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Systematic Review

The Impact of Integrated STEAM Education on Arts Education: A Systematic Review

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Abstract: Integrated Science-Technology-Engineering-Arts-Mathematics (STEAM) education, an educational approach that is steadily expanding and bringing positive results within various scenarios, is successfully implemented and promoted in various countries. However, it has often been noted in the specialized literature that the incorporation of the arts into STEAM proposals is often at the service of the other disciplines, in that authentic artistic content is scarce or non-existent. It is therefore necessary to ascertain the place of the arts within this approach, so as to move towards their inclusion in an authentic manner. Thus, with the aim of knowing the characteristics of STEAM educational proposals and determining the impact of integrated STEAM education on the development of artistic competencies, this study presents a systematic review of STEAM proposals within Primary and Secondary Education. The results show the very limited impact of this approach on arts education; although the evaluation of artistic competency development has had positive impacts, it has been contemplated in very few studies. Our conclusions reflect on some necessary considerations with which to achieve an authentic and meaningful integration of the arts within STEAM education, opening the door to a conversation on what was previously a gap in the literature.

Keywords: integrated education; disciplinary integration; integrated STEAM education; arts education; artistic education; competence development; systematic review; impact; primary education; secondary education

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1. Introduction

Integrated STEAM education is an educational approach based on the integration of knowledge from the disciplines of Science, Technology, Engineering, Arts, and Mathematics. It is aimed at solving problems in the real lives of students. This approach is consistent with the need for a comprehensive, less compartmentalized, and more holistic literacy, which 21st century society requires to function in an increasingly complex and interconnected world.

Although it is true that the theoretical foundation of integrated STEAM education has made significant progress, there are still shortcomings—especially from the epistemological perspective—despite its relevance for understanding the nature of the production of scientific knowledge [1]. In any case, it is an approach that is expanding rapidly and good results are reported in various contexts in various countries [2,3]. In fact, more and more countries are promoting the implementation of the STEAM approach throughout all educational stages [4–9] (among others).

It has been argued that integrated STEAM education represents a more holistic and balanced approach than its predecessor, the STEM approach [10–12]. In fact, our position adheres to the more recent and interesting view of A in STEAM, which includes the arts and humanities, although in this paper we will limit ourselves to the arts. However, a warning has repeatedly been sounded in the specialized literature that the incorporation of the arts in STEAM proposals often takes place at the service of other disciplines and that authentic artistic content is scarce or simply non-existent [13–15].

The current situation of the arts within integrated STEAM education must be clarified, so as to move towards their authentic incorporation. Only in this way can we escape from the instrumentalization of the arts and continue to take full advantage of the educational potential of this approach in STEAM. A systematic review of STEAM proposals is therefore presented in this study for the two stages of compulsory education within which the theoretical foundations of STEAM have advanced most: Primary and Secondary Education. Our aim is to ascertain the characteristics of STEAM educational proposals in relation to arts education and to determine the impact of integrated STEAM education on the development of artistic competencies (in this study, we adhere to the competency theoretical framework of [16], who proposed that the competency construct covers conceptual, procedural, attitudinal, contextual, communicative, metacognitive, and epistemological dimensions of knowledge).

2. Arts Education in Integrated STEAM Education

The STEAM approach was developed from STEM education, which initially emphasized Science, Technology, Engineering, and Mathematics to prepare students for a world with constant scientific-technological advances. However, as the 21st century has progressed, it has become clear that problem solving cannot be reduced to STEM disciplines alone. Thus, STEAM education has broadened the STEM approach by incorporating the arts and humanities, fostering inter-disciplinary collaboration, and providing students with a more holistic understanding of problems and their solutions [17]. Integrated STEAM education will therefore intrinsically imply speaking of an arts and humanities education.

In the literature, the most frequently repeated benefits of integrating the arts in the STEAM approach are, among others, the development of creativity, an innovative spirit, critical thinking, digital competence, knowledge of engineering design, and even the promotion of positive attitudes towards science and mathematics, and the contextualization of science [12,18–20]. Although also developed with STEM education, these capabilities are enhanced from unique perspectives within the arts; perspectives that can help find multiple answers to problems and that offer a type of open knowledge [21] based on deep subjectivity as opposed to scientific objectivity;—a paradoxical viewpoint that invariably leads to divergent reflections upon both the self and the exterior world. Certainly, the integration of artistic disciplines enhances a series of benefits; however, it is also paradoxical that, among these arguments, the improvement and development of artistic competence is not a leading activity, as if it were something secondary. It does not happen the other way around, which is to say, the concern for the development of scientific competence has always been at the forefront of the STEAM approach [13,19]; it has even been commented that "STEAM education was proposed as an important educational policy direction for solving the low motivation for science learning and the phenomenon of avoiding science and engineering" [22] (p. 559). In any case, we can surely look for the causes of this problem precisely in the origins of STEAM; in other words, as previously mentioned, in STEM, a scientific-technological approach. Based on the idiosyncrasy of integrated STEAM education, it is, however, logical to think that the development of artistic competencies within an educational approach that pursues the integration of knowledge for holistic problem solving should not be pushed into the background.

This "secondary" place of the arts as a participant in integrated STEAM education has hardly gone unnoticed. There has been a series of calls to improve that situation in the literature [13–15] (among others) and, ultimately, to move towards true STEAM integration, to which we hope this research will contribute.

In summary, arts education plays an intrinsic and essential role in integrated STEAM education so that individuals can gain sufficient integral literacy to face up to the challenges of the 21st century. Attention must be paid to that situation in the design of integrated STEAM proposals.

3. Method

In the present study, a systematic review of the literature was carried out following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Statement [23], a set of guidelines for the selection of papers with clearly defined inclusion criteria [24].

The search was performed on the Web of Science (WoS) database of Clarivate Analytics to ensure the quality of the studies; specifically, on its Core Collection, which includes, among others, the Social Sciences Citation Index, the Arts and Humanities Citation Index, and the Emerging Sources Citation Index, in which the most important arts education journals are included. The search key entered in the WoS Core Collection was as follows: *STEAM AND educati** (Topic). This search returned 1309 results. The results were then refined. First, the research area *Education Educational Research* was selected, which reported a total of 709 results. Second, it was restricted to the last decade, the period in which integrated STEAM education has gained greater strength, comprising publications from 2014 to 2023 inclusive, which reported a total of 673 results. Third, to obtain peer-reviewed studies of justified quality, *Articles* were selected, obtaining 393 results that, after filtering by English and Spanish languages (given the linguistic proficiency of the authors), were reduced to 381 articles. The systematic review began with that set of articles.

After reading the title, abstract, and keywords of the articles, the following inclusion criteria were applied:

1: The key search terms actually appear in the title, abstract, or keywords of the article.

2: The article is on the subject of integrated STEAM education.

3: The article reports the implementation of an integrated STEAM proposal with either Primary or Secondary Education students.

Using this procedure, a total of 42 articles were eliminated for not meeting Criterion 1, 67 for not meeting Criterion 2, and 204 articles for not meeting Criterion 3. The 68 remaining articles were then read in full, applying the following inclusion criteria:

4: An article that employs some instrument, technique, or tool to assess the impact of integrated STEAM education on competence development in STEAM disciplines.

Through this procedure, 41 articles were eliminated, leaving a total of 27 articles suitable for in-depth review.

Figure 1 shows the flow chart corresponding to this review.

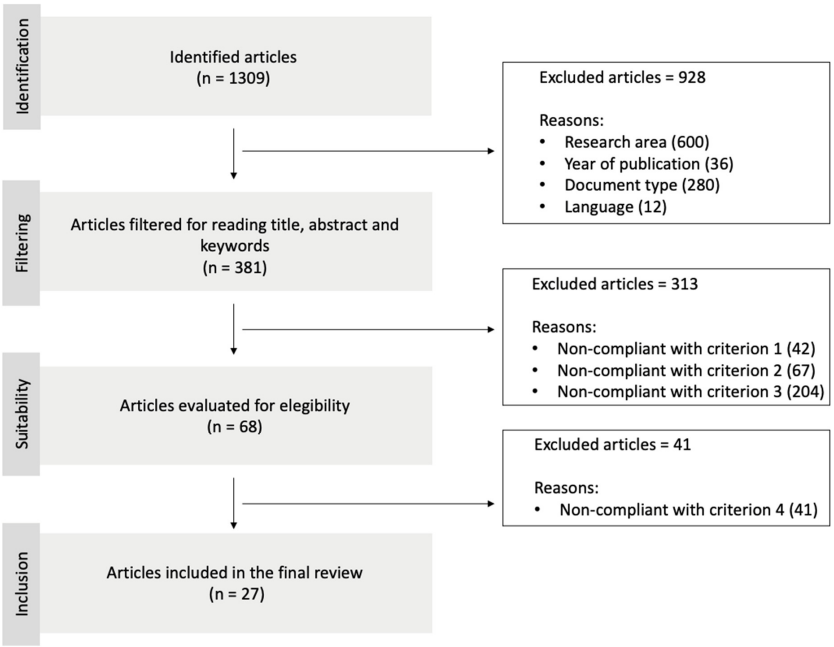

Figure 1. Flowchart of article selection procedure.

4. Results and Discussion

The results of this review and their discussion are presented below, divided into two parts. First, a general description of the articles included in the final review is shared and, second, the data corresponding to the in-depth review are presented.

4.1. General Description of the Studies

Table 1 shows the general characteristics of the studies according to their authors, the year of publication, the journal in which they were published, the country where the study was carried out, and the educational stage at which the reported implementation took place.

Table 1. General characteristics of the studies.

Author/s	Year	Journal	Country	Educational Stage
Başaran and Erol [25]	2023	Research in Science & Technological Education	Turkey	Primary education
Chen and Huang [26]	2023	Interactive Learning Environments	Taiwan	Primary education
Holguin-Alvarez et al. [27]	2023	Publications	Peru	Primary education
Salmi et al. [28]	2023	Interactive Learning Environments	Finland	Primary education
Szabó et al. [29]	2023	Education Sciences	Slovakia	Primary education
Chung et al. [30]	2022	International Journal of Technology and Design Education	Taiwan	Secondary education
Huang and Qiao [31]	2022	Science & Education	China	Secondary education
Hughes et al. [32]	2022	International Journal of STEM Education	United States	Primary education
Duo-Terron et al. [33]	2022	Frontiers in Education	Spain	Primary education
Liao et al. [34]	2022	Education Sciences	China	Primary education
Ozkan [35]	2022	International Journal of Technology in Education	Turkey	Secondary education
Çakır et al. [36]	2021	Education Technology Research and Development	United States	Secondary education
Choi et al. [37]	2021	Asia-Pacific Science Education	South Korea	Secondary education
Donia et al. [38]	2021	Journal of Chemical Education	Italy	Secondary education
Greca et al. [39]	2021	Revista Eureka sobre Enseñanza y Divulgación de las Ciencias	Spain	Primary education
Khamhaengpol et al. [40]	2021	Thinking Skills and Creativity	Thailand	Secondary education
Ozkan and Topsakal [41]	2021	Research in Science & Technological Education	Turkey	Secondary education
Piila et al. [42]	2021	Education Sciences	Finland	Primary education
Tran, Huang, Hsiao et al. [43]	2021	Frontiers in Education	Taiwan	Primary education
Tran, Huang and Hung [44]	2021	Frontiers in Education	Taiwan	Secondary education
Mierdel and Bogner [45]	2020	Journal of Microbiology & Biology Education	Germany	Secondary education
Rudd et al. [46]	2020	Journal of Science Education and Technology	United Kingdom	Secondary education
Tan et al. [47]	2020	Problems of Education in the 21st Century	Malaysia	Secondary education
Serrano Pérez and Juárez López [48]	2019	Computer Applications in Engineering Education	Mexico	Secondary education

Table 1. *Cont.*

Author/s	Year	Journal	Country	Educational Stage
Bati et al. [49]	2018	Cogent Education	Turkey	Secondary education
Thuneberg et al. [50]	2018	Thinking Skills and Creativity	Finland	Primary education
Shih et al. [51]	2017	Interaction Design and Architecture(s) Journal	Taiwan	Primary education

As can be seen, most of the studies (n = 24) correspond to the second five years of the decade, with 2021 being the most productive year (n = 9). The emergence of the STEAM approach can be seen as an entity in itself applied to more holistic problem solving, after its period of coexistence as a "successor-dating" approach to the previous STEM approach [17]. This progressive increase in studies also coincided with a growing interest in and discussions on arts integration [52], in line with the new political-educational requirements for the 21st century.

The corpus includes studies from a variety of journals, the most representative being Frontiers in Education (n = 3), Thinking Skills and Creativity (n = 2), Education Sciences (n = 2), Interactive Learning Environments (n = 2), and Research in Science and Technological Education (n = 2). It is striking that none of the journals belong to the field of arts education. Despite the fact that there are currently more than 20 arts education journals indexed in WoS, none of them explicitly raises the line of integrated STEAM education. Therefore, this issue appears to be in line with the idea that integrated practices are still observed with some suspicion within that field [53] and the need, as mentioned above, to move towards an integration of the arts within STEAM education in a way that is not based on its instrumentalization.

Most of the studies are from Asia (n = 14): Taiwan (n = 5), Turkey (n = 4), China (n = 2), Republic of Korea (n = 1), Thailand (n = 1), and Malaysia (n = 1). However, because of its trans-continentality, Turkey could be counted among the studies of European origin (n = 9) with Finland (n = 3), Spain (n = 2), Slovakia (n = 1), Italy (n = 1), Germany (n = 1), and the United Kingdom (n = 1). Finally, the American continent is represented (n = 4) with articles from the United States (n = 2), Mexico (n = 1), and Peru (n = 1). This panorama is congruent with the various educational policies that have promoted STEAM proposals in recent years. In addition, there are some theoretical models for integrated STEAM education from university research groups in some of these contexts; see, for example, the cases of Taiwan [54], South Korea [19,55,56], Thailand [57,58], and the United States [52,59,60]. These models address methodological, didactic and, to a much lesser extent, psychological and epistemological aspects [1].

Finally, the number of studies on students at the Primary Education stage (n = 13) and the Secondary Education stage (n = 14) was highly balanced. This scenario confronts the widespread idea that the implementation of integrated STEAM education in compulsory education at the Primary Education stage is more viable, due to the complexity of the different specialist teachers for each subject in Secondary Education. In fact, the reductionism of this idea overlooks the existence of various possible levels of disciplinary integration [61] with which these sorts of curricular difficulties can be surmounted.

4.2. In-Depth Review Data

Table 2 shows the information corresponding to each of the parameters under review: the type of research design of the study, the educational context in which it was conducted, the didactic methodology used in the integrated STEAM proposal, the evaluation instrument used in the evaluation, the componential development that was evaluated, and the reported impact on artistic competence development.

Table 2. In-depth review data.

Study	Design	Educational Context	Methodology	Instrument	Evaluated Competence Development *	Impact on Artistic Competence Development
Başaran and Erol (2023) [25]	Quasi-experimental	Formal	Project-Based Learning (PBL) and Context-Based Learning (CBL)	Primary School Environmental Awareness Scale [62] and ad-hoc scale	Environmental awareness and aesthetic view	Positive
Chen and Huang (2023) [26]	Quasi-experimental	Formal	Game-Based Learning (GBL)	Test	Science and Technology content knowledge	-
Holguin-Alvarez et al. (2023) [27]	Experimental	Formal	Multiple Teaching Method	Test and scale	Science skills and environmental awareness	-
Salmi et al. (2023) [28]	Pre-experimental	Formal	Inquiry	Test	STEAM content knowledge	Positive
Szabó et al. (2023) [29]	Quasi-experimental	Formal	Inquiry	Test	Spatial skills	-
Chung et al. (2022) [30]	Pre-experimental	Formal	Project-Based Learning (PBL)	Test	STEAM competences	Positive
Huang and Qiao (2022) [31]	Experimental	Formal	[a]	CT Skills Scale [63]	Computational thinking skills	-
Hughes et al. (2022) [32]	Experimental	Formal	Inquiry	Tests	Life and physical science knowledge	-
Duo-Terron et al. (2022) [33]	Quasi-experimental	Formal	[a]	Standardized tests by National Institute of Educational Evaluation of Spain	Linguistic and mathematical competencies	-
Liao et al. (2022) [34]	Quasi-experimental	Formal	Project-Based Learning (PBL)	Questionnaire	Computational thinking performance	-
Ozkan (2022) [35]	Quasi-experimental	Formal	[a]	Secondary School Visual Arts Lesson Scale [64] and Visual Arts Lesson Attitude Scale [65]	Visual arts achievements and attitudes towards visual arts	Positive

Table 2. *Cont.*

Study	Design	Educational Context	Methodology	Instrument	Evaluated Competence Development *	Impact on Artistic Competence Development
Çakır et al. (2021) [36]	Quasi-experimental	Informal	[a]	Test and Computer Attitude Scale (CAS) [66]	Computational thinking skills and attitudes towards computing	-
Choi et al. (2021) [37]	Pre-experimental	Formal	Socio Scientific Issues (SSI) Education	Questionnaire	Climate literacy	-
Donia et al. (2021) [38]	Pre-experimental	Informal	Multi-outcome experiments (MOEs)	Survey	Chemistry concepts	-
Greca et al. (2021) [39]	Quasi-experimental	Formal	Inquiry and Engineering Design Process (EDP)	Competence development evaluation instrument [67]	Development of key competencies	Positive
Khamha engpol et al. (2021) [40]	Pre-experimental	Formal	Engineering Design Process (EDP)	Worksheets	Basic science process skills and engineering design process on nanotechnology	-
Ozkan and Topsakal (2021) [41]	Experimental	Formal	Hands-on	Test	Force and energy conceptual knowledge	-
Piila et al. (2021) [42]	Experimental	Formal	[a]	Test	Natural Sciences knowledge	-
Tran, Huang, Hsiao et al. (2021) [43]	Experimental	Formal	Project-Based Learning (PBL)	Scientific Creativity Test [68]	Scientific creativity	-
Tran, Huang and Hung (2021) [44]	Quasi-experimental	Formal	Project-Based Learning (PBL)	Scientific Creativity Test [68]	Scientific creativity	-
Mierdel and Bogner (2020) [45]	Quasi-experimental	Informal	Inquiry	Questionnaire	Science content knowledge	-
Rudd et al. (2020) [46]	Quasi-experimental	Informal	Multiliteracies approach	Scale	Attitudes toward carbon footprint reduction	-

Table 2. *Cont.*

Study	Design	Educational Context	Methodology	Instrument	Evaluated Competence Development *	Impact on Artistic Competence Development
Tan et al. (2020) [47]	Quasi-experimental	Formal	[a]	Test	Electricity content knowledge	-
Serrano Pérez and Juárez López (2019) [48]	Pre-experimental	Informal	Theorical and hands-on	Test	Engineering Knowledge	-
Bati et al. (2018) [49]	Quasi-experimental	Formal	[a]	Test	Computational thinking skills	-
Thuneberg et al. (2018) [50]	Pre-experimental	Informal	Inquiry	Test	Mathematical knowledge	-
Shih et al. (2017) [51]	Pre-experimental	Informal	Game-Based Learning (GBL)	Test	STEAM performance	Positive

* Extraction of the literal information; - Not applicable; [a] Not specified.

As can be seen, the type of research design followed in the studies is mostly quasi-experimental (n = 13), followed by pre-experimental studies (n = 8), and a minority of experimental studies (n = 6). This all highlights the need to increase the number of qualitative or mixed studies that, by their nature, will help to deepen the understanding of the impact of integrated STEAM education on the development of artistic competence. For example, most of the research reviewed only presents quantitative assessments; however, qualitative data could be collected to refine, extend, or explain students' competency development.

Most of the studies were carried out within a formal context (n = 20) and a minority in an informal context (n = 7). Taking into account that this review required the studies to present an evaluation of STEAM proposals, it was considered that these results, coinciding with the nature of the different educational contexts, demonstrated greater concern for evaluation in a formal rather than in an informal one. This issue is highly relevant to this study, and it should be noted that the results and interpretations presented here were largely based on a formal context. In that sense, greater control over the evaluation of STEAM proposals was encouraged in an informal context, which may well be internal. In this way, it will be possible to continue to provide evidence of the development of artistic competence in this context as well.

With respect to the didactic methodologies used in the STEAM proposals, Inquiry (n = 6) and PBL (n = 5) dominated, followed by a minority using EDP (n = 2), GBL (n = 2), and hands-on (n = 2), as well as other methodologies such as CBL, the Multiple Teaching Method, SSI education, MOEs, the multiliteracies approach, and the theoretical framework, all with n = 1. The methodology was not indicated in some other studies (n = 7). These results are in agreement with the methodological recommendations for STEAM presented in the literature, where active methodologies have always been proposed, especially the Inquiry method (which is included in the hands-on methodology), PBL, and EDP [69,70]. In that regard, these methodologies fit in perfectly with the integration of the arts through problem-solving tasks and the reconciliation of multiple solutions through aesthetic research, which are both also common tasks for designers and artists [13]. On the other hand, the number of studies in which no methodology was indicated, through which integrated STEAM education has become viable, was of concern. Generally, in those cases, the approach was erroneously confused with the methodology, pointing to a persistent misunderstanding of the nature or epistemological dimension of the approach. The same may be said of its predecessor, STEM [71,72], which was also indicated in a previous study [1].

Ad-hoc instruments (in the form of tests, scales, questionnaires, surveys, and worksheets), i.e., those developed specifically for the study itself, were the most frequently applied (n = 21), compared to a minority of studies that used instruments that have already been created and validated (n = 8). This is an observation that already constitutes a conclusion, per se, about the need for instruments to assess competence development within integrated STEAM education. However, it is worrying that among the instruments, the vast majority presented no data or validation process, so their results should be interpreted with caution. Thus, in coherence with the complexity of competence development [16] as previously mentioned, to aim for the construction of the deepest and most complete interpretation possible of the impact of STEAM education on artistic competence development, it is considered necessary to uphold rigorous evaluation in STEAM education that is integrated in the context of mixed studies.

Finally, a large majority of studies assessed different dimensions of competence development in Science (n = 19), followed by the assessment of competence development in Mathematics (n = 10), Technology (n = 6), Engineering (n = 6), and Arts (n = 6). This panorama ratifies the instrumentalization of the arts [73,74] that still prevails, in this case in integrated STEAM education (or rather in STEM studies that instrumentally incorporate the arts) which, as already indicated, is a problematic issue repeatedly mentioned in the specialized literature [1,13,52,75]. Among the six studies that evaluate some dimension of artistic competence development, one of them evaluates the aesthetic view, another one evaluates visual arts achievements and attitudes towards visual arts, and the remaining

four evaluate contents and competencies related to STEAM where the arts are included, all of them reporting a positive impact on the respective artistic learning. On the one hand, this small sample shows a reduced panorama of the arts, with a predominant focus on the visual arts, traditionally considered the most accessible and popular artistic resource [76], while a wide range of artistic disciplines are not present, such as music, theater, dance, sculpture, etc. In any case, these six studies could be taken as a reference of acceptable models of integrated STEAM education.

On the other hand, these results show a reduced scope of integrated STEAM education in arts education, since, although with a positive impact, the evaluation of artistic competence development was noted in very few studies, and even those in which it was noted, it was only noted in one dimension: the attitudinal or procedural one. Very relevant dimensions of artistic competence, both for the arts and for the STEAM approach, such as the contextual, communicative, metacognitive, and epistemological dimensions of knowledge, were not evaluated. In this sense, the following conclusions reflect on some considerations that are necessary for achieving an authentic and meaningful integration of the arts within STEAM education.

5. Conclusions

The general objective of this study was to ascertain the characteristics of STEAM educational proposals in relation to arts education, and to determine the impact of integrated STEAM education on the development of artistic competencies. For this purpose, a systematic review of STEAM proposals of the two stages of compulsory education, Primary and Secondary Education, has been presented. The findings of this study have advanced some considerations that are needed to move towards an authentic and meaningful integration of the arts in integrated STEAM education, detached from its instrumentalism and capable of taking advantage of all the educational potential offered by this approach.

First of all, we have highlighted the problems encountered relating to a basic issue, that is, the knowledge of the nature of the STEAM approach. In that sense, it is true that, with respect to STEM, the integration of the arts adds further difficulty, it being the epistemological dimension of the STEAM approach that is precisely the most unknown [1]. In fact, no studies have been found in this review that have evaluated competence development in the context of artistic knowledge. However, it is necessary to look at this issue from a positive and enriching point of view. The variety of artistic disciplines, of different natures and with different ways of producing and understanding what knowledge is, can be a great enrichment by allowing different forms of integration and learning. Therefore, in relation to other findings here, the wide range of arts beyond the visual arts should be considered because of their potential that has still hardly been explored in integrated STEAM education.

Secondly, due to the scarcity of studies that evaluate dimensions related to artistic competence development, this review evidences the undervaluation of the integration of the arts, which may have several causes. One of them may be the consideration of the arts as a mere instrument in STEAM proposals, as some critics point out and as we have been discussing in this article. However, another cause may, we believe, be related to the difficulty of evaluating artistic content, especially in proposals where the research team does not include specialists within the field of arts education, or where there is no mixed evaluation combining quantitative and qualitative data. We therefore believe that any STEAM proposal should take into account the guidelines on arts learning, for example, the criteria proposed [77] could be used as criteria for evaluating the artistic part.

Thirdly, and related to all the above, we consider that teacher training in integrated education is of special importance, since none of the above can be remedied if teacher training is not addressed. In that sense, it is vital to begin by introducing this training in the degrees and Master's degrees dedicated to teacher training in the compulsory educational stages and, at the same time, to establish training courses on this subject. Moreover, according to the evidence available in the specialized literature [78,79] (in press),

the most effective approach to this training is through co-teaching approaches in which arts education specialists are included and that is complemented by and receives feedback from integrated STEAM education.

Among the limitations of this work, we can point to the use of a single database to conduct the review, which might imply that journals that may have led to different results could have been left aside. However, to the best of the authors' knowledge, there are no more than five journals specialized in arts education that are outside WoS, so it is unlikely that the trends could be otherwise. On the other hand, there are several arts education journals that are not included in databases such as WoS or Scopus, but we cannot assure the quality, as mentioned in the Methodology section. On the other hand, the criterion of considering articles only in Spanish or English, which might in principle be a limitation, is not one, because only 3% of the initial corpus was excluded under that criterion.

In summary, this paper adds to the contributions in defense of the integration of the arts to address the complex needs of contemporary education [53] and opens a conversation on the situation of the arts in integrated STEAM proposals and its impact on artistic competence development, which until now was a gap in the literature. In the near future, we intend to expand the corpus of studies and, with it, broaden the analysis and continue to provide relevant considerations for artistic competence development in integrated STEAM education.

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