

A bibliometric study on body percussion based on high impact search engines Estudio bibliométrico sobre la percusión corporal basado en motores de búsqueda de alto impacto

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Abstract. The purpose of this work is to present the state of the art of body percussion through a bibliometric study that collects the most significant literature at the international level from 2005 to 2021, and that can serve as a basis for future research on this topic. A total of $n=64$ documents were selected, extracted solely and exclusively from primary search engines with high academic scientific rigor: Web of Science (WOS) and SCOPUS. An *ex post facto* retrospective design was used and the information was classified in a Microsoft Excel database to subsequently carry out a frequency analysis of temporal, demographic, linguistic, production, citation and methodological variables. The main results are that Spain is the largest producer of literature through the BAPNE research group in the line of cognitive stimulation and executive functions. Non-intervention papers written in English and published in scientific journals predominate. Within the intervention studies, quantitative, quasi-experimental works prevail, with control and experimental groups, use of pretest and post-test and the test is the main evaluation instrument. It is ratified that the term «body music» is not suitable for research on body percussion and that it produces a great waste of time for researchers on the subject. On the contrary, the term «body percussion» is the most appropriate and effective term in the primary search engines.

Key Words: Body Percussion, BAPNE, Neuromotricity, Motor Control, Bibliometric Analysis.

Resumen. El propósito de este trabajo es presentar el estado de la cuestión de la percusión corporal a través de un estudio bibliométrico que recoja la literatura más significativa a nivel internacional desde 2005 hasta 2021, y que pueda servir como base para futuras investigaciones sobre esta temática. Se han seleccionado un total de $n=64$ documentos extraídos única y exclusivamente de motores de búsqueda primarios que cuentan con un alto rigor científico académico: Web of Science (WOS) y SCOPUS. Se ha utilizado un diseño *ex post facto* retrospectivo y clasificado la información en una base de datos en Microsoft Excel para posteriormente realizar un análisis de frecuencia de variables temporales, demográficas, lingüísticas, de producción, citación y metodológicas. Los principales resultados son que España es el mayor productor de literatura a través del grupo de investigación BAPNE en la línea de la estimulación cognitiva y de las funciones ejecutivas. Predominan los trabajos de no intervención escritos en inglés y publicados en revistas científicas. Dentro de los estudios de intervención prevalecen los trabajos cuantitativos, Quasi-experimentales, con grupo control y experimental, utilización de pretest y postest y el test es el principal instrumento de evaluación. Se ratifica que el término «*body music*» no es apto para la investigación sobre percusión corporal y que produce una gran pérdida de tiempo a los investigadores sobre la materia. Por el contrario, el término «*body percussion*» es el más adecuado y efectivo en los motores de búsqueda primarios.

Palabras clave: Percusión Corporal, BAPNE, Neuromotricidad, Control Motor, Análisis Bibliométrico.

Introduction

In the last five years, the number of publications on body percussion has increased considerably, with 114 documents on the subject. For this reason, it is necessary to carry out a bibliometric study that brings together all the information at international level in relation to this subject of study.

Body percussion is as old as the human being. Cremades (2009) and Cañabate et al. (2017) collect a multitude of definitions, although the most widespread

is the one presented by Romero (2013) who defines it as «[...] the art of percussion of the body producing various types of sounds with a didactic, therapeutic, anthropological and social purpose» (p.443). In reference to the variant with a pedagogical purpose, body percussion is a resource widely used by teachers in the classroom through coordination and dissociation activities. As for the social variant (inclusion/exclusion) it is used in many countries in the form of rites, songs and dances as a way of welcoming and inclusion in their community (Romero, 2014b, pp. 5-7). On the other hand, in its therapeutic variant it is born from the combination of two disciplines, music therapy and dance therapy. It gathers from the former «[...] the

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connection between music and emotion using singing, melody and percussion» and from the latter «[...] the link between movement and emotion, integrating dances, movement and choreographies» (Romero-Naranjo & Romero-Naranjo, 2013, p. 1737).

Our body is capable of making different types of sounds and timbres thanks to the anatomy it possesses depending on the possibilities of flexion, tension, extension or torsion of our limbs. Romero (2014b) divides them into those made with the upper and lower limbs basically to which he adds the different ways of stepping with the feet.

The use of the didactics of body percussion has been different according to the time, the country and the prevailing pedagogical currents. Today it seems clear the importance of the binomial music and movement in music education, but it has not always been so. Trives et al. (2018) analyze the pedagogical current that occurred from the mid-19th century to the early 20th century advocating that in this period there were two clearly defined camps between advocates (Fröbel, Hanson, Byington, Stetson, Dalcroze, Gulick, and Hall) and detractors (Giddings, Earhart, Seashore, and Kwalwasser).

On the other hand, Trives-Martínez and Vicente-Nicolás (2013) conduct a study on the use of body percussion in 20th century musical methodologies. Specifically, they focus on the most significant authors being these «[...] Emile Jacques-Dalcroze, Zoltan Kodaly, Carl Orff, Edgar Willems, Maurice Martenot and the BAPNE method» (p.1749). In all these methods, body percussion is used directly or indirectly related to some parameter of the music, the most significant being that of rhythm.

The BAPNE method is a method created by PhD. Francisco Javier Romero Naranjo in 1998. Romero (2019a) defines it as «[...] a method of cognitive, socioemotional, psychomotor and neurorehabilitative stimulation based on neuromotor skills whose objective is to work on executive functions» (p.2). It is articulated through body percussion and its acronym refers to the subjects on which it is based (Biomechanics, Anatomy, Psychology, Neuroscience and Ethnomusicology). There are several articles in which Romero himself exposes a new conceptual framework differentiating the terms motricity, psychomotricity and neuromotricity, justifying his activities under the latter (Andreu-Cabrera & Romero-Naranjo, 2021; Romero-Naranjo & Andreu-Cabrera, 2021 [In Press]). Likewise, there are many works in which the term neuromotricity is coined in their

titles (Romero, 2019a, 2019b, 2019c, 2019d, 2019e, 2019f, 2019g, 2019h, 2019i, 2019j, 2021a, 2021b, 2021c, 2022).

The purpose it pursues is:

[...] the development of executive function, attention, memory and concentration, thus activating all the lobes of the brain with the aim of also developing an independence of the lower extremities, as opposed to the upper ones and verbalization jointly. (Romero, 2014b, vol. 1, p. 3)

This methodology is aimed at all types of people from 0 to 99 years old and can be used by a large influx of different fields such as education (Pre-school, Primary, Secondary), therapy, neurorehabilitation, solfeggio and team building. It is based on a strong foundation and its central pillar is research. Its research group is formed by an interdisciplinary team of professionals in Music, Music Therapy, Psychology, Neurology, Neuropsychology, Physiotherapy and Pedagogy among others (Romero, 2014b) and classifies its publications into four main groups: 1- Foundation; 2- Didactic; 3- Research design; 4- Statistical results (Romero-Naranjo, 2022, pp. 37-38).

Under the authorship of this research group, there are 12 articles with a direct relationship on attention (Arnau-Mollá & Romero-Naranjo, 2020; Crespo-Colomino & Pons-Terrés et al., 2014; Jauset et al., 2014; Jiménez-Molina et al., 2017; Piqueres et al., 2018; Piqueres-Juan et al., 2019; Pons & Romero, A.A. et al., 2014; Romero-Naranjo & Pons-Terrés et al., 2014; Romero-Naranjo & Liendo-Cárdenas et al., 2014; Romero-Naranjo, 2015; Ros-Silla et al., 2019; Trives et al., 2014).

In reference to quantitative publications articulated through the BAPNE music-motor activities protocol, this research group has intervention works with control and experimental group with before and after evaluation that present statistically significant results and that verify the possible cognitive, psychomotor or executive functions stimulation, both in school population and other groups (Álvarez-Morales & Romero-Naranjo, 2019; Carretero-Martínez et al., 2014; Castelló-Juan et al., 2019; Cozzutti et al., 2017; González et al., 2019; Latre-Nava et al., 2019; Piqueres-Juan, et al., 2019; Romero, 2014a; Ros-Silla et al., 2019; Torró-Biosca et al., 2019), such as in emotional management and social competence among adolescents (Fabra-Brell & Romero-Naranjo, 2017; Moral et al., 2020), as well as in selective attention in students between 8 and 13 years old (Arnau-Mollá & Romero-Naranjo, 2020;

Piqueres-Juan et al., 2019; Ros-Silla et al., 2019), and rehabilitative therapy of drug addiction (Romero-Naranjo & Crespo-Colomino, et al., 2014).

In turn, it has to its credit qualitative studies using experimental group and evaluating after applying the BAPNE activity protocol after the intervention sessions in relation to well-being and quality of life in older people (Pons-Terrés & Romero-Naranjo, F. J. et al., 2014), as well as the perception of flow (Crespo-Colomino & Romero-Naranjo et al., 2014).

On the other hand, there are intervention studies carried out by authors not ascribed to any specific body percussion research group that apply or analyze the impact of activities in specific methods such as Dalcroze (Sutela et al., 2020; Sutela et al., 2021), the Momta program (Yung & Myungia, 2020), as well as body percussion activities not included in any methodology (Almoguera, 2019; García, 2020; Garcías de Ves 2021a, 2021b, 2021c; Garcías de Ves & Joven, 2020; Lima et al., 2016; Pérez, 2014; Picazzi, 2015; Riera & Casals, 2021).

From the perspective of Physical Education, Garcías de Ves (2021c) states that after just one online session of body percussion without a control group with teachers of this area, there was a greater predisposition to accept body percussion as body expression content in their classes. She confirms that around 30% of the teachers surveyed have used it as content to work on corporal expression. On the other hand, a multitude of studies carried out in the area of Physical Education show motor, psychomotor, cognitive or socioemotional benefits (Aguilar et al., 2021; Martínez et al., 2021; Pacheco et al., 2022; Padial et al., 2022; Palma et al., 2021; Pérez et al., 2022; Romero et al., 2021; Zambrano et al., 2022), as well as different types of correlations (Luis-de Cos et al., 2019; Mezcuca-Hidalgo et al., 2020; Villa et al., 2019), or programmes and pedagogical resources related to play, ludomotricity or musicomotricity (Burbano et al., 2021; González, 2022; Muñoz-Arroyave et al., 2020). The aforementioned topic could be approached in research from the perspective of body percussion included in Physical Education.

Throughout this work, the existence of a great terminological problem has been detected, since certain non-academic sectors refer to body percussion as «Body music» or «Bodymusic», this terminology having practically no relation with body percussion. Both Romero-Naranjo (2020) and Serna et al. (2018) have already warned of this situation, the latter stating that the term body music:

[...] it can refer, apart from body percussion as an educational and musical resource, to body movement in relation to music (dance and theater), to concepts of ethnomusicology and musicology in relation to tribal dances or to an ancient medical technique by which the body is percussed in order to auscultate. (Serna et al., 2018, p. 41).

Due to the great proliferation of literature on body percussion (91 documents) in the last 4 years (2018-2021) we see the need to continue and expand the work done by Serna et al. (2018) in which they analyzed a total of 77 documents on that subject until 2017 extracted from primary and secondary search engines, and in which they left aside for a later article, the second-order documents that did not deal with body percussion in a strictly direct way.

Therefore, the aim of this study is to present the state of the art of body percussion based solely and exclusively on n=64 Journal Citation Reports (JCR) documents with high impact index, found in primary search engines of high scientific-academic rigor and that can serve as a basis for future research on the topic in question.

Method

The present study used an ex post facto retrospective design, according to the classification offered by Montero and León (2005) on the classification and description of research methodologies in Psychology. Subsequently, a frequency analysis was applied to address the selected variables.

Sample

For the present study a sample of n=64 JCR documents extracted from the primary search engines WOS and SCOPUS from 2005 to 2021 was selected. The 95.31% came from WOS (61 documents) and 4.68% from SCOPUS (three documents).

This sample comes from the first block of analysis of a bibliometric study of n=271 documents that included: n=64 first and second order papers found in primary search engines (WOS and SCOPUS); n=127 documents collected from secondary search engines (ProQuest, Dialnet, SCIELO, Redalyc, ERIC, REDIB and REDINED); and n=80 body percussion books without scientific-academic rigor extracted from commercial sites (Amazon, Iberlibro, libreriauniversitaria. it, UniversalEdition.com, laflutedepan.com and Westmusic.com).

Instruments

For the search, screening and final selection of the information, the above-mentioned search engines were used, exploiting their analysis possibilities, as well as agglomerating the documents in lists of results and exporting them to the bibliographic manager Refworks. On the other hand, due to the diverse origin of the information found in the different search engines, the Microsoft Excel program was used to create a database to which all the information obtained could be transferred for subsequent analysis and preparation of tables and figures.

Procedure

The documents were searched in all the databases adhered to the subscription of the University of Alicante in the WOS and SCOPUS search engines in the period from July to November 2021. Specifically, the WOS collection included the following: Web of Science Core Collection; BIOSIS Citation Index; Current Contents Connect; Data Citation Index; Derwent Innovations Index; Festa®-the food science resource; Inspec®; KCI-Korean Journal Database; MEDLINE®; Russian Science Citation Index; SciELO Citation Index; and Zoological Record.

Both the terms and keywords as well as the complete strategy were used without any filtering in both search engines. In WOS the search was performed using the «subject» field (searches title, abstract, author keywords, and keywords plus), while in SCOPUS we searched within «all fields».

Firstly, the word body percussion was searched for in 14 languages other than English in order to determi-

Table 1

Results for the word body percussion in different languages

Language	Term	Wos	Scopus
Spanish	"Percusión corporal"	0	9
German	"Körperperkussion"	0	0
Catalan	"Percussió corporal"	0	0
Simplified chinese	身体打击乐	0	0
Traditional chinese	身體打擊樂	0	0
Korean	바디 퍼커션	1	0
French	"percussions corporelles"	0	1
Italian	"percussioni del corpo"	0	0
Japanese	ボディパーカッション	0	0
Turkish	"vücut perküsyon"	0	0
Polish	"korpoperkusjon"	0	0
Russian	"перкуссия тела"	0	0
Portuguese	"percussão corporal"	0	0
Galician	"Percusión corporal"	0	9

Note: inverted commas (") were used in WOS and braces ({}) in SCOPUS.

Table 2

Results obtained in the different meanings of body percussion, body music and BAPNE

Term	Wos	Scopus
Body percussion	90	36
Bodypercussion	1	3
Body-percussion	90	1
Body music	135	47
Bodymusic	135	6
Body-music	135	7
BAPNE	38	19
BAPNE®	38	2
BAPNE METHOD	33	2

ne the results obtained in each language. On the other hand, and with the same purpose, the different meanings of the terms body percussion, body music and BAPNE in English were searched. Secondly, the search strategy was prepared and applied to the aforementioned search engines. Thirdly, the document inclusion criteria were applied for their selection. Fourth, the references were saved in the lists of results offered by the search engines and exported to the bibliographic manager Refworks, as well as to Microsoft Excel files. Fifthly, the duplicates were compared and finally, sixthly, the information was transferred to the database created in Excel for subsequent analysis and extraction of results.

The first step was to carry out a study of the results found when searching for the word body percussion in isolation in 14 languages other than English in order to find out which words to include in the search strategy. Table 1 shows the results obtained in each language and search engine for the word body percussion.

The same was done with the different meanings of the terms body percussion, body music and BAPNE. Table 2 shows the results obtained for each meaning of the terms in WOS and SCOPUS.

Next, the search strategy was prepared based on the words and meanings that returned results combined with the Boolean operator «Or». The complete strategy was as follows: («body percussion» or «bodypercussion» or «body-percussion» or «percusión corporal» or «percussions corporelles») OR («body music» or «bodymusic» or «bodymusic») OR («BAPNE» or «BAPNE®» or «BAPNE METHOD»). The term body percussion was searched in 3 different languages in SCOPUS (English, Spanish and French) while in WOS it was searched only in English («body percussion» or «bodypercussion» or «body-percussion») as it did not return results when mixing the different languages.

The next step was to make the selection of papers that had to be published and edited material and meet one of the following inclusion criteria:

- Deal exclusively with body percussion as first order.
- Contain any of the search terms in the title, abstract or keywords.
- Make considerable allusion to body percussion within the body of the text or treat it as a noteworthy activity within the research.

After the selection of the documents, the results were saved in the saving lists and then exported to the bibliographic manager Refworks and to Microsoft Excel documents to proceed to the elimination of duplicates.

For the elimination of duplicate documents among the results obtained in the two search engines, WOS was taken as a reference because it provided the greatest number of results. Therefore, all the documents that appeared repeated in SCOPUS were counted in WOS. Figure 1 shows the document selection process, showing the number of results obtained in each search engine, as well as in the complete strategy, the documents selected, the repeated papers and those included in the final sample.

Finally, the information was transferred to the database created in Microsoft Excel in which all the metadata obtained from the search engines were classified, ordered and analyzed for the extraction of results and the preparation of tables and figures.

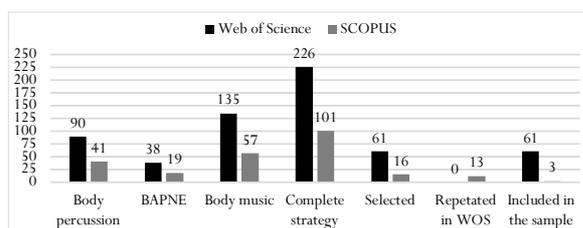


Figure 1. Document selection process

Results

High-impact research on body percussion was initiated in 2005. Sixty-four papers (100%) were published in 17 years (2005-2021) with an average of 3.76 papers per year. It was observed that the three most productive years (2014, 2017, 2019) contain the most papers in the sample (59.38%) being these a total of 38. In the last two years (2020 and 2021) 11 papers were published, four in 2020 (62.30%) and another seven

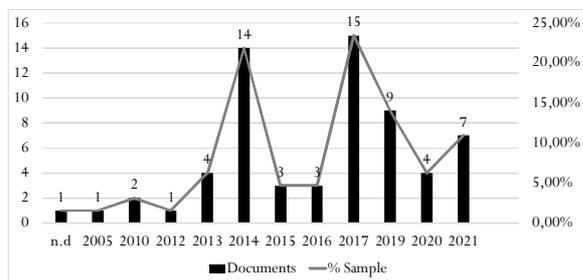


Figure 2. Documents by year

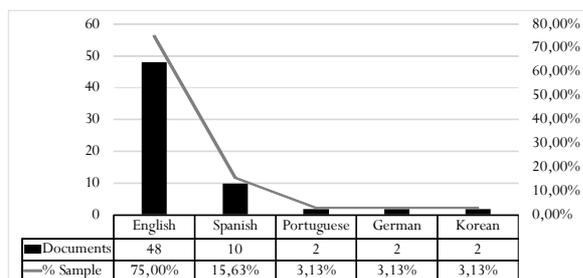


Figure 3. Documents by language

in 2021 (10.94%). Finally, one undated paper (1.56%) was found that belonged to a patent. Figure 2 shows in more detail the papers published by year.

Of the five languages found in this sample, 75.00% of the papers were published in English and 15.63% in Spanish, these being the predominant languages with 48 and 10 papers respectively. The remaining six papers (9.38%) were printed in equal parts in German, Portuguese and Korean. Figure 3 shows the distribution of published papers by language.

Of the 64 papers in the final sample, 36 (56.25%) were presented at nine congresses. Four of them published only one paper each (6.25%) while the remaining five presented 32 papers in total (50.00%). The most active conference was the *7th International Conference on Intercultural Education - Education, Health and ICT - From a Transcultural Perspective (EDUHEM)* which published 12 papers (18.75%). Table 3 shows the name of the congresses, the number of papers and the percentage of publication over the overall sample.

A total of 13 countries were found with a maximum of three countries per paper and a minimum of one. There was a predominance of documents whose authors wrote under the umbrella of a single country or affiliated entity. Specifically, 50 papers (78.13%) with these characteristics were found. Less well represented were 13 papers (20.31%) with a concentration of two countries per paper and only one research study (1.56%) with three participating countries. The main producers were Spain and Italy, which participated in 46 papers (71.88%) and 14 papers respectively (21.88%). Table 4 shows the

Table 3

Conferences	Documents	% sample
7th International Conference on Intercultural Education - Education, Health and ICT - From a Transcultural Perspective (EDUHEM)	12	18.75%
ERPA International Congress on Education (ERPA CONGRESS 2014)	9	14.06%
8th International Conference on Intercultural Education / International Conference on Transcultural Health (EDUHEM)	7	10.94%
ERPA International Congresses on Education 2015 (ERPA 2015)	2	3.13%
6th International Conference on Intercultural Education - Education and Health - From a Transcultural Perspective (Eduhem)	2	3.13%
Cyprus International Conference on Educational Research (CY-ICER)	1	1.56%
5TH World Conference on Educational Science	1	1.56%
4th International Conference on Movement and Computing (MOCO)	1	1.56%
7th World Conference on Educational Sciences	1	1.56%
Total: 9 conferences	36	56.25%

Table 4

Countries	Documents	% sample
Spain	46	71.88%
Italy	14	21.88%
Australia	4	6.25%
Finland	2	3.13%
Korea	2	3.13%
France	2	3.13%
Germany	2	3.13%
Brazil	1	1.56%
Cyprus	1	1.56%
South Africa	1	1.56%
Canada	1	1.56%
Turkey	1	1.56%
Portugal	1	1.56%
Not specified	1	1.56%

Note: each document may involve several countries

presence of each country in the selected sample.

The selected sample included 18 different research areas. Forty-four papers (68.75%) were found inserted under a single research area; 16 papers (25.00%) encompassed within two areas; three papers (4.69%) containing three areas and one paper (1.56%) containing five areas. The most representative area was Education & Educational Research which appeared in 41 papers occupying 64.06% of the sample. Table 5 shows the number of documents in which each research area appears.

In reference to the authors, a total of 103 authors were found, distributed in two groups. On the one hand, 67 authors belonging to the BAPNE research group published most of the documents in the sample (62.50%). On the other hand, 36 authors not belonging to any research group exclusive to body percussion published the remaining 24 documents (37.50%). Table 6 shows the list of authors and their production according to research group.

Table 5

Research areas	Documents	% of sample
Education & Educational Research	41	64,06%
Public, Environmental & Occupational Health	7	10,94%
Music	7	10,94%
Other topics not specified	6	9,38%
Social Sciences	5	7,81%
Arts & Humanities	5	7,81%
Psychology	4	6,25%
Four other different research areas	2	12,50%
Seven other different research areas	1	10,94%

Note: each document may contain several areas of research

Table 6

Research group	Documents	% sample	Authors	% authors
BAPNE	40	62,50%	67	65,05%
NO BAPNE	24	37,50%	36	34,95%
Total	64	100,00%	103	100,00%

The total sample ranged from single authorship to seven authors on the same document, with 57 of them (89.06%) written by between one and four authors and seven papers (10.94%) written by between five and seven authors. Co-authorship between two authors prevails with 20 papers (31.25%). Figure 4 shows in more detail the number of papers by number of authors.

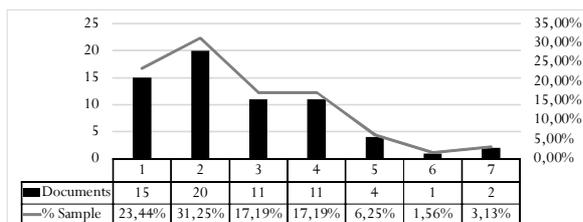


Figure 4. Documents by number of authors

Of the 103 authors included in the sample, 84 of them (81.55%) participated in only one article and

another 13 authors (12.62%) in two. The most active authors are Francisco Javier Romero Naranjo who participated in 40 papers (62.50%) and Natalia Crespo Colomino who collaborated in six papers (9.38%). Table 7 shows the number of papers per author.

On the other hand, it was found that 9.71% of the authors (10 out of 103) publish alone. There is a predominance of authors who publish a single paper (eight authors). The most representative are Margaret Kartomi with four papers (6.25%) and Francisco Javier Romero Naranjo with three (4.69%). of the 103 authors. Table 8 shows the authors and the number of papers they publish alone.

Table 7

Author	Documents	% sample
Romero-Naranjo, FJ	40	62,50%
Crespo-Colomino, N	6	9,38%
Cozzutti, G	4	6,25%
Kartomi, M	4	6,25%
Pons-Terres, JM	4	6,25%
Carretero-Martinez, A	3	4,69%
Blessano, E	3	4,69%
12 other authors	2	3,13%
84 other autors	1	1,56%

Note: more than one author may write each document.

Table 8

Author	Documents	% sample
Kartomi, M	4	6,25%
Romero-Naranjo, FJ	3	4,69%
Ozgu Bulut, M	1	1,56%
Brown, S	1	1,56%
Garcias-de Ves, S	1	1,56%
Perez-Aldeguer, S	1	1,56%
Goes, AA	1	1,56%
Ferre-Puntos, O	1	1,56%
Van Vreden, M	1	1,56%
Lee, H	1	1,56%
TOTAL: 10 authors	15	23,44%

The number of citations received by the 64 articles that made up the sample up to November 2021 was 117 with a range of between zero and 33 citations per year with an average of 9.75 citations per year and 2021 being the year with the highest number of citations (28.21%). Five years were found with no citations between 2006 and 2010; seven years with less than 10 per year (12.82%); three years between 10 and 20 (34.46%) and two years with more than 20 citations (48.71%). Figure 5 shows the number of citations per year for the total selected sample.

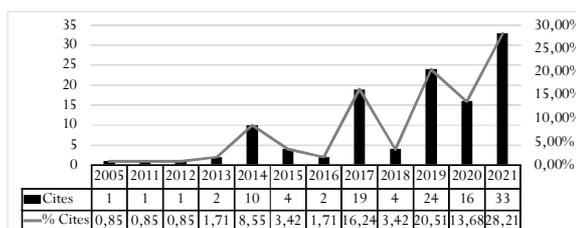


Figure 5. Citations by year

The number of citations per paper ranged from zero

to 16 with an average of 1.828125 citations per paper. 43.75% (28 papers) did not obtain any citations. Thirty-four papers (53.13%) were found between one and six citations (77.78%), and two (3.13%) between 10 and 16 (22.22%). Table 9 shows in detail the number of citations per paper.

Of the 103 authors in this sample, 45.63% (47 authors) did not receive any citations. 49.51% (51 authors) received between one and 10 citations and 2.91% (three authors) received between 11 and 16. The most cited authors are Francisco Javier Romero Naranjo who received 95 citations (81.20%) and Natalia Crespo Colomino who received 22 (18.80%). Table 10 shows the number of citations received per author.

Table 9

Citations by document

Citations	Documents	% documents	Sum of citations	% of citations
0	28	43,75%	0	0,00%
1	9	14,06%	9	7,69%
2	9	14,06%	18	15,38%
3	7	10,94%	21	17,95%
4	4	6,25%	16	13,68%
5	3	4,69%	15	12,82%
6	2	3,13%	12	10,26%
10	1	1,56%	10	8,55%
16	1	1,56%	16	13,68%
Total	64	100,00%	117	100,00%

Table 10

Most cited authors

Authors	Citations	% of citations
Romero-Naranjo, FJ	95	81,20%
Crespo-Colomino, N	22	18,80%
Pons-Terres, JM	16	13,68%
Carretero-Martinez, A	16	13,68%
Kartomi, M	11	9,40%
Cozzatti, G	10	8,55%
Blessano, E	10	8,55%
Conti, D	7	5,98%
Three other authors	6	5,56%*
Five other authors	4	3,70%*
20 other authors	3	2,78%*
Eight other authors	2	1,85%*
12 other authors	1	0,93%*
47 other authors	0	0,00%*

Note: the same citation can be counted in several different authors. (*) Each author.

With regard to the articles with the highest number of citations, it was found that the four most cited articles received between six and 16 citations and had between them a total of 38 (32.48%). The most cited article was *Science & art of body percussion: A review* by Francisco Ja-

Table 11

Most cited articles

References	Citations	% citations
Romero Naranjo, F. J. (2013). Science & art of Body Percussion: A review. <i>Journal of Human Sport and Exercise</i> , 8(2), 442-457. https://doi.org/10.4100/jhse.2012.82.11	16	13,68%
Carretero-Martinez, A., Javier Romero-Naranjo, F., Pons-Terres, J. M., & Crespo-Colomino, N. (2014). Cognitive, visual-spatial and psychomotor development in students of primary education through the body percussion - BAPNE method. <i>Procedia - Social and Behavioral Sciences</i> , 152(October 7, 2014), 1282-1287. https://doi.org/10.1016/j.sbspro.2014.09.363	10	8,55%
Jiménez-Molina, J.B, Vicedo-Canto, E., Sayago-Martínez, R., & Javier Romero-Naranjo, F. (2017). Evaluating attention, socioemotional factors and anxiety in secondary school students in murcia (spain) using the BAPNE method. Research protocol. <i>Procedia - Social and Behavioral Sciences</i> , 237(February 21, 2017), 1071-1075. https://doi.org/10.1016/j.sbspro.2017.02.157	6	5,13%
Kartomi, M. (2010). The development of the Acehnese sitting song-Dances and frame-Drum genres as part of religious conversion and continuing piety. <i>Bijdragen Tot De Taal-, Land- En Volkenkunde</i> , 166(1), 83-106. https://doi.org/10.1163/22134379-90003626	6	5,13%

vier Romero Naranjo published in 2013 in the *Journal of Human Sport and Exercise*. Table 11 shows the references of the four most cited articles.

With reference to the type of research, 46 first-order papers were found (71.88%) of which 18 (28.13%) were intervention, 21 (32.81%) non-intervention and seven (10.94%) protocol. On the other hand, 18 (28.13%) second-order papers were found, of which three were intervention (4.69%) and 15 non-intervention (23.44%). No protocol papers were found within the second-order papers. The BAPNE research group published exclusively first-order papers and the only seven protocol papers in the sample. Figure 6 details the number of papers by type of research, order of treatment and research group.

Of the 21 intervention papers (32.81%), 15 were quantitative (23.44%), five qualitative (7.81%) and one mixed (1.56%). 23.43% (15 papers) used both experimental and control groups, while 9.38% (six papers) used only the experimental group. On the other hand, 25.00% of the papers evaluated before and after (Pre-Post) while 7.81% (five papers) applied a single evaluation (post-test only). Figure 7 shows the ratio of intervention papers according to approach, type of group and type of assessment.

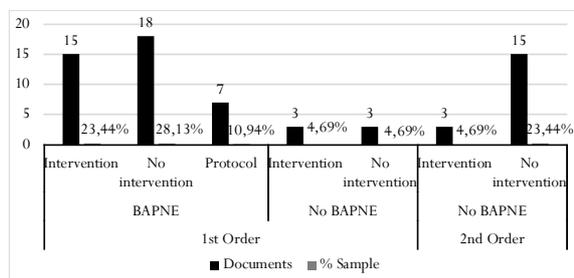


Figure 6. Documents by type of research, order of processing and research group

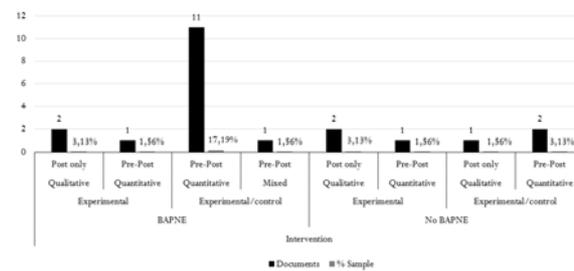


Figure 7. Intervention documents according to approach, type of group and type of evaluation

Six different research designs were found in the 21 intervention papers and two articles (3.13%) did not specify it. The Quasi-experimental design was the most used design appearing in 10 papers (15.63%) followed by the Experimental design which was found in five papers (7.81%). Figure 8 shows the research designs used in the intervention documents.

In relation to assessment or data collection instruments, eight different types of instruments were found in the 21 intervention papers. The test was the most frequently used, appearing in 11 documents (17.19%), followed by the questionnaire, which was found in five papers (7.81%). Figure 9 shows the detailed list of assessment and data collection instruments used in the intervention papers.

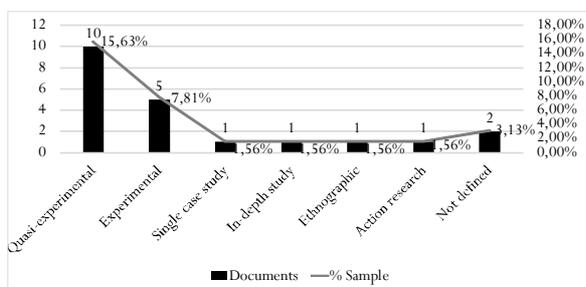


Figure 8. Research designs used in intervention work

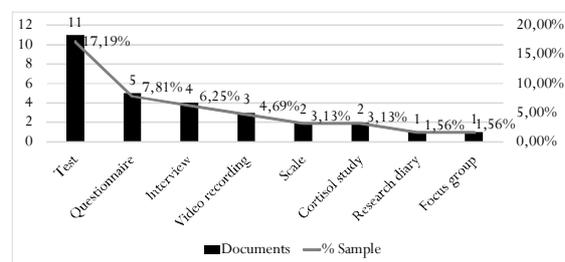


Figure 9. Instruments for evaluation and data collection in intervention work

Note: each document may use several evaluation tools.

Discussion and conclusions

The aim of this study is to present the state of the art of body percussion based on $n=64$ documents with high impact index found between 2005 and 2021 in primary search engines of high scientific-academic rigor (WOS and SCOPUS) and that can serve as a basis for future research on the subject.

The results extracted in this work present more differences than similarities with the previous bibliometric study presented by Serna et al. (2018). This is due to the difference in the impact index of the selected samples. In this study, the information was extracted solely and exclusively from primary search engines (WOS and SCOPUS), even finding publications in Q1 (Alonso-Sanz & Romero-Naranjo, 2015). In contrast, the previous bibliometric study also includes papers found in secondary search engines such as Dialnet or ERIC. Therefore, it is not possible to establish a strict comparison of results between the two studies. Even so, there are significant coincidences in terms of the most prolific journal; the researchers' preference for co-authorship; the predominance of two authors per paper; in the two most prolific authors; and in the most

cited author.

On the other hand, and in total agreement with Serna et al. (2018) and Romero-Naranjo (2020), we find and ratify the existing terminological problem around the term «body music» or «bodymusic» to find scientific-academic information referred to body percussion. This term confuses and involves the researcher in a great waste of time, since the wide range of topics and concepts it includes ranges from movement, dance or theater to ancient medical auscultation techniques, being practically null the relation with body percussion. Specifically, in WOS it obtains an effectiveness of 1.48%, i.e. only two documents included in the sample of the 135 results returned by the term. A little higher is found in SCOPUS (4.26%), with only two papers out of 47 being valid, although these two papers actually refer to body percussion and not to «body music».

The search for the word «body percussion» in 14 languages other than English was ineffective, since only one result was found in Korean in WOS, and in SCOPUS nine in Spanish and one in French. In contrast, the term «Body percussion» in English has an effectiveness rate of 67.77% in WOS (61 out of 90) and 31.71% in SCOPUS (13 out of 41) and includes all the valid results for the term in Korean, French and Spanish, as well as the term «BAPNE» which has an effectiveness rate of 100% (38 out of 38) in WOS and 31.58% in SCOPUS (six out of 19).

Therefore, and since body percussion is an emerging subject in recent years, it would be of great help for research and publication in high impact articles to centralize the term to the Anglo-Saxon meaning «Body percussion», or at least henceforth, to banish the concepts «Body music» or «Bodymusic» to refer to body percussion.

As main results show that body percussion began to be researched at a high scientific-academic level in 2005 and that the year with the highest activity is 2017 with 15 papers. The literature is written in five languages and six different types of documents, with English prevailing with 48 papers and Proceedings Papers with 36 works.

Geographically, there are 13 countries participating in the sample, with the maximum number of countries found in a single document being three. There are 48 documents published under the signature of a single country and the main producer of literature is Spain with 46 documents.

As for the research areas, a total of 18 are detected,

with a maximum of five areas per document. There is a predominance of papers containing a single area of research (44 papers), the most representative being *Education & Educational Research*, which appears in 41 papers.

In reference to authorship, a total of 103 authors and a maximum of seven authors per paper are listed. Papers written by two authors (19) and the publication of a single document per author (84 authors) prevail. The BAPNE research group is the most representative (67 authors), with PhD. Francisco Javier Romero Naranjo at the head and the most productive author of this study, publishing 40 documents. On the other hand, the most productive single author is Margaret Kartomi with four articles.

With respect to citations, a total of 117 citations have been recorded, with 33 of these being granted in 2021, which is the most cited year. There is a range between zero and 16 citations with an average of 1.828125 citations per document. The documents cited at least once predominate, with 36 papers receiving at least one citation. The same is true for authors, 56 of them receive citations, mostly between one and 10 per author. The most cited author is Francisco Javier Romero Naranjo, who receives 95 citations and publishes the most cited article (16 citations), *Science & art of body percussion: A review*, published in 2013 in the *Journal of Human Sport and Exercise*.

Regarding the order of treatment and type of research, there is a predominance of first order and non-intervention papers, with 46 papers exclusively on body percussion and 36 papers in which no intervention is carried out. On the other hand, within the 21 intervention papers, the following predominate: quantitative studies with 15 papers; the quasi-experimental design with 10 papers; the use of control and experimental groups with 15 papers; and the use of pre-test and post-test in the evaluation with 16 papers.

Of course, this study is not without limitations, as neither the impact of the journals nor that of the authors (quartile, h-index, citations, etc.) in platforms such as JCR or *Scimago Journal & Country Rank* (SJR) were analyzed. On the other hand, the assessment instruments of the intervention articles have not been detailed in a precise way by making a classification, for example with the name of the specific tests or questionnaires used in each study, but have simply been classified into large groups (test, questionnaire, interview, cortisol test...). Another limitation could be the failure to analyze the sample according to the gender of the authors in order

to know the presence of women in body percussion research.

Some possible lines for the future could focus on knowing the state of the art of body percussion, on the one hand, based solely and exclusively on the scientific literature found in secondary search engines, discarding all the documents included in this study; and on the other hand, analyzing the results of both studies as a whole in order to obtain a segmented and globalized vision that reflects a better understanding of the current state of this research subject.

Another possible line for the future would be to know the conceptual, referential and methodological framework of the publications in order to discover if any specific line of research is followed; if it is intended to go beyond the musical value (psychological or psychomotor aspects); which are the specific objectives; if there is or not sequencing of the activities and academic coherence; or if it is justified to make use of choreographies or background music in any of its genres or styles (Pop, Rock, Funky, Classical...).

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