manner similar to the function of citing underlying concepts. Therefore, the visualized map from CiteSpace can identify the structure of patterns and trends and the dynamics of the underlying scientific literature (Braam, Moed, & Van Raan, 1991). The citation tree rings show the

citation history of an article. The ring's colour indicates the corresponding citation time. The thickness of the ring is proportional to the number of references in a given period (Chen, 2013).

The 130 documentations downloaded were inputted into the CiteSpace 5.5.R2 software for bibliographic analysis with the time spacing set from 1982 to 2021 (130 records), and content analysis with the time span set 2000 to 2021 (114 records), both with the time part of a place as one piece each year. The nodes of the author, organization, region, and keyword were selected. Selection criteria were g-index, k=15.

Results

Bibliographic analysis

1 Time distribution of published papers

The relationship between the number and time of published papers can reveal the research history and development speed in this field and predict its development trend. The time distribution of published papers in the field of flamenco dance research is shown in Figure 1.

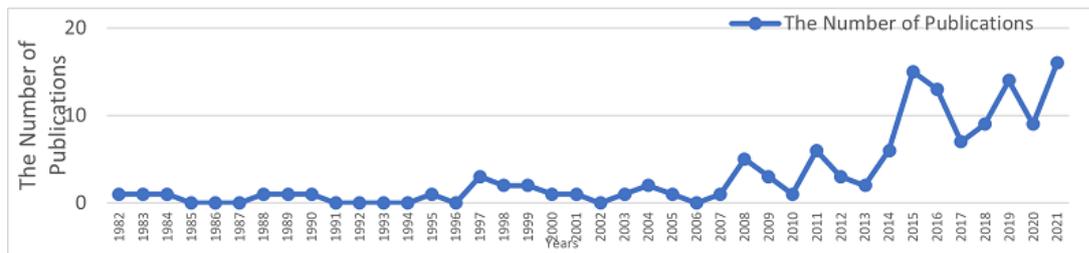


Figure1. The number of publications on flamenco dance per year from 1982 to 2021

It can be seen that the research papers on flamenco dance were first published in 1982. However, before 2008, researchers did not pay enough attention in this field, there are at most 3 articles published a year. Since 2008, it shows an upward trend with fluctuations even though the most was only 16 articles in 2021. While it also saw a surge in 2015 with 15 records and in 2019 with 14 records.

2 The co-occurrence network of scientific research authors

CiteSpace is only being equipped with use of counting the quantity of the first writers, so the writer is referred to underneath all first writers. Table 1 lists the authors with further than 2 articles. Alfonso Vargas-Macías, with 5 articles. Luis Gadea-Mateos, Alba Paris-Alemanly and F.J. Bejjani with 3 articles, respectively.

Table 1. High-yield authors in the flamenco dance research

Author	Frequency
Alfonso Vargas-Macias	5
Luis Gadea-Mateos	3
Albea Paris-Alemanly	3
F.J. Bejjani	3

As shown in Figure 2, 179 researchers (N = 179) participate in the related researches of flamenco dance, and they have 242 (N = 242) research cooperation of varying

degrees, showing that 24 groups with at least 3 members are formed in the field, 9 of them have more than 2 publications and show relatively stable.

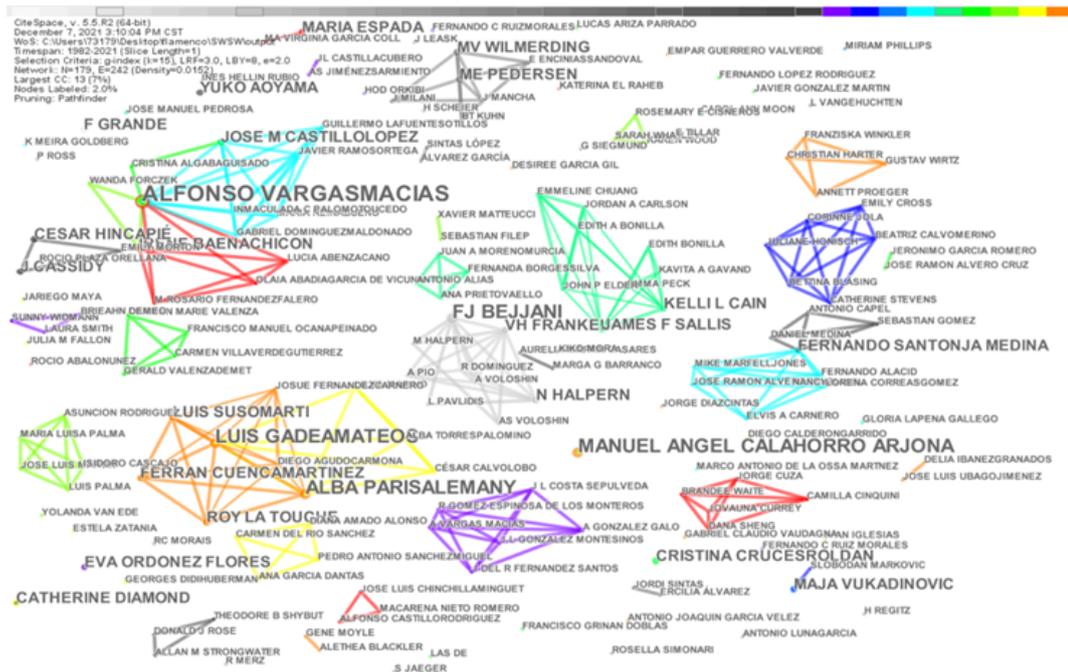


Figure 2. The co-occurrence network of authors in the flamenco dance research

It also can be seen from Figure 2, Alfonso Vargas-Macías, as a professor at the Telethusa Centre for Flamenco Research, has involved three teams and formed the largest research cooperation network in the field of flamenco dance. They focused on the aspects of biomechanics, podiatry, and injury of flamenco dance. One of the most cited articles is Metatarsal Pain and Plantar Hyperkeratosis in the Forefeet of Female Professional Flamenco Dancers (Castillo-López et al., 2014). The group of Fernando Santonja Medina did researches in the same area as well, such as Magnetic Resonance Study of Lumbar Disks in Female Dancers (Capel et al., 2009) and Comparison of two field methods for estimating body fat in different Spanish Dance disciplines (Alvero-Cruz et al., 2014). F.J. Bejjani with other members as a team also focused on the biomechanics aspects, publishing articles such as Musculoskeletal demands on flamenco dancers: a clinical and biomechanical study (Bejjani et al., 1988). Cain, K.L. group studied on the physiological aspects, such as Physical activity in youth dance classes (Cain et al., 2015), as well as ME Pedersen group, which did research about energy requirement, plantar flexion and dorsiflexion strength in

flamenco, such as Energy requirements of the American professional flamenco dancer (Pedersen et al., 2001) and Measures of plantar flexion and dorsiflexion strength in flamenco dancers (Pedersen et al., 1999). Alba Paris-Alemany with other researchers as a group focused on the motor image published, such as Visual-motor imagery predominance in professional Spanish dancers (Paris-Alemany et al., 2019). It can be seen that most of these groups focus on biomechanical and physical research.

3 The co-occurrence network of scientific research institutions

The authors' institutions which have more than 3 articles are listed in Table 2. The University of Seville with 8 articles are the most prolific institution, followed by the University of Granada with 7, Saint Anthony Catholic University has 6 publications as well as International University of La Rioja. And Telethusa Centre for Flamenco Research has 5, University of Malaga and Rey Juan Carlos University published 4 articles respectively. It shows the main research institutions are universities in different regions.

Table 2. High-yield institutions in the flamenco dance research

Institution	Frequency	Centrality
Univ Seville	8	0.05
Univ Granada	7	0
Univ Int La Rioja	6	0
Univ Catolica San Antonio Murcia	6	0.14
Ctr Invest Flamenco Telethusa	5	0.02
Univ Malaga	4	0.02
Univ Rey Juan Carlos	4	0.09

According to Figure 3, there are 82 (N=82) institutions involved in flamenco dance research, and these research institutions have 91 cooperations (E = 91). In the network, the density is 0.0274, which shows the cooperation network of scientific research institutions is relatively

stable. However, as table 2 shows, in the largest groups, the centrality value of Saint Anthony Catholic University is 0.14, Rey Juan Carlos University with 0.09, The University of Seville with 0.05, University of Malaga and Telethusa Centre for Flamenco Research with 0.02, the rest all as 0.00

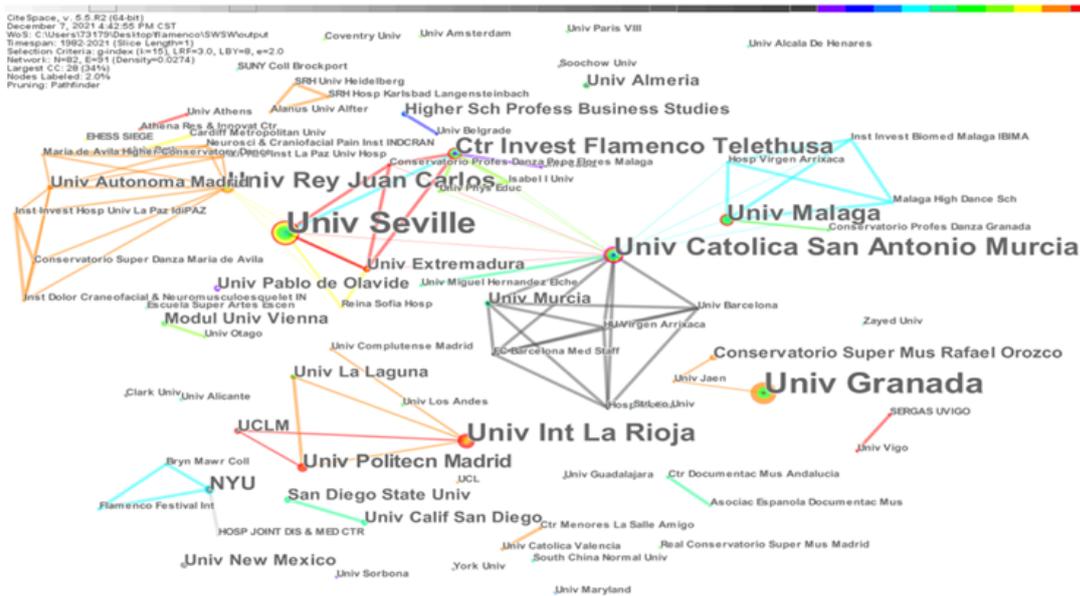


Figure 3. The co-occurrence network of institutions in the flamenco dance research

4 The co-occurrence network of scientific research region

As Table 3, Spain, as a place where flamenco developed, ranks the top with 60 publications. The second is the

USA with 15. France and England with 3, respectively. Other regions which did not list on the table made little contribution. As Figure 4 shows, there is less cooperation research between regions.

Table 3. High-yield regions in the flamenco dance research

Region	Frequency
Spain	60
USA	15
France	3
England	3

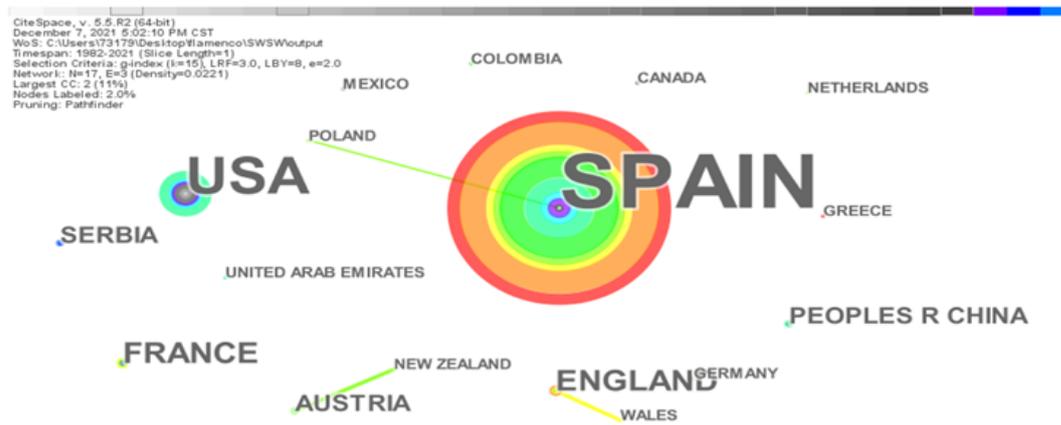


Figure 4. The co-occurrence network of regions in the flamenco dance research

Content analysis

1 Keywords co#occurrence analysis: thematic hotspots

As shown in Table 4 and Figure 5, “flamenco” has the largest nodes with 25 frequencies in the co-occurrence network, which is closely related to the keyword “dance”, “flamenco dance”. “Physical activity” is the 3rd on the list with 8 frequencies as well as “dancer”. Followed with “body” with 7 frequencies. Other keywords whose frequency is more than

3 and less than 6 in the field are “culture” “identity” “pain” “Andalusia” “biomechanics” and “art”.

The High-centrality keywords in the flamenco dance research. “Flamenco” (0.43) “dance” (0.42) and “dancer” (0.24) ranked the top 3 of the high-centrality keywords, while “art” (0.22) “body” (0.15) “anthropometry” (0.15) “physical activity” (0.12) are also the keywords whose centrality is more than 0.10. “injury” (0.09) “flamenco dance” (0.06) “Andalusia” (0.06) and “motor

Table 5. The keywords with the strongest citation bursts in the flamenco dance research

Keywords	Year	Strength	Begin	End	2000 - 2021
rehabilitation	2000	1.1761	2008	2010	
pain	2000	1.1672	2008	2011	
danse	2000	1.1761	2008	2010	
migration	2000	1.088	2009	2011	
identity	2000	2.76	2009	2011	
gender	2000	1.2439	2011	2011	
biomechanics	2000	1.1397	2014	2014	
Andalusia	2000	1.8822	2015	2016	
fandango	2000	1.1558	2015	2015	
body	2000	1.3214	2015	2021	
flamenco	2000	1.2649	2015	2016	
festival	2000	1.1558	2015	2015	
calibration	2000	1.1558	2015	2015	
adolescent	2000	1.1558	2015	2015	
children	2000	1.1558	2015	2015	
dance	2000	2.133	2016	2021	
gesture	2000	1.1761	2016	2016	
industry	2000	1.1001	2017	2017	
culture	2000	1.6147	2017	2017	
physical activity	2000	1.3459	2019	2021	
motor imagery	2000	1.1205	2019	2021	
emotion	2000	1.21	2019	2021	
style	2000	1.21	2019	2021	

Discussion

This study revealed that the hotspots and trends of flamenco dance research with a visualization analysis based on 130 articles published from 1982 to 2021 in Scopus and Web of Science Core Collection with Citespace# software, which included time distribution of published papers, Co-occurrence network of scientific research authors, institutions, regions, and keywords co-occurrence and strongest citation bursts analysis as well.

“Cultural”, “physical” and “biomechanical” researches as hotspots and trend over the world in the flamenco field

It is not difficult to predict that “cultural” study is one of the hotspots. First of all, it is a multi-cultural background art product integrated and developed in the Andalusia region in Spain with various elements (Palma et al., 2017) and it was listed as Intangible Heritage of Humanity in 2010 and has become the culture feature of Spain. Secondly, even though flamenco was considered a marginal art for Spanish society and it is not until the 1980s that the form was professionalized (de la Torre, Lara, & Arjona-Fuentes, 2019), a number of scholars tried to improve the recognition of flamenco as heritage at a political level since 1990s, and it was chosen as a symbol of regional cultural development and a prominent symbol of Andalusian identity (Machin-Autenrieth, 2015). Therefore, the cultural aspects, including identity and art research related to flamenco dance, especially in Andalusia, is one of the hotspots in the last 21 years. Furthermore, Flamenco promotes tourism in Spain, as an important part of cultural tourism, it has attracted many people and creates a huge global market demand (de la Torre et al., 2019; García et al., 2019). So, to find the way to improve the experience to the tourists, bringing the emotion and also living it (García et al., 2019), some researches about “cultural” aspect was studied.

We can also notice that these researches are not only in Spain, there are also some from different regions. It is widely popular in the United States, the United Kingdom, France, and other Europe countries (Machin-Autenrieth, 2015; Palma et al., 2017). as well included regions like Mexico, Poland, Canada according to results of this research. Except for tourism, emigration could also be a reason of this popularization. Some of emigrants from Spain developed flamenco where they stayed. They devised training program, run restaurants, bars and related activities which is a medium to bonds between them (Ruiz-Morales, 2011). Activities are formed through individual groups, universities and communities related to flamenco dance, which not only expands social identity and strengthens regional identity, but also developed the flamenco culture world widely (Crespi#Vallbona & Richards, 2007; García et al., 2019). Eva Encinias Sandoval, who built the flamenco program at the the University of New Mexico, could be a great example. She wove flamenco into the cultural fabric of New Mexico and started Festival called “Flamenco de Albuquerque” which draws audiences and dancers. Additionally, in both the United States and Canada in the first half of the century also the intangible cultural heritage such as the art of flamenco has been moved (Briseno, 2021). Flamenco dance is popular in Asia as well, South Korea, the Philippines, Singapore, more and more practitioners are from China, and Japan has the largest number of amateurs and dancers of flamenco (Aoyama, 2007). This phenomenon may be caused by globalization. There were universities’ program between different countries, and activities or festivals and cultural tourism over continents. On the contrary, unlike emigration or social identity, the main reason why it became popular in Japan is that it has a completely different culture from flamenco. The culture of Japan is opaque with its highly codified gestures in the observance of which propriety represses emotion to preserve a calm exterior of social harmony (Diamond, 2018). In the 21st century

in Japan, although many women have achieved economic independence, they still suffer from gender discrimination. Therefore, flamenco can express strong emotions and it does not necessary a partner, which is also a reason for its popularity in Japan (Diamond, 2018).

About “physical” and “biomechanical” aspect as hotspots, there are some main reasons. Flamenco dance has its unique characteristics with strong emotion and the footwork technique (Baena-Chicón, Gómez-Lozano, Cano, & Vargas-Macías, 2021), which requires dancers strike the floor to make a loud and rhythm voice (Vargas-Macías et al., 2021). Therefore, dancers were usually required to have a high level of physical conditions (Forczek, Baena-Chicon, & Vargas-Macías, 2017), there is research indicate that the require is similar to those of elite sports (Pedersen, Wilmerding, Kuhn, & Enciñas-Sandoval, 2001). Meanwhile, some research investigated as well the injury frequency of flamenco dancers and deduced that the pain and injuries on lower limbs and back may be caused by the model of footwork movement (Castillo-López et al., 2014; Pedersen, Wilmerding, & Science, 1998). Therefore, the biochemical and physical descriptions and relevant studies have been demanded to be researched, in order to prevent the injury or pain and improving dance performance. On the other hand, thanks for the advancement of research in the entire dance field, people are pursuing technical and aesthetic improvement in a more scientific way, and they have increased their awareness of physical health and injury protection. Also, compared with the previous family-style or mentor-apprentice-style methods (de la Torre et al., 2019; Palma et al., 2017), the official organizations and institute of development are more capable of academic research. The professional researchers who have been trained by institutionalization are more aware of scientific training methods. Meanwhile, flamenco has reached schools and universities, that could be also the reason that “psychological” aspect may be one of the trends for future studies. Therefore, biomechanical and physical aspects have become the hotspots in the field, including body, anthropometry, and physical activity research focusing on dancers, and it is going to act as an increasingly significant character in the future.

Comparing with related researches with Citespace software

There is limited research currently existing on research hotspots and trends in flamenco dance, but some articles have been reported to explore hotspots and trends related to other style dance fields. For instance, the article Quantitative Analysis on Research Trends of Dance Sport at Home and Abroad (Ma & Huang, 2019) studied on the hotspots and trends of DanceSport (Latin dance and Ballroom dance) research, including 61 records (1990-2018) with Citespace# as well, which has been found that the number of articles related to DanceSport published in Web of Science database, shows a skipping trend of rising since 2007, which is similar with flamenco dance time range in this article. Furthermore, another similar result is that in co-occurrence network of scientific research authors and institutions aspects, both of DanceSport and flamenco dance research show that although the number of research groups is less, there are some groups relatively stable, and the main research institutions are universities in different regions.

By contrast, the difference between DanceSport and flamenco dance researches is that the main research regions, Spain and the USA ranked the top of flamenco research, while the UK and the USA were the main regions in DanceSport research area. It may be due to the origin and level of development of those two styles of dance. Additionally, in terms of hotspots and trends, DanceSport researchers focused on the exercise,

health, and disease interventions of adolescence and the elderly, while flamenco researchers draw more attention to the biomechanical and physical aspects as well as the psychological aspects of dancers.

Comparing with related researches with other statistical methods

Some bibliometric analysis about the dance field has been documented with other statistical methods: information was downloaded into spreadsheet software (Microsoft Office Excel), and additional coding was manually performed for all analysis. For example, Publications in dance field in Arts & Humanities Citation Index: a bibliometric analysis (Ho & Ho, 2015) and A bibliometric analysis of dance performance reviews in the dance category of the Web of Science (Wang & Ho, 2019), these two with this method analysis about dance research and dance reviews respectively, based on Arts & Humanities Citation Index database of the Clarivate Analytics' Web of Science Core Collection.

According to the results in the face of the authors, they all indicated that most of the authors are single-authors. Interestingly, comparing with this study of flamenco dance research that the number of relatively stable groups was few to 9. That might mean researchers in the dance area should strengthen cooperation in the future. Furthermore, Huei-Chen Ho has also found that “body” and “education” were new popular words in article titles. Similarly, “body” is also one of the high-frequency keywords with high-centrality in flamenco dance research. Simultaneously, a common result of those two above articles about dance research and review is that “Ballets” is the main area for current dance researches and reviews, which may partially indicate that other dance style research needs to be studied in the future. Even though those above two pieces of research included more records of the data, they had limited to the bibliometric analysis including aspects of publication language, output, authors, journals, and distribution of words in the article title. Rather, this article, researching flamenco dance with Citespace#, can more clearly show the bibliographic and visual analysis evolution, hotspots, trends in Co-occurrence network and keywords with the strongest citation bursts.

Conclusion

CiteSpace software applies to fix quantify analyse added apparently, intuitionistic, and objective. Precise algorithms can analyse the hotspots, trends, knowledge base, and high-quality literature. Although the data recorded in this study are only 130 publications, hotspots and trends in the field of flamenco dance could be detected, this research could manifest the start, bursts, high-centrality and frequency reveal the evolutionary trends of hotspots. Based on the above analyse, the following conclusions can be drawn:

From the bibliographic analysis, the number of announced works in this field shows a growing trend in 2008 and reaches its peak by 2021. From the scientific research authors, Alfonso Vargas-Macías is the highest yield author in flamenco dance research, followed by Luis Gadea-Mateos, Alba Paris-Aleman and F.J. Bejjani. 9 research cooperative groups which have more than 2 publications and at least 3 authors are formed in the field of flamenco dance research, and most of these groups focus on biomechanical and physical research. In terms of scientific research institutions, The University of Seville with 8 articles is the most prolific institution and Saint Anthony Catholic University ranks the highest centrality value. Main research institutions are universities in different regions.

The cooperation network of scientific research institutions is relatively stable. Spain and the United States are high yield regions.

From the content analysis, the cultural aspects, including identity and art research related to flamenco dance, especially in Andalusia, which is one of the hotspots in the last 21 years. Furthermore, biomechanical and physical aspects have become the hotspots in the field of flamenco dance, including body, anthropometry, and physical activity research in the last years focusing on the dancer, and it is going to act as an increasingly significant character in the future. Besides, as physical activity, motor imagery, emotion, and style as keywords showed a burst in the last three years, the attention of future studies on flamenco dance might change to psychological aspects as well.

Funding

This research received no external funding

Bibliography

- Alvero-Cruz, J. R., Marfell-Jones, M., Alacid, F., Orta, P. A., Correas-Gómez, L., Medina, F. S., & Carnero, E. A. (2014). Comparison of two field methods for estimating body fat in different Spanish Dance disciplines. *Nutrición hospitalaria*, 30(3), 614-621. doi:10.3305/nh.2014.30.3.7240
- Aoyama, Y. (2007). The role of consumption and globalization in a cultural industry: The case of flamenco. *Geoforum*, 38(1), 103-113. doi:10.1016/j.geoforum.2006.07.004
- Aoyama, Y. (2009). Artists, tourists, and the state: Cultural tourism and the flamenco industry in Andalusia, Spain. *International Journal of Urban and Regional Research*, 33(1), 80-104. doi:10.1111/j.1468-2427.2009.00846.x
- Baena-Chicón, I., Gómez-Lozano, S., Abenza-Cano, L., de Vicuña, O. A. G., Fernández-Falero, M. R., & Vargas-Macías, A. (2020). Las algias como factor predisponente de lesión en estudiantes de baile flamenco. (Algias as a predisposing factor of injury in flamenco dance students). *Cultura, Ciencia y Deporte*, 15(44), 245-253. doi:10.12800/ccd.v15i44.1466
- Baena-Chicón, I., Gómez-Lozano, S., Cano, L. A., & Vargas-Macías, A. (2021). Pain catastrophizing in Flamenco dance students at professional dance conservatories. *Archivos de Medicina del Deporte*, 86-90. doi:10.18176/archmeddeporte.00030
- Bejjani, F. J., Halpern, N., Pio, A., Dominguez, R., Voloshin, A., & Frankel, V. H. (1988). Musculoskeletal demands on flamenco dancers: a clinical and biomechanical study. *Foot & Ankle*, 8(5), 254-263. doi:10.1177/107110078800800505
- Braam, R. R., Moed, H. F., & Van Raan, A. F. (1991). Mapping of science by combined co-citation and word analysis. II: Dynamical aspects. *Journal of the American Society for information science*, 42(4), 252-266. doi:10.1002/(SICI)1097-4571(199105)42:4%3C252::AID-ASI2%3E3.0.CO;2-G
- Briseno, E. D. (2021). Dancing through life: Preeminent professor of flamenco retiring from UNM after 43 years. *Albuquerque Journal*. <https://www.abqjournal.com/2359401/dancing-through-life-preeminent-professor-of-flamenco-retiring-from-unm-after-43-years.html>
- Cain, K. L., Gavand, K. A., Conway, T. L., Peck, E., Bracy, N. L., Bonilla, E., P, Rincon & Sallis, J. F. (2015). Physical activity in youth dance classes. *Pediatrics*, 135(6), 1066-1073. doi:10.1542/peds.2014-2415
- Capel, A., Medina, F. S., Medina, D., & Gómez, S. (2009). Magnetic resonance study of lumbar disks in female dancers. *The American journal of sports medicine*, 37(6), 1208-1213. doi:10.1177/0363546508330128
- Castillo-López, J. M., Vargas-Macías, A., Domínguez-Maldonado, G., Lafuente-Sotillos, G., Ramos-Ortega, J., Palomo-Toucedo, I. C., Reina-Bueno, M. & Munuera-Martínez, P. V. (2014). Metatarsal pain and plantar hyperkeratosis in the forefeet of female professional flamenco dancers. *Medical Problems of Performing Artists*, 29(4), 193-197. doi:10.21091/mpa.2014.4040
- Chen, C. (2005, January). The centrality of pivotal points in the evolution of scientific networks. In *Proceedings of the 10th international conference on Intelligent user interfaces* (pp. 98-105). doi:10.1145/1040830.1040859
- Chen, C. (2006). CiteSpace II: Detecting and visualizing emerging trends and transient patterns in scientific literature. *Journal of the American Society for information Science and Technology*, 57(3), 359-377. doi:10.1002/asi.20317
- Chen, C. (2013). *Mapping scientific frontiers: The quest for knowledge visualization*. Springer Science & Business Media. doi:10.1007/978-1-4471-5128-9
- Chen, Y., Chen, C., Hu, Z., & Wang, X. (2014). *Principles and applications of analyzing a citation space*. Beijing: Science and Technology Press, 14-15.
- Crespi#Vallbona, M., & Richards, G. (2007). The meaning of cultural festivals: Stakeholder perspectives in Catalunya. *International journal of cultural policy*, 13(1), 103-122. doi:10.1080/10286630701201830
- Cuellar-Moreno, M. (2016). Flamenco dance. Characteristics, resources and reflections on its evolution. *Cogent Arts & Humanities*, 3(1), 1260825. doi:10.1080/23311983.2016.1260825
- De la Torre, M. G. M. V., Lara, S. M., & Arjona-Fuentes, J. M. J. S. (2019). Flamenco tourism from the viewpoint of its protagonists: a sustainable vision using lean startup methodology. *Sustainability*, 11(21). doi:10.3390/su11216047
- De las Heras-Fernández, R., Coll, M., & Espada, M. (2020). Receptiveness of Spanish and Flamenco Professional Dancers in Their Training and Development. *International Journal of Instruction*, 13(2), 381-392. doi:10.29333/iji.2020.13226a
- De Santiago Ortega, P. P. (2018). Flamenco: De la marginalidad social a la referencia cultural pasando por la apropiación política. *Revista de Investigación sobre Flamenco "La Madrugá"*, (15), 91-115.
- Diamond, C. (2018). Being Carmen: Cutting Pathways towards Female Androgyny in Japan and India. *New Theatre Quarterly*, 34(4), 307-325. doi:10.1017/S0266464X18000398
- Forczek, W., Baena-Chicon, I., & Vargas-Macias, A. (2017). Movement concepts approach in studies on flamenco dancing: A systematic review. *European Journal of Sport Science*, 17(9), 1161-1176. doi:10.1080/17461391.2017.1359680
- Forczek, W., Chicón, I. B., & Macías, A. V. (2016). Variación de la posición del centro de gravedad en una bailaora profesional durante el zapateado flamenco. *Revista del Centro de Investigación Flamenco Telethusa*, 9(10), 30-36.
- Forczek-Karkosz, W., Michnik, R., Nowakowska-Lipiec, K., Vargas-Macias, A., Baena-Chicón, I., Gómez-Lozano, S., & Gorwa, J. (2021). Biomechanical description of Zapateado technique in flamenco. *International Journal*

- of Environmental Research and Public Health, 18(6), 2905. doi:10.3390/ijerph18062905
- García, L. G., Muñoz Fernández, G. A., & López-Guzmán, T. (2019). Cultural tourism and flamenco in the city of Cordoba (Spain). *Journal of Quality Assurance in Hospitality & Tourism*, 20(5), 581-598. doi:10.1080/1528008X.2019.1579077
- González Montesinos, J. L., Vargas Macías, A., Fernández Santos, J. del. R., González Galo, A., Gómez Espinosa de los Monteros, R., & Costa Sepúlveda, J. (2011). Análisis del baile flamenco: cargas de trabajo y condición física. *Revista Internacional de Medicina y Ciencias de la Actividad Física y del Deporte*, 11 (44), 708-720.
- Ho, H. C., & Ho, Y. S. (2015). Publications in dance field in Arts & Humanities Citation Index: a bibliometric analysis. *Scientometrics*, 105(2), 1031-1040. doi:10.1007/s11192-015-1716-1
- Ma Dan & Huang Junya. (2019) Quantitative Analysis on Research Trends of Dance Sport at Home and Abroad. *Journal of Xi'an Physical Education University*, 36(2): 185-194.
- Machin-Autenrieth, M. (2015, February). Flamenco¿ algo nuestro? (something of ours?): Music, regionalism and political geography in Andalusia, Spain. In *Ethnomusicology Forum* (Vol. 24, No. 1, pp. 4-27). Routledge. doi:10.1080/17411912.2014.966852
- Matteucci, X. (2014). Forms of body usage in tourists' experiences of flamenco. *Annals of tourism Research*, 46, 29-43. doi:10.1016/j.annals.2014.02.005
- Moon, C. A. (2015). The alert collector: Dance and flamenco, a guide to sources. *Reference & User Services Quarterly*, 54(3), 19-22. doi:10.5860/rusq.54n3.19
- Nakamura, I. S., Juzwiak, C. R., de Almeida, D. H., & Montesano, F. T. (2012). Antropometría, imagen corporal, autoestima y calidad de la dieta de brasileñas practicante de baile flamenco. *Revista del Centro de Investigación Flamenco Telethusa*, 5(5), 22-30.
- Navarro García, J. L. (1993). *Cantes y bailes de Granada*. Málaga: Editorial Arguval, 179.
- Palma, L., Palma, M. L., Rodríguez, A., Martín, J. L., & Cascajo, I. (2017). Live flamenco in Spain: a dynamic analysis of supply, with managerial implications. *International Journal of Arts Management*, 58-70.
- Parent, Mathias, V., Garcia, J., Campoy, M. J., & Alvero, J. R. (2016). Analysis of selection criteria in the access tests to official Dance studies. *Retos-Nuevas Tendencias en Educación Física Deporte y Recreación*, (29),79-85. doi:10.47197/retos.v0i29.34231
- Paris-Aleman, A., La Touche, R., Agudo-Carmona, D., Fernández-Carnero, J., Gadea-Mateos, L., Suso-Martí, L., & Cuenca-Martínez, F. (2019). Visual motor imagery predominance in professional Spanish dancers. *Somatosensory & motor research*, 36(3), 179-188. doi:10.1080/08990220.2019.1641480
- Pedersen, M. E., Wilmerding, M. V., Kuhn, B. T., & Encinias-Sandoval, E. (2001). Energy requirements of the American professional flamenco dancer. *Medical Problems of Performing Artists*, 16(2), 47-52. doi:10.21091/mppa.2001.2008
- Pedersen, M. E., Wilmerding, M. V., Milani, J., & Mancha, J. (1999). Measures of plantar flexion and dorsiflexion strength in flamenco dancers. *Medical Problems of Performing Artists*, 14, 107-112.
- Ruiz-Morales, F. C. (2011). De cante, baile y toque en la emigración. *Sociabilidad en torno al flamenco en Bélgica, 1956-1975*. *Revista de Dialectología y Tradiciones Populares*, 66(2), 433-454. doi:10.3989/rtdp.2011.16
- Schindler, L. (2018). The ethnomethods of ethnography: A trans-situational approach to the epistemology of qualitative research. *Human Studies*, 41(1), 103-120. doi:10.1007/s10746-017-9449-1
- Smith, L., DeMeo, B., & Widmann, S. (2011). Identity, migration, and the arts: three case studies of translocal communities. *The Journal of Arts Management, Law, and Society*, 41(3), 186-197. doi:10.1080/10632921.2011.598418
- United Nations Educational, Scientific, and Cultural Organization. (2010). Decision of the Intergovernmental Committee: 5.COM 6.39. <https://ich.unesco.org/en/decisions/5.COM/6.39>
- Vargas-Macías, A., Baena-Chicón, I., Gorwa, J., Michnik, R. A., Nowakowska-Lipiec, K., Gómez-Lozano, S., & Forczek-Karkosz, W. (2021). Biomechanical Effects of Flamenco Footwork. *Journal of Human Kinetics*, 80(1), 19-27. doi:10.2478/hukin-2021-0086
- Wang, X., & Ho, Y. S. (2019). A bibliometric analysis of dance performance reviews in the dance category of the Web of Science. *COLLNET Journal of Scientometrics and Information Management*, 13(1), 79-90. doi:10.1080/09737766.2018.1550036
- White, H. D., & McCain, K. W. (1998). Visualizing a discipline: An author co-citation analysis of information science, 1972-1995. *Journal of the American society for information science*, 49(4), 327-355. doi:10.1002/(SICI)1097-4571(19980401)49:4<327::AID-ASI4>3.0.CO;2-4
- Wieczorek, M. (2017). Domains of public activity in touristic flamenco shows. *International Journal of Tourism Anthropology*, 6(1), 41-61. doi:10.1504/IJTA.2017.088024