Key themes in art education research: A bibliometric review[1]

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Abstract: Research in art education is a specialised field situated at the intersection between issues around the visual arts and educational issues, which in turn constitutes a heterogeneous space that needs to be addressed by academia. For this reason, the present paper conducts a bibliometric analysis of the international scientific output on "Art Education" in the Web Of Science Core Collection (WOS) database between the years 1900-2024. Bibliometric techniques are applied to determine the global production and the dimensions along which terms are distributed and the conceptual structure of the research field. As regards the results, the analysis of the conceptual structure of art education defines two areas; the first relates to teaching-learning processes, and the second to therapeutic, social intervention and community processes. This research leads us to conclude that, globally speaking, Art Education has consolidated itself as a well-defined research community, with shared themes and lines of research.
Keywords: art education; bibliometric analysis; themes; research trends.

ES Temas clave en la investigación sobre educación artística: Una revisión bibliométrica

Resumen: La investigación en educación artística es un campo especializado situado en la intersección entre las cuestiones en torno a las artes visuales y las cuestiones educativas, lo que a su vez constituye un espacio heterogéneo que debe ser abordado por el mundo académico. Por este motivo, el presente trabajo realiza un análisis bibliométrico de la producción científica internacional sobre "Educación artística" en la base de datos Web Of Science Core Collection (WOS) entre los años 1900-2024. Se aplican técnicas bibliométricas para determinar la producción global y las dimensiones a lo largo de las cuales se distribuyen los términos y la estructura conceptual del campo de investigación. En cuanto a los resultados, el análisis de la estructura conceptual de la educación artística define dos áreas; la primera se refiere a los procesos de enseñanza-aprendizaje, y la segunda a los procesos terapéuticos, de intervención social y comunitaria. Esta investigación nos lleva a concluir que, globalmente, la Educación Artística se ha consolidado como una comunidad de investigación bien definida, con temas y líneas de investigación compartidas.
Palabras clave: educación artística; análisis bibliométrico; temas; tendencias en investigación.

Sumario: 1. Introduction, 2. Study design and research questions, 3. Methodology, 3.1. Search and selection procedure, 3.2. Data description, 3.3. Data analysis technique, 4. Results, 4.1. Overall production: empirical data and trend, 4.2. Genealogy/Theoretical substrate, 4.3. Most important documentary sources, 4.4. Most representative authors in the field and affiliation, 4.5. Thematic map, 4.6. Underlying structure of terms, 5. Conclusions, 6. References.

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1. Introduction

Research in art education began to develop more prolifically in the twentieth century and became a specialised area of research situated at the intersection between issues concerning the visual arts and educational issues —indeed a heterogeneous territory (Marín-Viadel, 2011a, p. 213). The earliest published research on art education followed very directly the predominant models of the first decades of the twentieth century in the educational sciences (Marín-Viadel, 2011b).

Beginning in the 1950s, research findings suggest that both producing and perceiving art involved problem-solving and problem-posing activities (Efland, 1987). Many art educators emphasised art-making as a form of critical engagement (Ecker, 1963), and creativity was studied as a form of inquiry (Eisner, 1972; Torrance, 1980). During the middle decades of the twentieth century, most research projects were targeted at changing conceptions around contents and policies in the teaching of art in the curriculum (Barkan, 1962; Freedman, 1987). Innovative curricular models were developed that addressed in a systematic way the breadth and complexity of art learning in successive grades of the school system, especially during the years of compulsory schooling' (Marín-Viadel, 2011a, p. 214). With regard to the changing conceptions of the art curriculum, mention must be made of the interest in technology and curricular aids, including sketchbooks and teaching materials (White, 2004). A close link between arts education and children's personal well-being has likewise been foregrounded in recent decades, with creative and communal art-related experiences being advocated so as to enhance children's self-knowledge and self-esteem (Coholic, 2010; Fancourt & Finn, 2019).

In the field of research, art education associations have also played a relevant role. In this regard, we should mention the International Society for Education through Art (InSEA), a non-governmental world organization for Consultative Relations with UNESCO; the National Society for Education in Art and Design (NSEAD) in the United Kingdom and the National Art Education Association (AERA) in the United States. The latter has developed in the last decades an important research work through Special Interest Groups that work on specific topics. Among those linked to arts education we find: a) The Arts and Learnings group, which deals with curriculum-related issues, evaluation, the creative process and aesthetic education; b) The Arts-Based Educational Research group, which works on the development of a new methodology that looks at education from an artistic standpoint; c) The Arts and Inquiry in the Visual and Performing Arts in Education group, with a focus on educational research in the visual arts and d) Design and Technology, which seeks to develop research and innovation in the teaching of technology in both the formal and the non-formal education system. However, evaluative research combining and interweaving methodologies through different techniques and instruments is still scarce.

When it comes to developing a prospective in arts education research that incorporates all the international scientific production, there is hardly any literature available, with the exception of published work on highly specific issues. In this sense, mention must be made of research work that analyses the relationship between art education and information and communication technologies, e.g. the implications of virtual reality (González-Zamar & Abad-Segura, 2020), and digital design in art education (González-Zamar & Abad-Segura, 2021a); or the trends in scientific publications related to ubiquitous learning and its connection with arts and visual education (González-Zamar et al., 2021). Existing research on the development of emotional creativity in art education has also been studied (González-Zamar & Abad-Segura, 2021b). Other works focus on specific sub-areas of the arts field, such as art therapy (López-Escribano et al., 2023; Wei & Zhong 2023), arts-based management (Ferrerira, 2018), the social impact of the arts in scientific production (Lindström et al., 2022), Korean art (Lee, 2021; Lee & Taeha, 2022) or the intersection between sustainability and the arts (Wright & Liang, 2019).

Despite this published work, we still lack bibliometric analyses that provide specific empirical data on trends in art education research at a global level, quantify these developments, delve into the connections between the key topics discussed in this area of research and map out the mesh of existing connections, as has been done in other areas (Hallinger & Kovačević, 2019).

2. Study design and research questions

The present study conducted a bibliometric analysis of the international scientific production on "Art Education" in the 20th and 21st century (1900-2024) in the Web Of Science Core Collection (WOS) database. The research questions were as follows:

1.   What has been the overall production and development of the concept of "Art Education" in the scientific literature?
2.   Regarding documentary sources:
     a)   Which are the most relevant sources in terms of impact indicators?
3.   Regarding the authors:
     a)   Who are the most representative authors in the field according to various production quality metrics?
     b)   Which institutions do the most relevant authors belong to?
4.   Regarding the conceptual structure:
     a)   What is the underlying structure of the relevant terms obtained from titles, abstracts and keywords according to inertia/(a) centrality and density; and (b) network configuration?

3. Methodology

3.1. Search and selection procedure

In order to learn about the historical development and current state of research on "Art Education", a search was carried out in the WoS Core Collection (Clarivate Analytics). The key search term was "Art Education", the lemmatization was turned off to obtain articles that only address the topic of interest and the search scope was "title, abstract and keywords" in the WoS search engine. The eligibility criteria have been based on the PICO elements (Population, Interventions, Comparators and Outcomes) of the review question. In this case, the research question sought to answer the production and development of the concept of the discipline of Art Education in scientific literature, which is why the study population was located under the descriptor "Art Education", and no exclusion criteria were selected regarding the interventions, comparators and results, so as not to limit the sample under study. After a preliminary study in the SCOPUS database, it was decided to opt for WoS for the following reasons:

1. The number of documents found in SCOPUS following an equivalent search by title, abstract and keywords yields 20,783 results (compared to 22,705 in WoS).
2. Most of the traced bibliometric studies can be found in WoS (Aria & Cuccurullo, 2017).
3. The most internationally accepted impact factor is JCR.
4. The 20 journals with the highest scientific production in Art Education are indexed in both databases.
5. After including the ESCI index in WoS, in addition to the journals indexed in SCOPUS, we find journals with content related to the study area in ESCI that have either taken a long time to join SCOPUS or have not yet done so. Thus, ESCI appears to be a more inclusive index than SCOPUS for journals in the field.
6. WoS offers greater diversity and document typologies (30 typologies; see Table 2) compared to SCOPUS (11 typologies).

The overall period 1900-2024 was originally targeted, although in practice the analysis is reduced to the period 1955-2024, since before 1955 scientific output was virtually non-existent. All kinds of resources have been searched for.

3.2. Data description

Almost 23,000 documents belonging to 7,533 sources have been traced (See Table 1). The documents contain more than half a million (559,410) references to other documentary sources. The average number of years since publication is $M = 10.8$. The average number of citations per document is 5.5, whereas, considering all the years under examination, this figure drops to 0.6658 citations per document.

Table 1. Key information on data.

Source Type	N
Sources (Journals, Books, etc.)	7,533
Documents	22,705
Average years from publication	10.8
Average citations per document	5.335
Average citations per year per doc	0.6658
References	559,410

Source: Own elaboration.

If we look at the type of document (see Table 2), we see that the highest number corresponds to articles (13,349) followed by proceeding papers (5,516). Book chapters (849), book reviews (644) or general reviews (587) are much less numerous. The presence of the remaining document TYPES could be described as purely symbolic.

Table 2. Distribution by document type.

Document Type	N	Document Type	N
Article	13,349	Biographical-item	14
Proceeding paper	5,516	Reprint	11
Article; Book chapter	849	Correction	6
Book review	644	Review; Book chapter	6
Review	587	Art exhibit review	4
Editorial material	507	Discussion	4
Article; Proceedings paper	367	Editorial material; Early access	3
Article; Early access	351	Bibliography	2

Document Type	N	Document Type	N
Editorial material; Book chapter	141	Article; Book	1
Meeting abstract	117	Article; Retracted publication	3
Book	70	Chronology	1
Letter	44	Correction; Book chapter	1
Note	33	Correction; Early access film review	1
Review; Early access	27	Film review	1
News item	20	Item about an individual	1

Source: Own elaboration.

Most of the keywords found (37,574) have been proposed by the authors, while 8,857 are included in "Keyword Plus". The number of authors is just over 43,000, appearing as single authors in 8,757 documents, while they appear as co-authors in 13,948. The average number of documents per author is 1.898.

3.3. Data analysis technique

The analysis of scientific production data in the field of art education has involved both descriptive analysis and the mining of several kinds of networks. Different approaches have been developed to extract networks by using several units of analysis (see Table 3).

Table 3. Bibliometric techniques by unit of analysis.

Bibliometric tehnique	Unit of analysis	Relation type
Bibliographic coupling	Author Document Journal	Common references in the authors' works Common references in documents Common references in journal items
Co-authorship	Author Institutional affiliation	Co-occurrence of authors in the list of authors of a single document Co-occurrence of institutions in the address list of a document
Co-word	Keyword or term taken from the title, abstract or body of the paper	Co-occurrence of terms in one document

Source: Adapted from Aria & Cuccurullo (2017, p. 961).

The most common analysis in bibliometrics is citation analysis. It uses citation count as a measure of similarity between documents, authors and journals. Citation analysis can be broken down into co-citation —not used in this study— and bibliographic coupling. Examples of bibliographic coupling are author coupling (Zhao & Strotmann, 2008), and journal coupling (Gao & Guan, 2009). Another common bibliometric analysis is co-author analysis, which examines authors and their affiliations in order to study social structure and collaborative networks (Glänzel, 2001). Finally, co-word analysis produces semantic maps of a specific field that facilitate the understanding of its cognitive structure. It can be applied to keywords in documents, abstracts or full texts. The unit of analysis is usually a concept or a keyword, not a document, an author or a journal. In the present study we have employed all the above procedures by using the bibliometrix software package (Aria & Cuccurullo, 2017) from the R environment (R Core Team, 2021, see Fig. 1).
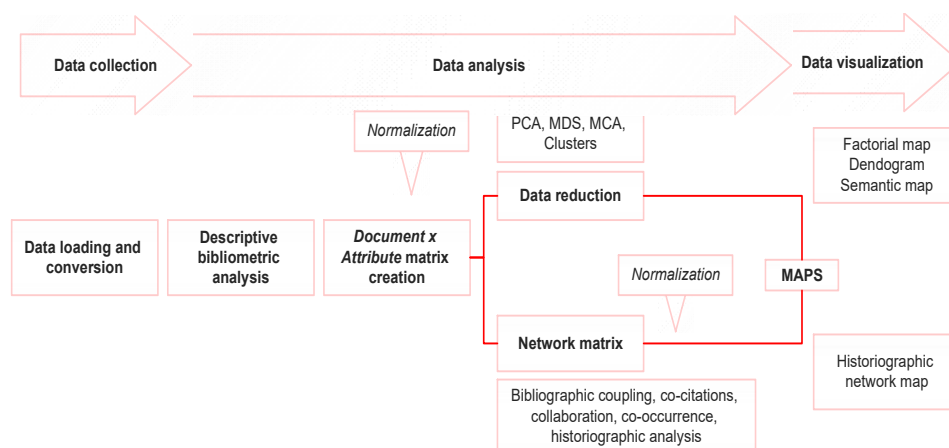

Figure 1. Analysis process using bibliometrix.

Source: own elaboration.

In order to obtain accurate data on the publication trend, the loess smooth technique was applied on the original data by using the default control settings of the loess procedure in the R statistical system, v. 4.1.1 (R Core Team, 2021). Analyses were completed with SAS, v. 9.4 (SAS Institute, 2023). Loess is a modern robust smoothing technique based on non-parametric local regression. The Generalized Cross Validation (GCV, Craven & Wahba, 1978) and the Akaike Information Criterion Corrected (AICC, Akaike, 1973) were used as criteria for the selection of smoothing parameters, given their robustness when using large data sets. Smoothing parameters of 0.6, 0.8 and 1.0 were used in all cases. For all plots where loess curves have been used, the smoothing parameter with the lowest value in AICC1 was employed, which establishes a balance between the sum of squares of the residuals and the complexity of the fit (Hurvich et al., 1998).

To calculate the representativeness and relevance of authors, the h-index and the g-index have been used. As is well known in academic contexts, the or h-index is a metric that aims to measure both the productivity and the "quality" (i.e., the citation impact) of a scholar's publications (Hirsch, 2005). It is based on the set of most cited publications and the number of citations they have received from other authors. Therefore, the h-index tries to combine an assessment of both quantity (number of articles) and quality, as determined by the "impact" or number of citations that publications receive from other scholars. The g or g-index is calculated on the basis of the distribution of citations received by the publications of a given researcher.

The co-occurrence of words in the WoS database was used to determine the network of term co-occurrences within in the "Art Education" framework. The analysis was carried out using multivariate dimensionality reduction analysis techniques such as Multiple Correspondence Analysis (MCA). In order to outline the conceptual structure of the field of study, as well as to create clusters of documents expressing common concepts, the function Conceptual Structure was used to perform a multiple correspondence analysis (MCA). The MCA analytical procedure is an exploratory multivariate MCA technique for the graphical and numerical analysis of multivariate categorical data, which aims to summarise a large amount of data into a small number of dimensions (Greenacre, 2017). In co-word analysis, MCA is applied to a Document x Word A matrix. The words are represented on a two-dimensional map. The results are interpreted according to the relative positions of the points and their distribution along the dimensions; the more similar the words are in their distribution, the closer they are represented on the map (Garson, 2012).

4. Results

4.1. Overall production: empirical data and trend

The initial question refers to the overall production in art education in the literature over the years analysed. The results are summarised in Figure 2, which shows, in the first place, the raw data reflecting the number of documents produced per year.
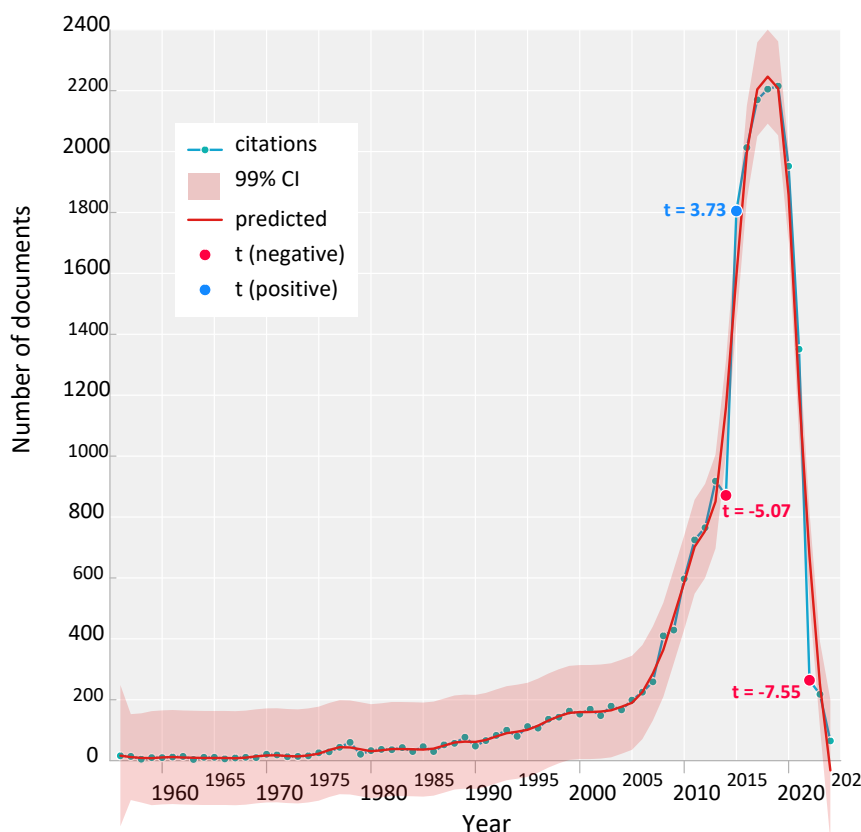

Figure 2. Spectroscopic analysis of scientific production.

Source: own elaboration.

It is clear that, until around 2005, scientific output in this field was generally very modest, although the curve up to that date showed a gentle upward slope. From 2005 to 2020 there is a sudden rise in production, which exceeds 2,000 published papers in the years 2016-2020. In recent years (2021-2024), scientific production in this area has experienced a gradual decline. The trend in publications can be seen in the loess smooths which show, in addition to the actual output, the predicted output, together with the 99% confidence interval as shown in Figure 2. In numerical terms, over the last two decades, the annual scientific production has increased by 997% (from 2038 to 20319 between 2000 and 2024). Finally, the loess graph shows the significant t values, both positive and negative, so as to illustrate the contrasting differences between the empirical values and those predicted by the model. Thus, a positive t value is found in 2015 (t = 3.73), while negative t values occur in 2014 (t = −5.07) and 2022 (t = −7.55). The rest of t contrasts turned out to be non-significant (i.e., $p \geq .05$).

4.2. Genealogy/Theoretical substrate

The 14 documents (resources) that make up the substrate of contemporary thinking in art education were analysed. The scientific resources and authors most cited by the 20 most prolific authors up to 2024 —which therefore conform the classic theoretical substrate in art education— are those listed below (ordered from most to least cited):

On this theoretical foundation, the most productive authors on the subject of art education (R. Huerta, D. Bennett, N. M. Kalin, J. Steers, M. Sclater, J. Adams...) have addressed as main descriptors in their scholarly output "Art Education", "Creativiy", "Art", "Higher education", "Education", "Arts", "Curriculum", "Music", "Arts Education", "Design", "Teaching", "Teaching Education", "Hiv", "Design Education" and "Music Education". The above descriptor sample, in addition to the prevailing thematic focus, evidences the profusion and dispersion of terminology in our field (e.g., Art-Arts; Art Education-Arts Education) which suggests a lack of international consensus in the use of terms stemming from different epistemological approaches (Marín-Viadel, 2011b) (see Fig. 3).
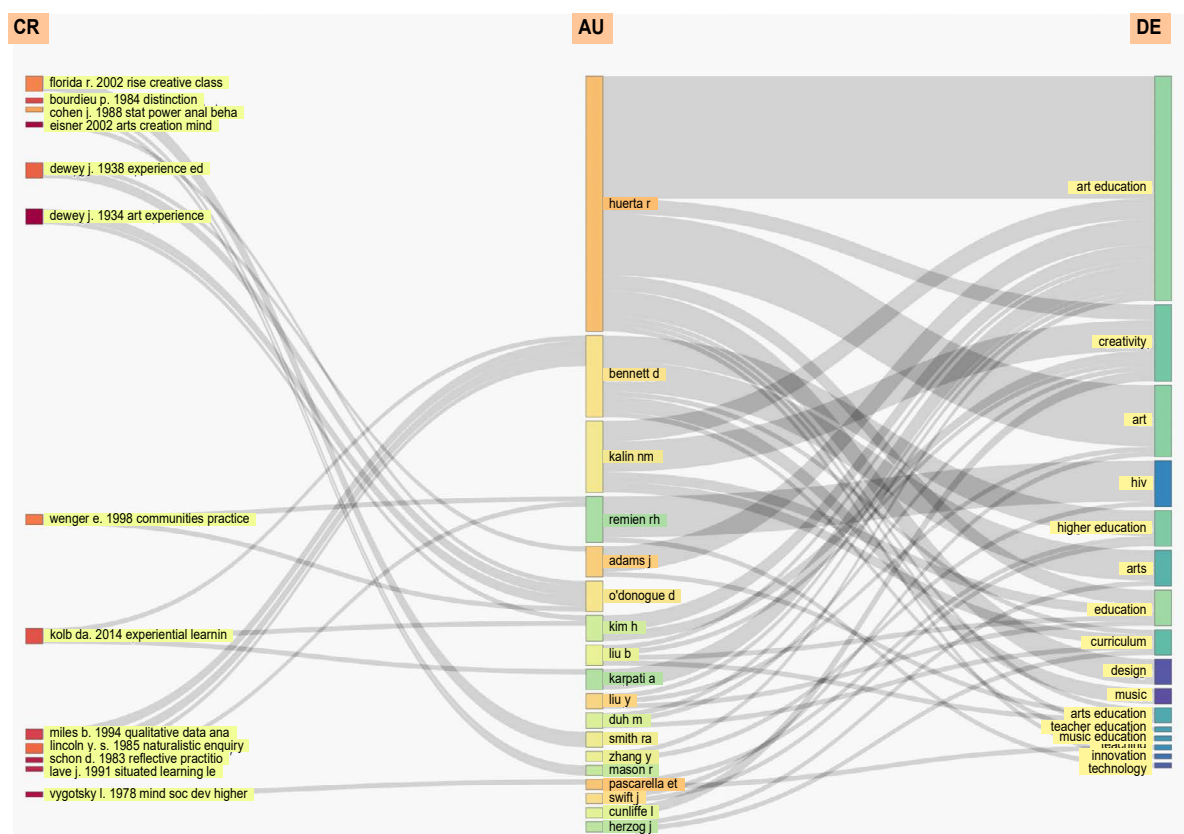

Figure 3. Most cited classical documents and authors.

Source: own elaboration.

4.3. Most important documentary sources

As shown in Figure 4, which lists the 20 most important sources on the subject, the *International Journal of Art & Design Education*, with 419 published articles, occupies the top position, followed by *Journal of Art & Design Education* (253 articles), *Journal of Aesthetic Education* (225), *International Journal of Education Through Art* (177), *Studies in Art Education* (169) and *Arte Individuo y Sociedad* (130). The rest do not exceed one hundred articles (see Fig. 4).
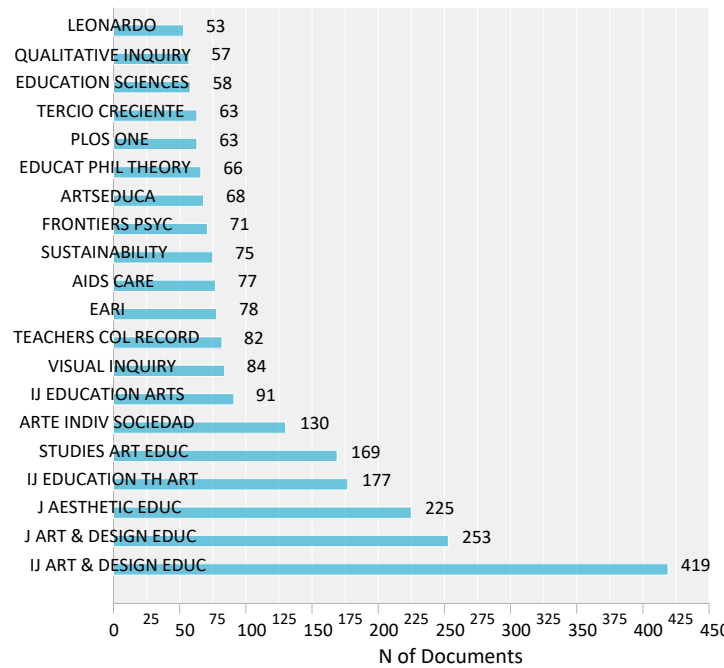
Figure 4. Most relevant sources.

Source: own elaboration.

The oldest of the relevant journals is the *International Journal of Education Through Art*, although the cumulative trend is much milder than those mentioned above. The rest of the relevant journals in this field (e.g. *Studies in Art Education*; *Arte, Individuo y Sociedad*; or *International Journal of Education and the Arts*) are much more recent, and have started to experience a significant increase in the number of articles published since the second decade of the 21st century onwards.

4.4. Most representative authors in the field and affiliation

In order to quantify the representativeness or relevance of the authors, the h and g indices were used. In the data analysed, the correlation coefficient between both indices was very high and significant: r =.95. Figure 5 shows the h-index and g-index of the 20 most relevant authors considering these quality metrics. As can be seen, the g-index is systematically higher in practically all cases than the h-index. Except for the author at the top of the list (Pascarella ET) whose h-index is h = 15 and g = 22, the rest of the authors are close to $h \approx 6$ and $h \approx 8$.
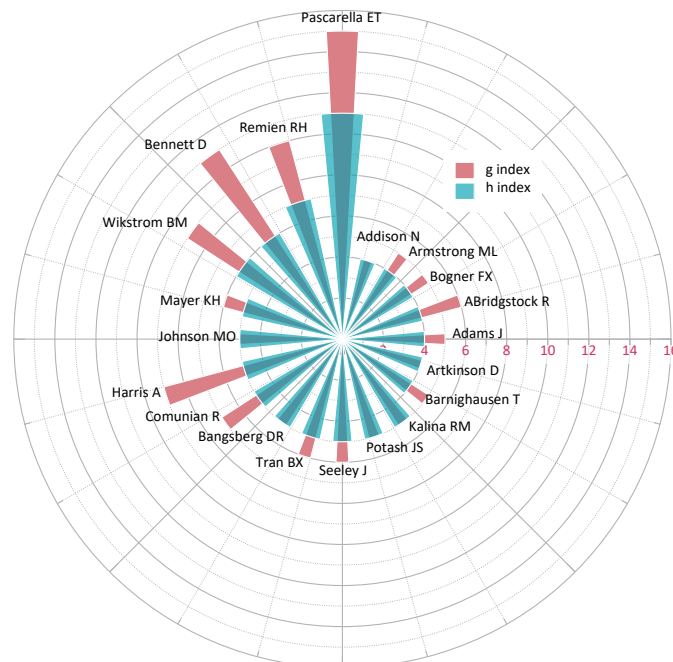

Figure 5. Most relevant authors by impact.

Source: own elaboration.

Among the affiliations of the most representative authors, Columbia University in the USA (*N* = 181) contributes the most publications, followed by the University of Toronto (*N* = 165) in Canada. Of the 20 universities, 15 are American (75%), one Canadian (5%), one Finnish (5%), and three (15%) Spanish.

4.5. Thematic map

The thematic map makes it possible to define four typologies of themes according to the quadrant in which they are located (see Fig. 6):

1. Themes located in quadrant 1 or upper right (central and developed) are known as motor themes. They are characterised by their high centrality and density.
2. Themes in quadrant 2 or lower right (central and undeveloped) are known as basic or cross-sectional themes. They are characterised by their high centrality and low density.
3. Themes in quadrant 3 or upper left (peripheral and developed) are known as isolated and highly developed themes or niche themes (isolated themes). They have high density and low centrality.
4. Themes in quadrant 4 or lower left (peripheral and undeveloped) are known as emerging or declining themes. They have low centrality and density. The map has been constructed by using Keywords Plus[2] on the following parameters: 500 words, a minimum frequency of 5 words per 1,000 documents, and 3 tags per cluster.

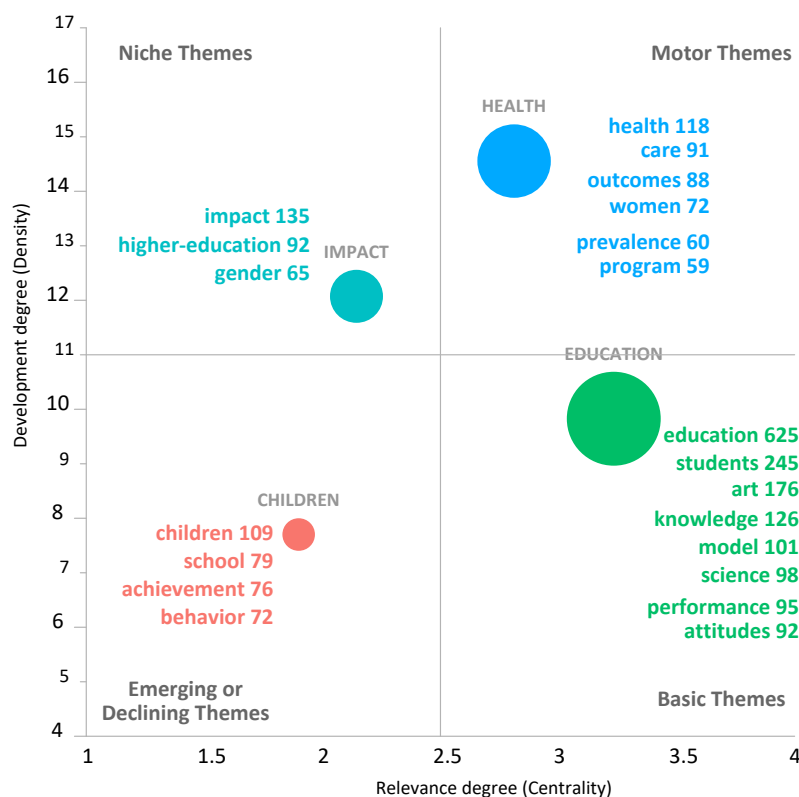The results (see Fig. 6 and Table 4) show the following:

Figure 6. Thematic map.

Source: own elaboration.

Table 4. Cluster centrality and density.

Cluster	Cen	Den	$RCen$	$RDen$
education	6.09	9.52	4	2
health	4.36	11.27	3	4
impact	3.68	10.03	2	3
children	3.19	8.07	1	1

Note: Cen = Centrality; Den = Density; R_{Cen} = Rank Centrality; R_{Den} = Rank Density

Source: own elaboration.

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2   In Keywords Plus keywords are selected by Thomson Reuters editorial experts with the support of a semi-automated algorithm. They are generated from the titles and include important terms in the field of study that have not been considered by the authors. Unlike the keywords proposed by the authors, the Keywords Plus field is standardised, and captures the content of the document in greater depth and range.

1.   In the case of density, the first position is occupied by *health* (Den = 11.27), followed by *impact* (Den = 10.03).
2.   In quadrant 1 (motor themes) we find *health* (*N* = 116), along with *care* (*N* = 91), *outcomes* (*N* = 87), *women* (*N* = 70), and *programme* (*N* = 59), as the most representative terms.
3.   In quadrant 2 (basic or cross-cutting themes) is *education* (*N* = 618). The main associated terms are *students* (*N* = 241), *art* (*N* = 173), *knowledge* (*N* = 125), or *science* (*N* = 97).
4.   In quadrant 3 (niche topics) we find *impact* (*N* = 132), along with *higher-education* (*N* = 88), and *gender* (*N* = 63).
5.   In quadrant 4 (emerging or declining themes) there is *children* (*N* = 101), along with *school* (*N* = 75), *achievement* (*N* = 72), or *behaviour* (*N* = 70).

4.6. Underlying structure of terms

The function Conceptual Structure has been used to perform a Multiple Correspondence Analysis (MCA) which aims to outline a conceptual structure of the field of study, as well as to create a cluster of K-means to identify groups of documents expressing common concepts (see Figure 10). In view of the point patterns in Figure 7, we can make the following claims:

1.   Dimension 1 (47.16 % of the inertia) establishes a clear differentiation between two clusters: the first is made up of terms relating to teaching and learning processes developed in structured educational settings. The second refers to therapeutic, social intervention and community processes.
2.   The highest values in this dimension correspond to the socio-health and therapeutic domain (e.g., *prevention*, *therapy*, *prevalence*, *risk*, *care*). Lower values in this dimension, such as *classroom*, *motivation*, *instruction*, *teachers*, o *language*, can be ascribed to the psycho-pedagogical context.
3.   The terms belonging to cluster 1, and especially those with values below 1.00 in Dimension 2, show a much higher degree of similarity between them than the terms belonging to cluster 2, which appear considerably more dispersed.
4.   Around the origin (0, 0) are terms belonging exclusively to cluster 1 (e.g., *attitudes*, *experiences*, *model*, *arts*, *higher-education*. Consequently, these terms are less well represented in the two-dimensional space than others that lie further away, such as *achievement*, *motivation*, *prevention*, *prevalence*, *creativity*, or *intervention*.
5.   Dimension 2 (20.00 % of the inertia) is notably less important than Dimension 1 for the reduced data we are analysing. The highest values correspond to processes associated with learning in formal settings, e.g., *achievement*, *motivation*, *classroom*, *engagement*, *instruction*, *school*, while the lowest values correspond to terms involving creative processes, such as *art*, *creativity*, *design*, *framework*, or *higher-education*.
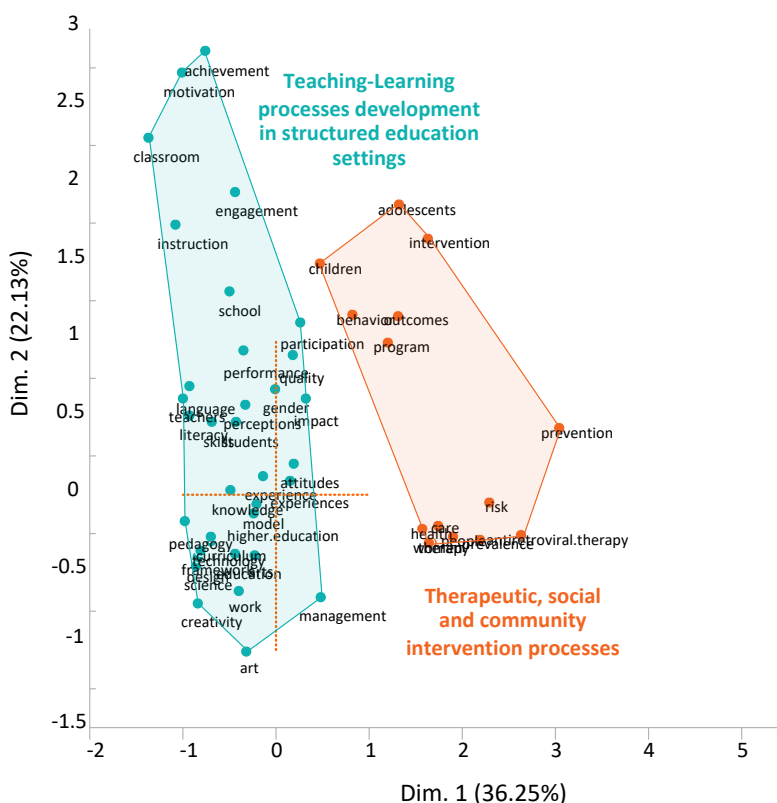

Figure 7. MCA results.

Source: own elaboration.

5. Conclusions

The overall production in the field of "Art Education" was very modest until 2005, while from then until 2022 there has been a sudden rise, including a booming production in the period 2015-2022 —an observation which matches work developed by Lindström et al. (2022), and a gradual decline from 2022. It was during the last two decades when the annual scientific output increased exponentially, so that most of the area's production is concentrated within this period. This may be related to the uploading of journal entries from this research field into databases including high-impact journals (WoS), as well as to the interest of authors in publishing their research in indexed sources to meet academic career accreditation processes.

The analysis of the substratum of contemporary thought, as constructed with the scientific resources most cited by the most prolific authors in the area and the use of the main descriptors employed in its scholarly production, has enabled us to infer the thematic orientation of this field of research towards formal education in the school environment and the curriculum (Blaikie et al., 2004; Kalin & Barney, 2014; Popovich 2015; Steers, 2014), as well as towards the development of creativity (Adams & Owens, 2015; Steers, 2009), higher education (González-Zamar & Abad-Segura, 2020; Fontal et al., 2021; Miralay, 2024; Sclater, 2016) and teacher education (Adams, 2007; Garcia-Lazo et al., 2024; Huerta, 2022; Page et al., 2011). Furthermore, the sample of descriptors shows the overabundance and dispersion of existing terminology (e.g., Art-Arts; Art Education-Arts Education). This problem has already been pointed out by authors such as Marín-Viadel (2011b) who suggest a lack of international consensus in the use of terms supported by differing epistemological approaches. In relation to the disciplinary affiliation, a clear educational orientation is found in the art-related texts that focus on the topic "Art Education", which is evidence of the disciplinary framing of art education within the field of the educational sciences. The main sources in the field of art education are English-language journals. More particularly, it is the *International Journal of Art & Design Education* that tops the list, as pointed out by González-Zamar and Abad-Segura (2021). Not before we reach the sixth position in this ranking can we find the first journal in Spanish, *Arte Individuo y Sociedad*. Also noteworthy is the presence in the list of multidisciplinary journals and journals that operate on the basis of article processing charges. On the other hand, the relevance of authors publishing in the field of art education is quantified (Pascarella, E. T.; Bennett, D.; Remien, R. H., …) as is the representativeness of the authors' affiliations, where American universities stand out.

The study also features a thematic map that makes it possible to define four main themes, as well as to know the relationship between the themes and the overall degree of development of the lines of research present in the scientific field under examination. The resulting motor theme is *health* together with its most representative terms: *care, outcomes, women* and *prevalence*. This theme exhibits a substantial development and is important for the purposes of our research field. The basic theme is, by far, *education*, involving the terms *students*, *art*, *knowledge* and *model*. This theme is important because it is a general theme that cuts across the different research areas in the field of study. Within the isolated or niche theme category we find *impact*, together with *higher-education* and *gender*. This theme has well-developed internal links, but not very significant external links, so that its relevance to the field of study is limited. Finally, the emerging or else declining theme is *children* along with *school*, *achievement*, and *behaviour*. This theme is underdeveloped and constitutes a marginal theme within the field.

Moreover, the conceptual structure of the field of study gives rise to two dimensions and, within the first one, to a clear difference between two clusters, which allows us to conclude that there are two areas wherein we can frame the documents that express common concepts in the field of art education knowledge: the first one is made up of terms related to teaching-learning processes developed in structured educational settings; and the second one is related to therapeutic processes, social and community intervention in the family, and cultural and socio-health contexts. This dichotomy is also reflected in the work of Lindström et al. (2022), where a relationship is established between research work that deals with art and learning outcomes, and other studies that research into art as a means to health and well-being outcomes. Within these areas, the highest values correspond to the socio-health and therapeutic domain (López-Escribano et al., 2023; Machuca & García, 2024; Mareza & Nugroho, 2019; Moreno-Cano et al., 2021), and to values that can be ascribed to the psycho-pedagogical context. In relation to the latter dimension, the highest values, in turn, correspond to processes linked to learning in formal settings (Lilliedahl, 2023; Miralay, 2022; Montero, 2023; Zhang et al., 2024), while the lowest values correspond to terms that fall under the creative process category (Vojvodić & Sredanović, 2020).

This is the first time that a systematic study has been carried out on the global scholarly production on art education and the development of the concept itself in the scientific literature, although other bibliometric studies are available that have only focused on specific aspects of this field of research (González-Zamar & Abad-Segura, 2020; 2021a; 2021b; González-Zamar et al., 2021; Lindström et al., 2022; López-Escribano et al., 2023). The resulting data are useful for educational policy developments, art education teachers, academics and other stakeholders, and support our claim that, in global terms, art education has consolidated itself as a defined research community, with shared themes and lines of inquiry. The limitations of this study stem from the difficulty of quantifying knowledge expansion. This is because using publication volume as the primary metric assumes that all knowledge resides within these publications and that each publication contributes equally to knowledge accumulation (González & Moya, 1997). Additionally, relying solely on publication counts fails to assess their quality, underlining the necessity for expert judgment to supplement this evaluation (Gómez & Bordons, 1996). Finaly, metric bias (e.g., older documents, though less relevant, accrue more citations over time and are erroneously perceived as more relevant than newer ones) also presents

another constraint of this study. For future investigations, other types of documents could be included as search targets. Furthermore, this methodology could be extended by resorting to other quantitative or qualitative databases or tools which would encourage different study perspectives.

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