

Programas de Expresión Musical en Educación Infantil para mejorar la inclusión: una Revisión Sistemática de la Literatura

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Resumen. La armonización de lo cognitivo con lo emocional debería guiar los esfuerzos de toda práctica docente. El objetivo es realizar una revisión sistemática sobre la evidencia científica dedicada a programas musicales dirigidos a la etapa de Educación Infantil (EI) para identificar las características de los mismos. Se utilizaron las directrices de PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) y PICOS (population, intervention, comparator, outcome, study characteristics) a través de 5 bases de datos electrónicas desde 2010 hasta 2020. Fueron incluidos 12 artículos. Los hallazgos en la literatura muestran un escaso uso de la música en educación. Entre las conclusiones se destaca que, en la última década del transcurso de programas musicales, apenas son los estudios relacionados con la etapa de EI.

Palabras clave: Revisión Sistemática; Música; Intervención; Educación Inclusiva.

[en] Musical Expression Programs in Early Childhood Education to Improve Inclusion: A Systematic Review of the Literature

Abstract. The harmonization of cognitive and emotional aspects should be an underlying guide in all teaching practices. The aim of this paper is to conduct a systematic review of the scientific evidence concerning music programs in Early Childhood Education (ECE), to identify their characteristics. Guidelines from both PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) and PICOS (Population, Intervention, Comparator, Outcome, Study characteristics) were applied to analyze relevant articles published between 2010 and 2020 and retrieved from 5 electronic databases. In all, 12 articles were included in the study. Finding in the literature show a scarcity of music in education. Among the conclusions, it should be highlighted that there were hardly any studies linked to music programs in the Early Childhood Education stage over the past decade.

Keywords: Systematic Review; Music; Intervention; Inclusive Education.

Sections. 1. Introduction. 2. Methodology. 3. Systematic Review of the Literature on Musical Expression Programs. 4. Data Analysis and Results. 5. Discussion and Conclusions. 6. Bibliographic References.

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1. Introduction

According to social psychologists, human beings are among the most intelligent species in the civilised world. Affective disciplines such as music can be beneficial for a fulfilling life experience because in education, the emotions are important aspects for autonomy and personal expression in general (Flerloos et al., 2021).

Music psychology specifically studies musical expression and its effects. Developments in this area regarding musical expressiveness reveal that it to be a multi-faceted phenomenon, because affect and emotion can both be expressed through this discipline. It can furthermore influence the different qualities of sound produced. Juslin and

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Timmers (2012) noted that the basis of learning how to teach musical expression stems from the first experiences of speaking and singing that take place in infancy, as it is from that time when children have instinctive thoughts and feelings. Studies, such as the one completed by Meissner and Timmers (2018), showed that students are capable of communicating basic emotions such as happiness and sadness, through instrumental improvisations when using expressive techniques such as tempo, dynamics, and articulation. Nevertheless, their results indicated that the instrumental interpretation of sad fragments were significantly more effective at improving musical expression than happy fragments. This observation might constitute one of the most outstanding conclusions about the notion of music, because individuals are given the chance to express their own emotions through spontaneous exploration of what concerns the world of sounds (Paz, 2020).

Music is both a language and an art form through which individuals can express the feelings that an intangibility of sound with a variety of meanings awakens within them. Moreover, within a system where sedentariness prevails, awareness that corporal expression is stimulated by an auditory stimulus leads to an adventure charged with emotion. The listeners' maturity and the emotional mood therefore justifies their level of subjectivity. Various authors (Barrett et al., 2021; Coombes, 2020) have stated that music can be considered as an art, a science and a language.

The relation between etiology and history from a socio-musical perspective is found in the cultural determination of the music category. However, even though the music subject has evolved within the educational system, since it was included in the Spanish Education Organic Law 2/2006, it is still considered a secondary subject within the curriculum. Yet, historic, social and ethnic differences have generated a somewhat indetermined concept, because some researchers (Sa et al., 2020; Wang, 2021) have indicated the capacity of music to modify individual behavior, due to it is great emotional power. This power depends on the interaction of melody, rhythm and harmony. If the multidimensional nature of the fabric of Musical Expression is accepted, music can be understood as a discipline that can provide aesthetic experiences through spontaneous expression that is an excellent source for experiences leading to optimal physical, spiritual and mental health (Coombes, 2020; Flerloos et al., 2021).

According to socio-affective neuroscientific studies, it is turned into an attitude musical expression becomes part of an attitude and assumes a unique leading role, demonstrating the capability of resilience, present in the rational and emotional mind (Friston et al., 2017). The estimation of the sonorous possibilities specific to promoting cognitive processes such as memory and attention can generate cerebral, functional and/or structural changes. But proper brain development needs art, since social skills such as self-control are exercised through play, dance or drawing. For this reason, the use of art as an educational aspect to place the emphasis on people and not on the numerical result they obtain, makes it relevant in the development of social skills to express and communicate with the use of the body and the voice (González, 2014). In this regard, Sousa (2011) says that regions of the brain specialised in language are connected to the limbic system because they require an emotional component. In other words, bearing in mind those artistic-creative activities call for cerebral training, these can give rise to the development of complex cognition. This idea conceptualizes the notion of socio-affective neuroscience (Aversi et al., 2019). In contrast, bibliographic reviews, such as Peñalba's (2017), have indicated the recent relation between neuroscience and Music Education. According to this author, an increasing number of investigations focus on the didactics of music in a transdisciplinary manner by focusing on communication, psychology and emotion. This may be due to the contribution of music to both empathic and emotional development, as well as favoring the development of language, mathematical thought and reading skills (Peñalba, 2017).

At the stage of Early Childhood Education (ECE), Musical Expression comes within the block of artistic language in the area of languages: communication and representation (Decree 122/2007). This states that artistic language is a means of expression that develops necessary aspects of life such as the imagination. Article 1 of the Spanish Organic Law 3/2020, which has modified Article 91 of the LOE (Organic Law 2/2006), indicates the need to increase educational and training opportunities in the general population, turning the idea of socio-educational inclusion into egalitarian education, to achieve social change. However, quantifiable measures to reach a certain degree of globalization in education has been focused on in the scientific literature over the past five years. Thus, a capitalist principle is usually present in most studies (Paz, 2020; Reyes et al., 2020), where economic success is considered an essential part of being successful in life. This means that the rate of socio-educational inclusion is the most widely used variable in empirical studies. This highlights that equality requires strategies that imply affective activation in educational contexts. One of these strategies is the Music subject, which despite its innumerable benefits has scarce little legislative value. According to the OECD (2012) which has the greatest influence on economic and social policy, this might be the reason why absenteeism persists within ECE. Thus, the need to conduct a Systematic Literature Review (SLR) arose from the afore-mentioned undervaluation of Music in the curriculum (Organic Law 3/2020) along with the insufficient number of studies concerning musical expression over the past decade (2010-2020).

Studies in neuroscience (Aversi et al., 2019; Sa et al., 2020) have pointed out that both skill and willingness are necessary for learning. However, there is scarce amount of literature available concerning the recent revelations about neuroscience and music.

This justifies the need for national and international data with which to examine the scientific contributions that have been made. This study presents a systematic review of investigations linked to music programs founded on the premises of neuroscience to favor inclusion at ECE centers both in Spain and abroad. This review aims is to com-

municate relevant information to enable the creation of didactic proposals directed towards the fulfilment of student educational needs.

2. Methodology

A Systematic Literature Review (SLR) is conducted in this study. This is a systematic method in which sections of primary studies published in a given field and over a set range of years can be identified, interpreted, summarized and critically analyzed. It furthermore follows the reporting guidelines for the organization and management of the review (Grant & Booth, 2009), in response to some research questions. In this study, PRISMA reporting guidelines were followed. This methodology added rigor to the process of selecting and analyzing the results (López et al., 2016; Moher et al., 2009a; Moher et al., 2009b; Moher et al., 2014), so that the systematic review could be described completely and transparently (Liberati et al., 2009). In education, this methodology aims to add interactivity to an SLR, as it may be considered a type of investigation in itself, since it works with a publicly available protocol (López et al., 2016; Shamseer et al., 2015).

Indeed, the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Statement, released in 2009, draws from the QUOROM (Quality of Reporting of Meta-Analysis) initiative of 1999. QUORUM sets out the norms for the optimization of scientific quality in clinical testing or Meta-Analysis. Nevertheless, the PRISMA Statement is also ideal for an SLR applied to other fields (Urrútia & Bonfill, 2010; Moher et al., 2009a; Moher et al., 2009b; Moher et al., 2014; Sánchez, 2020). PRISMA was being updated (at the time this review was prepared). The PRISMA 2020 Statement (that includes checklists, explanations, and elaboration and flow diagrams) replaced the PRISMA 2009 Statement. The PRISMA 2020 checklist includes 7 sections with 27 items. It also includes a checklist for the inclusion of journal and conference abstracts within systematic reviews. This checklist for abstracts updates the PRISMA 2013 Statement for abstracts, reflecting the newly modified content of PRISMA 2020 (Page et al., 2021).

The response to certain research questions is necessary to analyze the works included in a review:

- *What is the state of national and international scientific production publications related to both the implementation and the evaluation of musical programs directed at the second stage of ECE?*
- *What are the objectives and contents of the musical programs?*
- *How are they implemented?*
- *How is the evaluation of these programs carried out?*

Subsequently, some research objectives are required. The principal objective of this work is to conduct a systematic review of the scientific evidence on musical programs designed for the second stage of ECE, in order to identify the characteristics of the programs. More specifically, the aim is to:

1. Detect national and international research articles concerning the application and the evaluation of musical programs for the second cycle of ECE over the past ten years (2010-2020).
2. Systematically analyze both the characteristics and the evolution of the scientific production of these programs in relation to year of publication and geographic setting.
3. Present the curricular components that a music program must have in accordance with the programs that are implemented and evaluated in the scientific articles examined.

3. Systematic Literature Review on Programs of Musical Expression

Relevant contemporary searches for music programs based on neuroscience to favour inclusion in ECE Centres in Spain and abroad were identified, selected and critically evaluated.

3.1. Identification

The bibliographic research targeted scientific articles published over the past decade (2010-2020) and found between August 2020 and January 2021 in the databases of Web of Science (WoS), Scopus, Dialnet, Science Direct and ERIC. This period was chosen because the most significant neuroscientific contributions applied to education are relatively recent, which is to say within the past decade. WoS, Scopus and Dialnet were chosen because they list the main scientific publications from all areas. Science Direct was selected because it provides access to a broad knowledge base of scientific and medical literature. This is considered relevant, because various musical interventions are designed to prevent illnesses and to promote good health. Finally, ERIC was consulted because it is financed by the Department of Education of the United States government and because it specializes in areas of both psychology and education.

The combination of keywords used are: musical program pre-school education and “music education” AND “evaluation program”. Nevertheless; the initial search on the databases did not result in excessively high number of records.

The bibliometric results were systematized in a table for their organization, by compiling the following information: author, year, title, number and volume of the journal and the *Digital Object Identifier* or DOI. In addition, all the available documents were downloaded and stored for subsequent analysis.

3.2. Filtering

Duplicated documents, book chapters, conference papers and news items were removed from the references obtained in the identification phase. The titles and the abstracts were then read after having selected the language.

The results included the complete texts of available studies, with quantitative and qualitative methodological designs both of Musical Expression programs and reviews on the use Musical Expression in the framework of ECE. All studies within the context of primary and secondary education and university education were therefore excluded.

Finally, a reading checklist of the selected studies was completed, which included the title, the abstract, the introduction (objective), the methodology (protocol, search and bias), the results and the conclusions.

3.3. Inclusion

The studies that formed part of the systematic review were written in Spanish, English, Portuguese, Russian, and Korean and had been published in scientific journals between 2010 and 2020. The full-length of the articles selected in the previous phase, in accordance with the criteria for inclusion and exclusion, were read. The reading followed the criteria for eligibility defined in the PICOS (Population, Intervention, Comparator, Outcome, Study characteristics) format, a strategy with which certain items proposed by PRISMA may be checked and in our case, education programs evaluated. The acronym reflects the five points to be taken into account (Liberati et al., 2009):

P: precise description of the population under study.

I: description of the Intervention that was applied.

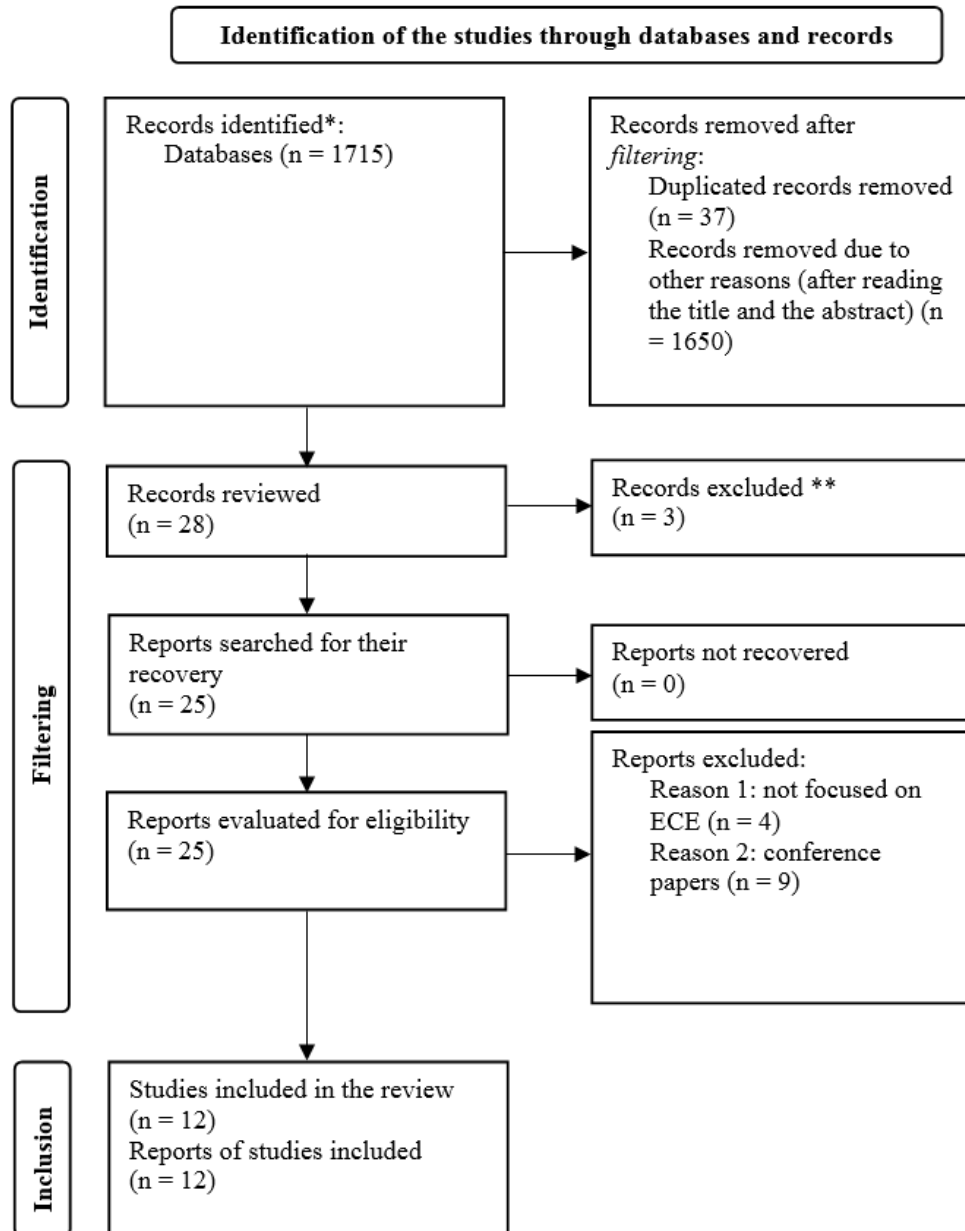
C: specification of the control group characteristics (to which the intervention was not applied).

O: outcome of the intervention that was carried out.

S: specification of the design of the studies.

During April 2021, the relevance of each item was noted on the checklists completed for each selected article. Some articles were removed in this process, because they were either conference communications or because they were not applicable to ECE. The definitive list of studies was decided upon for inclusion in the SLR. The review comprised a total of 12 records (Figure 1).

Figure 1. Flow diagram of the PRISMA Statement of the review.



Source: PRISMA (2021).

4. Analysis of the literature included and the results

A form with which the bibliographic parameters could be recorded was prepared, for data collection and analysis: author and authors, year of publication, title, journal, databases, country where the study took place, type of study, population, objective, contents and paradigm on which the study was based according to its theoretical framework (Table 1). The data referring to the author or authors, year, title, and journal for publication were kept in the general information of the research. Nevertheless, the collection and the analysis of the remaining parameters involved detailed reading for in-depth understanding of the papers.

This section is divided into two sub-sections, to provide orderly and coherent data analysis results. The first covers a description of the studies included in the review and the second shows the most relevant aspects.

4.1. General description of the studies forming the sample

Even though musical interventions within the framework of ECE have become more common, there is little available evidence to date, consequently supporting about the efficacy of these approaches. Moreover, even though a small number of studies were expected, the number of papers finally identified after applying the criteria for inclusion and exclusion was very low. Table 1 shows the list of the 12 studies retrieved from the two searches.

Geographically, it can be seen that almost all the publications were located within Europe. Spain ($n = 3$) was the country with more studies covering the use of programs or reviews of Musical Expression in ECE (Chao et al., 2015; Durán et al., 2014; Ruiz & Lara, 2015). Russia and the United Kingdom followed, each with two articles (Akimova, 2019; Huat & Ibbotson, 2018). The sampling portions belonging to continents other than Europe were: Auburn (United States), Singapore (Asia), Philadelphia (United States), Turkey (Asia), Chile (South America), Taiwan (Asia) and Korea (Asia) (Barry & Durham, 2017; Bautista et al., 2018; Brown & Sax, 2013; Burak, 2019; Cerebello & Sandoval, 2020; Han, 2015; Lee, 2016).

Another interesting question is the sample distribution in relation to its grouping by programs or reviews of Musical Expression in ECE. Most of the studies ($n = 11$) covered Musical Expression in ECE through educational praxis, generally through the implementation of programs, which concluded the limited presence of reviews ($n = 1$). Regarding the typology of the papers, this means that more than three-quarters of the sample belonged to studies of an empirical nature ($n = 11$) (Akimova, 2019; Bautista et al., 2018; Barry & Durham, 2017; Brown & Sax, 2013; Burak, 2019; Chao et al., 2015; Durán et al., 2014; Han, 2015; Huat & Ibbotson, 2018; Lee, 2016; Ruiz & Lara, 2015); whereby theoretical studies comprised less than a quarter of the sample ($n = 1$) (Cerebello & Sandoval, 2020).

Despite there being no differences referring to the number of articles published by the journal, the JCR-indexed journal with a higher selection of papers was the *Early Childhood Research Quarterly* ($n = 2$) (Bautista et al., 2018; Brown & Sax, 2013). There again, the Spanish journals that may be highlighted in this review were the *Revista de Logopedia, Foniatría y Audiología* [Journal of Logopedia, Phonometry and Audiology] ($n = 1$) (Durán et al., 2014) and the *Revista de Didácticas Específicas* [Journal of Specific Didactics] ($n = 1$) (Ruiz & Lara, 2015).

Table 1. General mapping of the sample of twelve articles.

Authorship, year, title, journal and database	Country of study	Type of study	Population of study	Objective	Contents	Paradigm upon which the study is based
Akimova, A. R. (2019). Individual-topological characteristics of the development of music, the arts, and intellectual skills among children of pre-school age. <i>Problemas de la Ciencia Musical</i> [Problems of Musical Science]. Web of Science.	Magnitogorsk (Russia, Europe).	E (Quantitative, experimental design).	48 boys and girls (2 ^o -3 ^o ECE) attending institutions and centres for the development of musical, artistic, visual and intellectual skills.	To study and to compare the inter-individual originality of pre-school pupils from the point of view of creative skills, creative thought and perception and information processing.	The investigation was centered on the inclusion of creative activities to improve the skills of highly gifted ECE pupils.	No concrete paradigm was specified upon which the study was based, but it was clarified in the body of the article that the diagnosis was conducted by an educational psychologist. Hence, it was considered to be based on psychology initiatives.
Barry, N. & Durham, S. (2017). Music in the Early Childhood Curriculum: Qualitative Analysis of Pre-Service Teachers' Reflective Writing. <i>International Journal of Education & the Arts</i> . ERIC.	Auburn (Alabama, USA).	E (Qualitative design).	24 ECE Master's Degree students and 55 ECE and PE pupils (3.5-5.5 years old).	Become aware of the transcendence of music in the development of ECE and PE pupils.	Musical interpretation through theatre (vocal education and song) and instrumental (training in rhythm).	Constructivist approach in ECE using music. This program follows a project-based methodology and thus explores musical topics through the interests of pupils.
Bautista, A., Moreno, A., Bull, R., Amsah, F. & Koh, S. F. (2018). Arts-related pedagogies in preschool education: An Asian perspective. <i>Early Childhood Research Quarterly</i> . Science Direct.	Singapore (Asia).	E (Quantitative, longitudinal design).	1538 children between 4-5 years old from 113 classes (2 ^o ECE) (80 centers).	To document how pedagogic praxis is seen in ECE in the context of arts in Asia.	Supporting socio-emotional content through music, dance, visual arts and language skills.	Regarding the ideas of theorists such as Vygotsky, Dewey, Piaget and Bruner, the study is based on three fundamental theories: holistic and active learning, interactivity and play.
Brown, E. & Sax, K. (2013). Arts enrichment and preschool emotions for low-income children at risk. <i>Early Childhood Research Quarterly</i> . Science Direct.	Philadelphia (Pennsylvania, USA).	E (Quantitative, experimental, observational design).	205 4-year-old children (2 ^o ECE), 174 children as EG and 31 children as CG.	To examine the expression of emotions among children in ECE from low-income families attending music programs.	Self-expression is worked on through dance, song and the visual arts, in the Settlement music program.	Based on the Theory of Differential Emotions, it defends the use of positive emotions to achieve optimum development of adaptive functions.
Burak, S. (2019). Self-Efficacy of Pre-School and Primary School Pre-Service Teachers in Musical Ability and Music Teaching. <i>International Journal of Music Education</i> . ERIC.	Akdeniz (Turkey, Asia).	E (Quantitative, experimental design).	395 future teachers of ECE and PE.	To reveal the effects of such factors as gender, age, their current year of study at the university and musical experience with musical skills and music teaching.	The study centered on testing the musical self-efficacy of future ECE and PE teachers through the use of a self-efficacy scale designed for teaching musical skills.	Based on beliefs of self-efficacy, the study can be understood as a sub-dimension of the theory of social learning that defends the achievement of certain goals, if one believes in one's own capabilities. In this study, this theory is transposed to the area of music and is known as musical <i>self-efficacy</i> .
Cerebello, E. & Sandoval, E. (2020). Analysis of musical training in early childhood education curricular programs in Chile. <i>Revista Boletín Redipe</i> . Dialnet.	Chile (South America).	T (Documentary design).	23 study plans from the Chilean university institute.	To set out the curricular relevance of musical expression in institutions that train ECE teachers in Chile.	The review was centered on the analysis of learning that, through music, combines three vital contents of ECE: personal development, communication and interaction.	Musical expression in ECE as a teaching orientation for the critical analysis of institutional study plans within Chile. It is all based on the benefits of musical activity in the brain (neuroscience).

Authorship, year, title, journal and database	Country of study	Type of study	Population of study	Objective	Contents	Paradigm upon which the study is based
Chao, R., Mato, D. & Lopez, A. (2015). Is the approach used to teach maths and music interdisciplinary in Early Childhood Education? <i>Educação e Pesquisa</i> . Dialnet.	A Coruña (Spain).	E (Quantitative, experimental, observational design).	700 teachers were randomly selected and the acceptance sample of 360 teachers of ECE and ME.	To analyze whether the teaching of music and mathematics can be done with an interdisciplinary approach in ECE.	The study covered the specific contents of mathematics in ECE through an interdisciplinary approach with music.	<ul style="list-style-type: none"> ▪ The Orff method for ME. Rectangular pieces are taught with xylophones through rhythm with language. ▪ Kodály ME method. Based on song and representation of notes through manual gestures for working on pitch. ▪ Mertenot Method of ME to teach an awareness of tone.
Durán, M., López, A., Fernández, J. C., García, M. & García, S. (2014). Pilot study on the implementation play based program in a classroom context to stimulate Language development. <i>Revista de Logopedia, Foniatria y Audiología</i> . Science Direct.	A Coruña (España).	E (Quantitative, quasi-experimental design).	25 children between 5-6 years old (3°ECE).	To design and to apply a play based education program to stimulate language development in ECE pupils with and without difficulties.	The program of play activities in ECE develops the specific contents of rhythmic education (fluency of speech) and auditory perception.	In accordance with the theory of Bruner, the investigation was guided using play to stimulate language growth and development.
Han, H. I. (2015). An Analysis of the Effect on Musical Education for Preschoolers through the Method of Story-Telling. <i>The Journal of Learner-Centered Curriculum and Instruction</i> . Web of Science.	Korea (Asia).	E (Quantitative, quasi-experimental design).	EG and CG in the three levels of ECE (1°/2°/3° ECE).	To analyze the effect of music in ECE through narrative story-telling methods.	The contents are educational digitalization (use of digital resources in education), cello technique and interpretation and the ability to read musical notation.	The study is guided by the theory of Gordon in the sense that music must be lived through profound early understanding and experimentation. The author calls this process <i>audiation</i> .
Huat, B. & Ibbotson, L. (2018). A feasibility study of the impact of the Kodály-inspired music programme on the developmental outcomes of four-to-five year olds in England. <i>International Journal of Educational Research</i> . Science Direct.	Teesside (United Kingdom).	E (Quantitative, quasi-experimental design).	56 children between 4-5 years old (2° ECE), where 28 were the EG and the rest the CG. It was carried out randomly.	To investigate the impact of the Kodály approach on the developmental outcomes of ECE pupils at a school in the north-west of England.	Intonation of songs (vocal education and song) approached by working with four concepts: beat, rhythm, tone and structure.	The Kodály method of ME, based on its most important medium: song.
Lee, A. (2016). Implementing character education program through music and integrated activities in early childhood settings in Taiwan. <i>International Society for Music Education (ISME)</i> . ERIC.	Chungwa (Taiwan, Asia).	E (Qualitative design).	5 teachers and 92 boys and girls in 3° ECE.	To explore the perspectives of ECE teachers towards efficacy in using musical activities to improve attention, respect, value, honesty, responsibility and cooperation among pre-school pupils within a Taiwanese pre-school setting.	The character education program promotes values such as "courage" using different popular songs.	<ul style="list-style-type: none"> ▪ The Orff method of ME. Orff instruments are used to work on the rhythm of songs through language at the same time as approaching a sense of responsibility towards working with other learning tools.
Ruiz, M. E. & Lara, F. (2015). Rhythmic work through music: a tool for the rehabilitation of children with functional dyslalia. <i>Revista de Didácticas Específicas</i> . Dialnet.	Burgos (Spain).	E (Quantitative, experimental design).	16 pupils between ages 4-6 years (2°/3° ECE) distributed in 2 EG and 2 CG.	To apply a music program designed for ECE pupils with functional dyslalia, as an indirect intervention.	Rhythmic sequences of songs together with its prosodic work to connect rhythmic and speaking skills beyond of a verbal context.	The study conceives of music as a medium. It is governed by the principles of music therapy linked to the phonetic model with two strategies: <ul style="list-style-type: none"> ▪ Correct production of the phoneme. ▪ Metric rhythm with the cycle of beats and stresses.

Note. T = Theoretical; E = Empirical; EG = Experimental group; CG = Control group; ECE = Early Childhood Education; ME = Musical Education; PE = Primary Education. Source: authors' own work.

4.2. In-depth description of the results of the review

This review focused on the study of relevant and contemporary research on musical programs based on neuroscience, aimed to favor inclusion at ECE centers in Spain and abroad. Over half of the studies from the sample ($n = 7$) approached dynamic educational practices through the use of song (vocal education and song) and training in rhythm through percussion and movement. This is because singing is one of the first musical experiences that children assimilate (Brown & Sax, 2013; Barry & Durham, 2017; Chao et al., 2015; Durán et al., 2014; Huat & Ibbotson, 2018; Lee, 2016; Ruiz & Lara, 2015). However, there was a significant fall in the sample population that covered the distinction between hearing and listening, done through sound games in which auditory perceptions were developed ($n = 2$) (Durán et al., 2014; Han, 2015). Judging from this information, the studies are concentrated in blocks of Musical Expression referring to training in rhythm, vocal education and singing.

As complementary information, the difference between empirical papers and the only theoretical article included should be pointed out (Cerebello & Sandoval, 2020). The latter refers to the impact of Musical Expression on the development of executive, cognitive and emotional functions through the discipline of neuroscience. Nevertheless, the study centered on a systematic review of the analysis of musical education in curricular programs in Early Childhood Education in Chile. This justifies why there have been no studies to date, in which the impact of integrating music in ECE programs based on the premises of neuroscience has been examined.

In addition, all the studies are coherent and have a theoretical framework. Nevertheless, it has been detected that there are few studies ($n = 2$) with respect to the paradigmatic vector adopted and detailed in Table 1 that explicitly define the Musical Expression method on which their educational programs were based (Chao et al., 2015; Huat & Ibbotson, 2018). This may be due to the conception of music as a means and not as an end in itself, as is stressed in the study by Ruiz and Lara (2015). This premise can indicate why none of the studies from the sample adhere to a view that specifically covers a state of the question conceptualizing Musical Expression within the framework of ECE. In parallel, some works analyzed the role of music as a transcendent pedagogical strategy to satisfy both educational needs, fundamentally within the field of linguistic competence (Akimova, 2019; Durán et al., 2014; Lee, 2016; Ruiz & Lara, 2015), and social needs in terms of inclusion (Brown & Sax, 2013). In turn, there are the other studies in which the use of music was investigated within the ECE curricular planning stage (Bautista et al., 2018; Barry & Durham, 2017; Burak, 2019; Cerebello & Sandoval, 2020; Chao et al., 2015; Han, 2015; Huat & Ibbotson, 2018).

Regarding the evolution of scientific production in accordance with the year of publication, irregular national and international collaboration has been observed. Over the past twenty years (2010-2020) there was some stagnation between 2010-2012, in the scientific production of Musical Expression programs in ECE. Thus, with the exception of 2015 ($n = 3$) (Chao et al., 2015; Han, 2015; Ruiz & Lara, 2015), 2018 ($n = 2$) (Bautista et al., 2018; Huat & Ibbotson, 2018), and 2019 ($n = 2$) (Akimova, 2019; Burak, 2019), there was only one single study on the topic in each of the other years: 2013, 2014, 2016, 2017 and 2020 (Barry & Durham, 2017; Brown & Sax, 2013; Cerebello & Sandoval, 2020; Durán et al., 2014; Lee, 2016). Greater scientific production was therefore found in the years 2015, 2018 and 2019. In relation with the objective defined in the studies, one characteristic that defines the surge in these programs is the conception of music as a means to improve the specific difficulties of curricular subjects subject to evaluation. This aspect might determine the direct influence on their publication.

Another important aspect to note is that one third of the studies included in the review ($n = 3$) (Akimova, 2019; Barry & Durham, 2017; Han, 2015) do not specify precisely the methodological research design by which they are governed and that this must be intuited by the reader from the description of the instruments used or other methodological details. Therefore, and following the guidelines of PRISMA Statement, this is biased.

Finally, in accordance with the programs that were implemented and evaluated in the scientific articles being reviewed, it was noted that some ($n = 5$) design, apply and evaluate the programs through indirect interventions. In other words, they use music as a means to achieve the objectives proposed in the classroom activities that have been programmed (Brown & Sax, 2013; Chao et al., 2015; Durán et al., 2014; Lee, 2016; Ruiz & Lara, 2015). This strategy explains the absence of any mention of curricular elements in those programs. However, reference is made in two studies of the sample to the pedagogic principles that guide them, rather than to curricular elements (Bautista et al., 2018; Huat & Ibbotson, 2018). In other words, in accordance with article 19 of Organic Law 3/2020, the aim is to guarantee inclusive education through child-centered education. In particular, Bautista et al. (2018) affirmed that his program followed the directives of the Ministry of Singapore (Asia) entitled *Nurturing Early Learners (NEL)*, which is based on the principles that the child is the protagonist of the learning process.

5. Discussion and conclusions

The aim of this study was to identify characteristics, select and evaluate information in the literature through the systematic review of scientific evidence about national and international music education programs aimed at the second cycle of ECE. With respect to the first of the specific objectives, the national and international research papers that have over the past ten years (2010-2020) approached the application and evaluation of music programs in the second cycle of ECE have been detected. The results of the systematic review report a scarce number of studies

that cover music programs directed at ECE. This observation implies a drawback for this study, due to the limited information that was obtained.

Hardly any studies on music programs over the past decade, have been related to the ECE stage. In this sense, it is understandable that the application of strategies that activate the emotions, as with Musical Expression, was inviable, since an education that was not driven by economic factors was not guaranteed until Organic Law 10/2002. A situation that invites the logical explanation that a long time was necessary, for the initiated construct to bear its fruits within that stage. Nevertheless, the results of the studies under review, at a temporal level, show a preference for education items that is far from mere chance. It tends to be thought that the appearance of new studies on musical programs that continue to justify the transcendence of this discipline in ECE is not foreseeable, demonstrating the need for investigation within this field (Barrett et al., 2021; Inangil et al., 2020; Raglio et al., 2020).

In relation to the second of the specific objectives, both the characteristics and the evolution of the scientific production of these programs have been analyzed with reference to the year of publication and the geographic setting. It is remarkable that despite the scarce scientific production over the past ten years, practically all the studies were developed in Europe and published in European journals. A geographical focus that underlines the need to propose studies directed at the specificity of Musical Expression, given that this lack of investigation complicates the independent development of this discipline. This problem therefore transcends the scientific community and moves into the educational community, which is an indication of the great amount of work that remains, to achieve the desired benefits of inclusion (Paz, 2020; Reyes et al., 2020).

In accordance with the third specific objective, the necessary curricular elements of a music education program have not been detailed in relation to the programs that have been implemented and evaluated in the articles under review, because most studies conceive of music as a means of achieving what has previously been planned in the program of classroom activities. Despite there being two studies that referred to the curriculum (Bautista et al., 2018; Huat & Ibbotson, 2018), these were centered on pedagogical principles and not on curricular elements. As has been seen, most of the studies adhered to a theoretical framework that justified the interdisciplinarity of music with mainstream subjects such as languages and mathematics. Faced with this scenario, music is not actually considered as a pedagogical strategy that must have a relation to curricular elements. This controversy gives rise to a perspective towards integral and inclusive education.

These premises lead us to conclude that Musical Expression has involved a change of scope in the way education is understood and should entail an unavoidable interdisciplinary methodological change (Ruiz, 2016). In effect, despite its innumerable benefits, there is little conjecture in the scientific literature on music programs, as a construct (Ruiz & Lara, 2015). The aim is not to destroy the hopes of the scientific community through this reflection, but to raise awareness about real situations. Apart from doing some research on education issues. The actual situation of the use of musical programs in ECE has been clarified through this study, furthermore contributing to a deeper perspective through a theoretical foundation endowed with rigor and systematicity. One limitation for a future line of research is the enlargement of the study through Meta-Analysis, which allows us to obtain the effect size of a study (Durlak & Lipsey, 1991; Ledesma et al., 2008). The small number of studies in this research as well as the presence of methodological bias in three of them could influence the results of the Meta-Analysis since publication bias is one on the strengths of this type of research.

6. Bibliographic References

- Akimova, A. R. (2019). Individual-Topological Features of Development of Musical, Artistic and Intellectual Abilities among Pre-School Age Children. *Problemy Muzykalnoi Nauki-Music Scholarship*, 3, 139-149. <https://doi.org/10.17674/1997-0854.2019.3.139-149>
- Aversì, T. A., Tamaishi, B. H., Fátima De, M. P. & Aversì, R. A. (2019). Neuropsychology of the temporal lobe: Luria's and contemporary conceptions. *Dementia e Neuropsicología*, 13(3), 251-258. <https://doi.org/10.1590/1980-57642018dn13-030001>
- Barrett, J., Schachter, R., Gilbert, D. & Fuerst, M. (2021). Best Practices for Preschool Music Education: Supporting Music-Making Throughout the Day. *Early Childhood Education Journal*. <https://doi.org/10.1007/s10643-021-01155-8>
- Barry, N. & Durham, S. (2017). Music in the Early Childhood Curriculum: Qualitative Analysis of Pre-Service Teachers' Reflective Writing. *International Journal of Education & the Arts*, 18(16). <http://www.ijea.org/v18n16/>
- Bautista, A., Moreno, A., Bull, R., Amsah, F. & Koh, S. (2018). Arts-related pedagogies in preschool education: An Asian perspective. *Early Childhood Research Quarterly*, 45, 277-288. <https://doi.org/10.1016/j.ecresq.2017.12.005>
- Brown, E. & Sax, K. (2013). Arts enrichment and preschool emotions for low-income children at risk. *Early Childhood Research Quarterly*, 28(2), 337-346. <https://doi.org/10.1016/j.ecresq.2012.08.002>
- Burak, S. (2019). Self-Efficacy of Pre-School and Primary School Pre-Service Teachers in Musical Ability and Music Teaching. *International Journal of Music Education*, 37(2). <https://doi.org/10.1177/0255761419833083>
- Cerebello, E. & Sandoval, E. (2020). Análisis de formación musical en programas curriculares de Educación Parvularia Chilena. *Boletín Redipe*, 9(4), 122-136.
- Chao, R., Mato, D. & López, A. M. (2015). ¿Se trabajan de forma interdisciplinaria música y matemáticas en Educación Infantil? *Educação e Pesquisa*, 41(4), 1009-1022.
- Coombes, E. (2020). Betwixt and between: considering liminality and rites of passage in the context of music therapy in a specialist further education college. *Arts in Psychotherapy*, 67. <https://doi.org/10.1016/j.aip.2019.101610>

- Decreto por el que se establece el currículo del segundo ciclo de la Educación Infantil en la Comunidad de Castilla y León (Decreto 122/2007, de 27 de diciembre). *Boletín Oficial de Castilla y León*, núm. 1, 2008, 2 de enero. <https://bocyl.jcyl.es/>
- Durán, M., López, A., Fernández, J. C., García, M. & García, S. (2014). Estudio piloto sobre la implementación de un programa lúdico en el contexto escolar para la estimulación del lenguaje. *Revista de Logopedia, Foniatria y Audiología*, 34(4), 171-179. <https://doi.org/10.1016/j.rlfa.2014.03.002>
- Durlak, J. A. & Lipsey, M. W. (1991). A practitioner's guide to meta-analysis. *American Journal of Community Psychology*, 19(3), 291-332. <https://doi.org/10.1007/BF00938026>
- Flerloos, I., Tan, S., Williams, G., Alhambra, T., Koppelaar, E., Bilajac, L., Verma, A., Markaki, A., Mattace, F., Vasiljev, V., Franse, C. & Raat, H. (2021). Socio-demographic characteristics associated with emotional and social loneliness among older adults. *BMC Geriatrics*, 21(1). <https://doi.org/10.1186/s12877-021-02058-4>
- Friston, K. J., Lin, M., Frith, C. D., Pezzulo, G., Hobson, J. A. & Ondobaka, S. (2017). Active inference, curiosity and insight. *Neural Computation*, 29(10), 2633-2683. https://doi.org/10.1162/neco_a_0099
- Grant, M. J. & Booth, A. (2009). A typology of reviews: an analysis of 14 review types and associated methodologies. *Information and Libraries Journal*, 26, 91-108. <https://doi.org/10.1111/j.1471-1842.2009.00848.x>
- González, J. (2014). *Arte y Cognición*. Fontamara.
- Han, H. I. (2015). An Analysis of the Effect on Musical Education for Preschoolers through the Method of Story-Telling. *The Journal of Learner-Centered Curriculum and Instruction*, 15(4), 709-724.
- Huat, B. & Ibbotson, L. (2018). A feasibility study of the impact of the Kodály-inspired music programme on the developmental outcomes of four to five year olds in England. *International Journal of Educational Research*, 89, 10-21. <https://doi.org/10.1016/j.ijer.2018.03.002>
- Inangil, D., Irmak, P., Doğan, S. & Körpe, G. (2020). Effectiveness of Music Therapy and Emotional Freedom Technique on Test Anxiety in Turkish Nursing Students: A Randomised Controlled Trial. *European Journal of Integrative Medicine*, 33. <https://doi.org/10.1016/j.eujim.2019.101041>
- Juslin, P. N. & Timmers, R. (2012). Expression and communication of emotion in music performance. In P. N. Juslin & J. A. Sloboda (Eds.), *Handbook of music and emotion. Theory, research, applications* (453-489). Oxford University Press.
- Ledesma, R., Macbeth, G. & Cortada, N. (2008). Tamaño del efecto: revisión teórica y aplicaciones con el sistema estadístico ViSta. *Revista Latinoamericana de Psicología*, 40(3), 425-439.
- Lee, A. (2016). Implementing character education program through music and integrated activities in early childhood settings in Taiwan. *International Society for Music Education (ISME)*, 34(3), 340-351. <https://doi.org/10.1177/0255761414563195>
- Ley Orgánica de Calidad de la Educación (LOCE) (Ley Orgánica 10/2002, de 23 de diciembre). *Boletín Oficial del Estado*, núm. 307, 2002, 24 de diciembre. <https://www.boe.es/>
- Ley Orgánica de Educación (LOE) (Ley Orgánica 2/2006, 3 de mayo). *Boletín Oficial del Estado*, núm. 106, 2006, 4 de mayo. <https://www.boe.es/>
- Ley Orgánica por la que se modifica la Ley Orgánica 2/2006, de 3 de mayo de Educación (Ley Orgánica 3/2020, de 29 de diciembre). *Boletín Oficial del Estado*, núm. 106, 340, 30 de diciembre. <https://www.boe.es/>
- Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche P. C., Ioannidis, J. P. A., Clarke, M., Devereaux, P. J., Kleijnen, J. & Moher, D. (2009). The PRISMA Statement for Reporting Systematic Reviews and Meta-Analyses of Studies That Evaluate Health Care Interventions: Explanation and Elaboration. *PLoS Medicine*, 6(7), e1000100. <https://doi.org/10.1371/journal.pmed.1000100>
- López, L. M., Bernholc, A., Chen, M. & Tolley, E. E. (2016). School-based interventions for improving contraceptive use in adolescents (Review). *Cochrane Library*, 6, 1-62. c10.1002/14651858.CD012249
- Meissner, H. & Timmers, R. (2018). Teaching young musicians expressive performance: an experimental study. *Music Education Research*, 21(1), 20-39. <https://doi.org/10.1080/14613808.2018.1465031>
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G. & Grupo PRISMA (2014). Ítems de referencia para publicar Revisiones Sistemáticas y Metaanálisis: La Declaración PRISMA. *Revista Española de Nutrición Humana y Dietética*, 18(3), 172-181. <https://dx.doi.org/10.14306/renhyd.20.2.223>
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G. & Grupo PRISMA (2009a). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *BMJ*, 21(331): b2535). <http://dx.doi.org/10.1136/bmj.b2535>
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G. & Grupo PRISMA (2009b). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine* 6(7): e1000097). <https://doi.org/10.1371/journal.pmed.1000097>
- OCDE (2012). *Equity and Quality in Education: Supporting Disadvantaged Students and Schools*. OCDE.
- Page, M., Moher, D., Bossuyt, P., Boutron, I., Hoffmann T., Mulrow, C., Shamseer, L., Tetzlaff, J., Akl, E., Brennan, S., Chou, R., Glanville, J., Grimshaw, J., Hróbjartsson, A., Lalu, M., Li, T., Loder, E., Mayo, E., McDonald, S... McKenzie, J. E. (2021). PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews. *BMJ*, 372(160). <https://doi.org/10.1136/bmj.n160>
- Paz, E. (2020). Educational inclusion of students in situation of disability in higher education: a systematic review. *Teoría de la Educación*, 32(1), 123-146. <https://doi.org/10.14201/teri.20266>
- Peñalba, A. (2017). La defensa de la educación musical desde las neurociencias. *Revista Electrónica Complutense de Investigación en Educación Musical*, 14, 109-127. <http://dx.doi.org/10.5209/RECIEM.54814>
- PRISMA (2021). *PRISMA Flow Diagram*. <http://www.prisma-statement.org/>
- Raglio, A., Imbriani, M., Imbriani, C., Baiardi, P., Manzoni, S., Gianotti, M., Castelli, M., Vanneschi, L., Vico, F. & Manzoni, L. (2020). Machine learning techniques to predict the effectiveness of music therapy: a randomized controlled trial. *Computer Methods and Programs in Biomedicine*, 185. <https://doi.org/10.1016/j.cmpb.2019.105160>
- Reyes, P. A., Moreno, A. N., Amaya, A. & Avendaño, M. Y. (2020). Educación inclusiva: una revisión sistemática de investigaciones en estudiantes, docentes, familias e instituciones y sus implicaciones para la orientación educativa. *Revista Española de Orientación y Psicología*, 31(3), 86-108. <https://doi.org/10.5944/reop.vol.31.num.3.2020.29263>
- Ruiz, E. (2016). *Expresión Musical en Educación Infantil. Orientaciones didácticas*. CCS.

- Ruiz, M. E. & Lara, F. (2015). El trabajo rítmico realizado a través de la música: una herramienta para la rehabilitación de niños/as con dislalia funcional. *Revista de Didácticas Específicas*, 12, 76-97. <https://doi.org/10.15366/didacticas2015.12.004>.
- Sa, J., Lordier, L., Zollinger, B., Kunz, N., Bastiani, M., Gui, L., Adam, A., Borradori, C., Lazeyras, F. & Hüppi, P. S. (2020). Music enhances structural maturation of emotional processing neural pathways in very preterm infants. *Neuroimage*, 207(15). <https://doi.org/10.1016/j.neuroimage.2019.116391>
- Sánchez, J. C. (2020). La revisión sistemática de la literatura en investigación educativa: Posibilidades, riesgos y sostenibilidad. Blog Aula Magna 2.0. <https://cuedespyd.hypotheses.org/8753>
- Shamseer, L., Moher, D., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P. & Stewart, L (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. *Research Methods & Reporting*, 1-25. <https://doi.org/10.1080/10.1136/bmj.g7647>.
- Sousa, D. (2011). Mind, brain and education: the impact of educational neuroscience on the science of teaching. *Learning Landscapes*, 5(1), 125-138. <https://doi.org/10.36510/learnland.v5i1.529>
- Urrútia, G. & Bonfill, X. (2010). Declaración PRISMA: una propuesta para mejorar la publicación de revisiones sistemáticas y metaanálisis. *Medicina Clínica*, 135(11), 507-511. <https://doi.org/10.1016/j.medcli.2010.01.015>
- Wang, Y. (2021). Exploring the effects of using various designs of game-based materials on music learning. *Interactive Learning Environments*. <https://doi.org/10.1080/10494820.2021.1894182>