Exploring Perspectives, Uses, Implications and Needs of the Educational Digital Portfolio in the Arts: A Systematic Review of the Scientific Literature

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Abstract

In recent years, the emergence of digital technology and the creation of new opportunities and contexts have given rise to significant changes in the teaching and learning strategies and evaluation processes used in artistic disciplines, including use of the digital portfolio. This work consisted of a systematic analysis of the literature produced on this subject thus far in *JCR*, *SCOPUS*, and *ERIC* to detect practices, limitations, and opportunities. Following the analysis of the selected sample, which consisted of 32 articles, three main categories were established: development of artistic competences, teacher training and employability. The main findings related to the benefits of the digital portfolio for the development of competences, artistic identity and digital literacy through reflective practices. The study concluded that more experimental studies are needed to explore the digital portfolio and the design of more flexible and sustainable platforms, and demonstrated that there is a clear need for curricular changes to bring about improvements.

Keywords

digital portfolio, evaluation, development of competences, digital competence, reflective practices, artistic disciplines

The teaching and learning process is linked to the evolution of the society in which this educative process occurs. In the field of educational technology, the transition from the teaching portfolio to a digital version is gaining more and more strength in a wide range of disciplines.

In this regard, Kunnari and LaUrikainenen (2017) defined the digital portfolio (also known as an electronic portfolio or e-portfolio) as a working and learning space that allows students to collect, create, share, collaborate and reflect on their own learning. In addition, it allows feedback to be provided through evaluations. These virtual, open-plan spaces are designed and completed by students and allow for the participation of everyone involved in the teaching and learning process. In this open space, communities can be built through multimodality and hypertextuality (González & Montmamy, 2019). Thus, the use of the digital portfolio in educational settings is linked to the development of a series of generic competences such as planning and learning skills,

autonomous learning and personal initiative, creative capacity, reflective thinking, critical thinking, selection and organization of information, communication and digital competence (Rubio & Galvan, 2013). Moreover, they could help strengthen the competences inherent to the field in which the digital portfolio is being used.

In this regard, the digital portfolio has shown itself to be a powerful tool in early childhood education (Sherfinski et al., 2019), primary education (Aspden, 2017) secondary education (Soria Ortega & Carrió Llach, 2016) and university education (Rodrigues &

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Table 1. Relationship Between the Variables and Research Questions.

Extrinsic variables: source and year of publication	Who were the authors of these works, and in which publications and year were they published?
Substantive variables: participants and context	What educational areas and stages have been addressed in research on the use of digital portfolios in art?
	What artistic disciplines have used digital portfolios?
Thematic and methodological variables	What areas and objectives have been developed?
	What methods, design and instruments have been used?
	How have the portfolios been evaluated?

Rodríguez-Illera, 2014), as well as in continuous training for in-service teachers (Kloser et al., 2021). This is because the digital portfolio helps both current and future teachers self-regulate their learning by prompting them to set goals and encouraging them to achieve these goals through reflection on samples of evidence that show the process carried out (Pegrum & Oakley, 2017). In addition, the digital portfolio is a common resource in teacher training evaluation when it comes to promoting individual and group self-assessment processes (Ellerani & Mendoza, 2013).

Due to the multimodality that characterizes digital portfolios, in the field of artistic education its application is particularly interesting. This is because it is a discipline where image, text, video, sound, etc. meet very commonly. Therefore, the aim of this work was to explore the use of the digital portfolio in fields related to arts education. To achieve this, it could be beneficial to understand the procedures and criteria that have guided the actions of researchers right through the publication of the results obtained (Hernández-González et al., 2017). This understanding was gained through systematic reviews in which research was synthesized based on the analysis of primary studies. Therefore, the purpose of this work involved shedding light on the history of digital portfolio use. This is intended to determine current and future educational research trends and guidelines related to using digital portfolios in the artistic fields (Morales et al., 2017).

This article describes a systematic review of high-impact scientific literature produced up to the year 2020, with a particular focus on research on the use of the digital portfolio in arts education. The intention was to update and reaffirm our current knowledge on the subject, detect evolving trends in research on the subject and systematically describe and synthesize the evidence provided by the scientific literature on the subject (Siddaway et al., 2019). This approach consisted of answering questions to inform our understanding of the way in which digital portfolios affect student performance and efficiency, as well as determining the competences and achievements they seek to promote. Thus, the questions to be answered were:

Q1 What educational areas and stages have been addressed in research on the use of digital portfolios in art? Q2 What artistic disciplines have used digital portfolios? Q3 What methodologies have been used? Q4 How have the portfolios been evaluated? Q5 What have been the objectives of researchers in this field? Q6 What have been the main results of relevant studies on the use of digital portfolios in arts education?

## Methodology, Materials, and Methods

To answer the research questions, we carried out a search of the scientific literature on digital portfolios and arts education. Both the search and the selection of articles complied with the criteria set out below. The entire process, including the results of the reviews, was carried out in accordance with the guidelines of the protocol described in the Preferred Reporting Items for Systematic Reviews (PRISMA) (Hutton et al., 2016; Urrútia & Bonfill, 2010), and the methodological parameters established by Alexander (2020) were taken into account for the quality of the systematic reviews. A number of phases were established to systematize this study (Zawacki-Richter et al., 2020).

Phase I. Formulation of the research questions. To arrive at the final results, various research questions revolving around three groups of variables were formulated (see Table 1).

Phase II. Eligibility criteria and information sources. To compile the publications, the first step was to specify the descriptors to be used. To achieve this, a literary review was carried out of the scientific articles on the use of digital portfolio in arts education that had been cited most in the last 5 years. Thus, the combination of descriptors used was "digital portfolio" OR "electronic portfolio" OR "eportfolio" OR "e-portfolio" AND "art" OR "music." This process provided access to the articles that contained said descriptors in the title, abstract or keywords. Words such as "education" and "learning" were avoided since the preliminary review had revealed several instances in which these were not used. The search included works published up to 2020, so the aim was to compile all publications made and indexed in the

Table 2. Inclusion and Exclusion Criteria.

Inclusion criteria	Exclusion criteria
Research on the use of the digital portfolio in artistic fields	Works in which the main thrust is the digital portfolio and arts education is peripheral
Methodology: no restrictions	Works in which the main thrust is arts education, and the digital portfolio is peripheral
Artistic discipline: no restrictions	
Sample size and context: no restrictions	Research based on samples that were not collected in an educational setting or did not have an educational purpose
Educational level: all levels, in formal, non-formal and informal education	
Language, source type, access type: all	
Areas of knowledge: social sciences / education	Duplicates
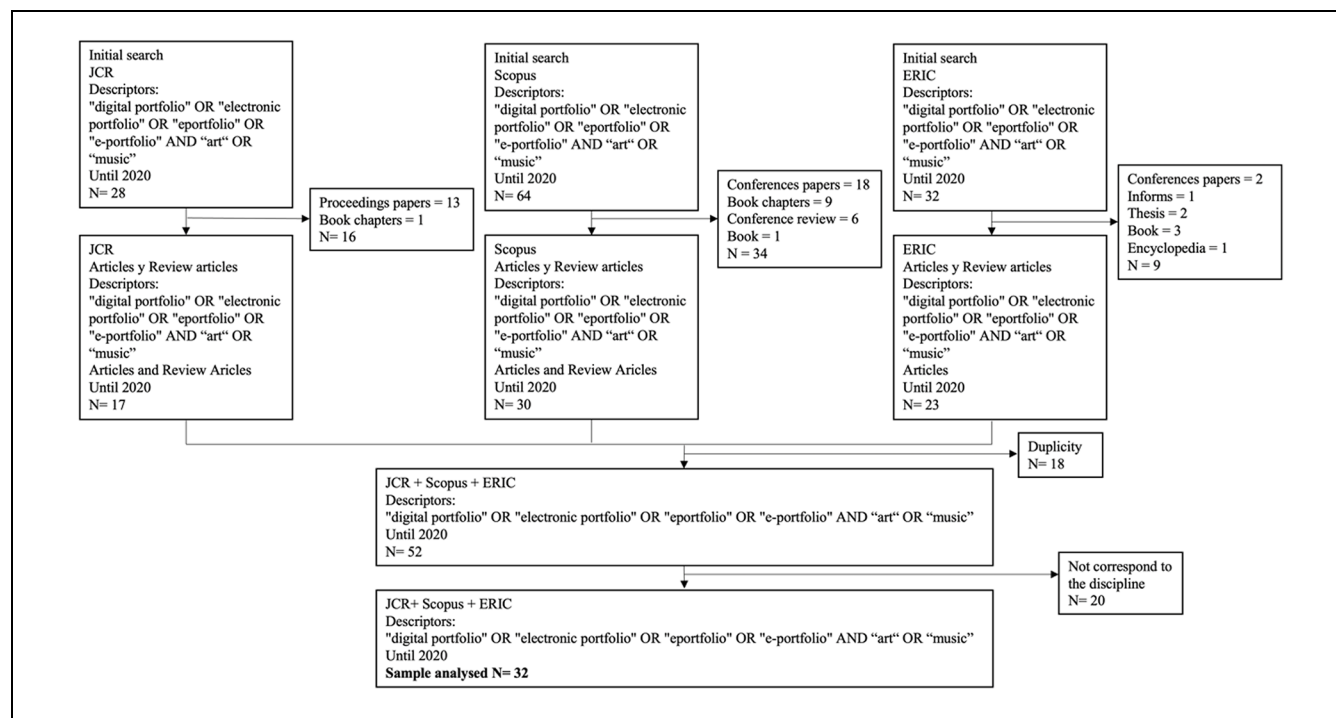
Figure 1. Flowchart showing the article selection process.

aforementioned databases up to the year before this research was carried out.

Phase III. Strategies for searching for and selecting studies. The search focused on three leading databases in the field of social sciences: *Journal Citation Reports* (*JCR*), *SCOPUS* and *Education Resources Information Center* (*ERIC*). All three take a multidisciplinary approach to the results, in addition to being considered excellent indicators of the quality of scientific literature. These databases were accessed through the web portal of the Spanish Foundation for Science and Technology (FECYT).

After the criteria established in Phase II had been applied, a total of 28 articles were found in *JCR*, 64 in *SCOPUS* and 32 in *ERIC*. Subsequently, an initial elimination process was carried out since the aim was to analyze articles or reviews on the proposed subject only. This resulted in a total of 17, 30 and 23 works, respectively. After the data had been crossing-checked to remove any duplicates, the sample was further reduced to a total of 52 eligible manuscripts. We analyzed all the articles to detect any works that did not relate to the subject of the research. We agreed on the inclusion and exclusion criteria shown in Table 2.

Thus, the final sample analyzed was made up of a total of 32 articles. The following Figure 1 shows a summary of the process.

Phase IV. Coding and synthesis. Once the final sample had been selected, we read the works exhaustively and analyzed all the articles. We did it to establish the main categories and to identify the following data: (1) the area

Table 3. Summary of Results.

	Category	Field	Educational/Professional stage	Art	Evaluation	Methodology
Bennett et al. (2016)	Artistic development	Formal	High	Music/ Writing	Included	Mixed
Berg and Lind (2003)		Formal	High	Music	Not included	Qualitative
Brook and Upitis (2015)		Formal	Not specificy	Music	Not included	Qualitative
Doren and Millington (2019)		Formal	High	Fashion	Not included	Qualitative
Driscoll (2007)		Formal	High	Visual	Not included	Qualitative
Fitzsimmons (2008)		formal	Teacher	Visual	Not included	Qualitative
Heydon et al. (2017)		Formal/non formal	Inter-generational	Music	Not included	Qualitative
Hutcheson (2008)		Formal	Secondary	Visual	Included	Qualitative
Newhouse (2014)		Formal	High	Visual	Not included	Mixed
Noakes (2019)		Formal	High	Visual	Not included	Qualitative
Saarinen et al. (2017)		Formal	Primary	Craft	Not included	Mixed
Stephensen and Dillon (2013)		Formal	High	Music	Not included	Qualitative
Strycker (2020)		Formal	Primary/Secondary	Visual	Not included	Mixed
Upitis et al. (2012)		Formal	High	Music	Not included	Qualitative
Waters (2007)		Formal	Secondary	varias	Not included	Qualitative
Yeo and Rowley (2020)		Formal	High	Music	Not included	Qualitative
Bauer and Dunn (2003)	Teacher training	Formal	High	Music	Not included	Qualitative
Blom et al. (2014)		Formal	High	Music	Not included	Qualitative
Dikici (2009)		Formal	High	Visual	Included	Qualitative
Charréu and Oliveira (2015)		Formal	High	Visual	Not included	Qualitative
Gracia and Wenceslao (2018)		Formal	High	Music	Not included	Qualitative
Lind (2007)		Formal	High	Music	Included	Qualitative
Parkes et al. (2013)		Formal	High	Music	Included	Qualitative
Payne and Burrack (2017)		Formal	High	Music	Included	Mixed
Rawlings (2016)		Formal	High	Music	Not included	Qualitative
Rowley and Dunbar-Hall (2012)		Formal	High	Music	Not included	Qualitative
Taylor et al. (2012)		Formal	High	Music	Not included	Qualitative
Mohamad et al. (2015)	Employability	Formal	High	Visual	Not included	Quantitative
Munday et al. (2017)		Formal/non formal	High/Teacher	Visual	Included	Qualitative
Rourke and Snepvangers (2016)		Formal	High	Visual	Not included	Mixed
Rowley and Bennett (2016)		Formal	High	Different	Not included	Mixed
Thornton et al. (2011)		Formal	High	Music	Included	Quantitative

to which the study belonged; (2) educational field; (3) educational or professional level; (4) artistic discipline; (5) context and sample; (6) objectives; (7) methodology; (8) inclusion of assessment mechanisms; and (9) main results and implications. We use the qualitative analysis software ATLAS.ti, version 8.4.3 for the coding of the three areas.

Results

The Table 3 provides a summary of items 1, 2, 3, 4, and 8 and an initial overview of 7. The items 5, 6, and 9 are explained below.

As shown, all articles focused on formal environments and two also included non-formal environments.

In response to Q1, with respect to educational level, the majority (75.75%) focused on higher education, either universities or music schools. In response to Q2, regarding artistic disciplines, the majority focused on

music (51.5%) and visual education (33.3%). In 75.5% of cases, no reference was made to assessment tools. In response to Q3, most of the methodologies used (68.75%) were qualitative.

The analyzed of all the articles helped us to establish the main areas to which the scientific literature on the subject belonged (see Table 4).

To answer Q4, Q5, and Q6, all results are described below according to the categories mentioned in Table 4.

Development of Artistic Competences

When discussing the development of artistic competence, a study by Newhouse (2014) is particularly enlightening. One of the author's goals was to compare classic and digital portfolios and their relationship with the assessment process. This was achieved through a sample of 75 Australian students and teachers of visual arts and

Table 4. Main Areas.

Areas	Description	No. of selected works
Development of artistic competences	Works based on the use of the digital portfolio and how it can help develop artistic competences. These also describe the development of other competences, the involvement of education centers and the various limitations.	16
Teacher training	Works that focus on the development of teaching competences. These also describe the development of other competences linked to teaching competence, suggestions for curricular changes and the various limitations.	11
Employability	Works that focus on how students use the digital portfolio to make the transition from studying to the workplace. They also describe the possible limitations.	5

design. To achieve this, he used a mixed method collection, and the author concluded that, while visual arts teachers and students were more reluctant to digitize portfolios, design teachers and students were in favor of doing so.

As a result of his research, Fitzsimmons (2008) proposed the use of the digital portfolio as an alternative way for infant and primary school students to view works of art. This study involved monitoring the various digital portfolios of 20 US-based infant and primary school art teachers over a 2-year period. This monitoring process was accompanied by visits and discussion groups among the teaching staff. The insights offered and the benefits observed for the students signaled the need for an overhaul of the entire curriculum. In the same way, Doren and Millington (2019) examined a different educational level but reached similar conclusions in their study, which aimed to promote reflective learning. To this end, they analyzed the implementation of digital portfolios at a New York design school for 2 consecutive years. According to the results, there was a dramatic shift in the way students learned, which led to a complete redesign of the school curriculum based on the digital portfolio as the cornerstone.

For primary school students, Saarinen et al. (2017) researched the experiences of students in Helsinki who were using digital portfolios in crafts education over a 3-year period. The study was based on interviews with 38 students and concluded that the digital portfolio was a viable method for promoting crafts education. The key functions they identified were information storage and management, communication, and verification of development. The main benefits were related to the activities documented in the digital portfolio, as it seemed to help stimulate memory and elicit recollection of concepts in a way that furthered the students' understanding of experiences.

In a study that focused on primary and secondary education, Strycker (2020) considered how teachers used technology to develop students' artistic competences. Some of his questions related to the use of digital portfolios. He interviewed 33 primary and 34 secondary school teachers in Ohio. His conclusions highlighted the importance of teachers' digital competence. In addition, he observed that digital portfolios were used by secondary school teachers more often and more effectively. Some teachers also expressed equity-related concerns when using digital portfolios to produce and teach art.

Also, Hutcheson (2008) explored digital competence in a secondary school setting to conduct a study based on the combination of digital narratives documented in digital portfolios used in the art classroom as a way of developing this competence. In his work, the author presented the results of the 2008 to 2009 Davis Digital Storytelling Challenge. In this regard, Driscoll (2007) analyzed the key factors underlying the popularity of digital portfolios. These factors included easy access, low cost, and the considerable impact they have on the teaching and learning process. She concluded that, in addition to serving as a tool to give teachers and students the opportunity to set goals and identify strengths, digital portfolios are an ideal resource to develop digital competence. In this way, Meanwhile, Heydon et al. (2017) integrated various digital resources into an intergenerational art class. The participants were 15 older people and nine preschool-age children based in the United States. Data were collected through ethnographic methods, and a qualitative thematic analysis with multimodal elements was conducted. The results reported that digital portfolios were useful for organizing all class information, which had initially appeared to be disparate. The researchers suggested that the integration of digital media enhanced literacy options by providing new tools for meaning-making and expanded identity options by highlighting achievements and promoting intergenerational relationships.

Focusing on a higher education setting, Upitis et al. (2012) described the use of the ePEARL portfolio among Canadian music students and how this evolved into iSCORE. To achieve this, they engaged in three phases over the course of 22 months: (1) a case study of how ePEARL was used by a teacher and a student; (2) use of

ePEARL by four teachers and 15 students for a period of 5 months; and (3) development of the iSCORE portfolio aimed at training for musicians. They concluded that the digital portfolio was closely linked to self-regulated learning. Waters (2007) also focused on a specific tool, the Weigand portfolio, and considered how this helped reform theater, music, dance, and fine arts courses at Hope High School in Providence. The study adopted a reflective approach and described three types of portfolios: (1) developmental, which provided a record of things that an individual had done over a period; (2) reflective, which included personal reflections on the content; and (3) representational, which showed an individual's achievements in relation to a particular work. He added that the three types could be blended.

In a study that focused on reflection skills, Bennett et al. (2016) investigated how the process of creating a digital portfolio can influence the development of artistic identity. To that end, they analyzed the work of 186 classical and contemporary music students and 34 creative writing students from a total of four Australian universities. The authors used a qualitative and quantitative approach and carried out the study over the course of 13 weeks (i.e., one semester). They observed how the different digital portfolios became free-flowing accounts of their learning. Their conclusions suggested a need to introduce portfolios at the beginning of the course, through an easy-to-use platform chosen by the students themselves. They also highlighted the need for this platform to allow different formats with a view to reflecting the students' creative diversity.

Along similar lines, Noakes (2019) explored the challenges encountered by visual arts students from less favorable social backgrounds. To achieve this, he used a sample of three students of color in South Africa. The study described how all students used different platforms to the ones that were recommended and, in addition, how they used pseudonyms to avoid being recognized.

Also, Berg and Lind (2003) explored reflective thinking in a project with 10 US undergraduate students who were studying an instrument and taking a music education methodology course. However, their study was based on a digital portfolio with a fully structured format and five specific categories: (1) curriculum vitae; (2) philosophy statement; (3) teaching competences; (4) national standards; and (5) reflections. The results of this reflective practice were very positive, and the authors proposed that this method be used to assess progress throughout the whole course, rather than during a single semester. In addition, the students believed that the structure was beneficial since it helped those with less advanced digital skills.

For their part, Stephensen and Dillon (2013) examined a digital portfolio designed by postgraduate music students in Queensland. In their conclusions, they suggested that web tools such as blogs and social networks could be used to give artists an opportunity to engage in dialog about their art with consumers. On the negative side, a disjuncture was identified between the open nature of the digital portfolio and the university's control policy.

Yeo and Rowley (2020) focused on the multimodal possibilities offered by the digital portfolio as a journal for 18 university students who prepared and performed an opera. To achieve this, they asked the following questions: (1) What do you hope to learn from the project experience? (2) What are your strengths and what can you offer others in the project? (3) What are your limitations and how can you develop more skills? (4) What are your learning objectives and outcomes? (5) What connections have you made from your formal study that you can apply in the project? (6) What are your own perceptions and ideas on how you changed or gained new insight into your profession? (7) Can you identify learning areas for future development? The analysis indicated a direct benefit for the professional training of students as creative artists.

Brook and Upitis (2015) described how the use of the digital portfolio could help music students in Canada enhance their artistic competences. Their thesis was based on the development of self-regulation and reflection. In addition, they concluded that the portfolio also helped improve the focus of teaching staff.

In conclusion to the development of artistic competencies section, the digital portfolio has been used mainly in formal education environments, both in primary education, secondary education, and higher education. The most common methodology has been qualitative. The studies have emphasized the need to develop digital competence related to art education and an overhaul of the entire curriculum to implement the digital portfolio. The development of skills such as creativity, reflection and understanding, and the ability to organize artistic material was also highlighted. However, some researchers expressed equity-related concerns when using digital portfolios to produce and teach art.

Teacher Training

In this way, Rowley and Dunbar-Hall (2012) described how the use of the digital portfolio had been implemented throughout a music teacher education program at an Australian university. On one hand, they reported that the implementation process required constant technological support. On the other hand, however, it improved the learning process and provided an additional level of assessment, since the work had to be well produced and include a variety of digital resources. As a result of this

quality and variety, the digital portfolio became an assessable component.

Rawlings (2016) carried out a systematic review on the use of the electronic portfolio in music teacher education programs in the United States between 2003 and 2013. The analysis was based on three types of portfolio: (1) learning portfolios; (2) credential portfolios (or portfolios based on the curriculum vitae); and (3) employment portfolios. In addition, the author reported a number of challenges during the preparation process: (a) technological frustration; (b) portfolio content; and (c) social interactions during portfolio construction.

In Australia, Taylor et al. (2012) analyzed how 81 students integrated digital portfolios into an initial music teacher training program. Through three focus groups and various interviews, the author designed different phases: (1) initial discussion on the possibilities of portfolios and their content; (2) evaluative comments from students as they worked on their portfolios; and (3) summative comments from students about their portfolio experiences. In all phases, the authors highlighted the need for technological competence due to the many possibilities offered by portfolios and their multimodal nature. In addition, they suggested that it was impossible to establish one portfolio model, since each student built it in their own way. In this line, Bauer and Dunn (2003) carried out a similar study with future music teachers at a university in Ohio. The students stressed the need for prior technological training to develop their digital portfolios more effectively.

In the case of Lind (2007), he drew similar conclusions through a series of interviews and focus groups with 24 music education students in which she observed that the students required greater flexibility in the design of portfolios to better develop their creativity. However, she reported that the use of digital portfolios required more interaction between teachers and students. She also pointed to the benefits of incorporating videos for documenting teaching competence.

For their part, Parkes et al. (2013) focused on the university setting and described how the digital portfolio had been devised, integrated, and maintained in different areas of teacher training in New York, including music. Through a description of the students' work, the authors suggested that metacognitive practices be favored to help students take ownership of their own learning and growth. This would help them develop their teaching skills through reflection. Along similar lines, Payne and Burrack (2017) sought to identify what parts of the portfolio used in a music teacher training program could predict teaching effectiveness in terms of planning and preparation, the classroom environment, instruction, and professional responsibilities. To achieve this, they obtained results from the portfolios of 65 students at a Kansas university during their placements. They concluded that student reflections (as part of the portfolio construction process) were the only significant predictor of future teaching effectiveness.

Blom et al. (2014) also focused on a university setting, but this time in relation to teaching staff, through four case studies with four teaching staff members at different music universities in Australia. After the development of reflection skills and the identification of benefits in relation to teamwork and peer and continuous assessment, as well as the formation of teacher identity, the results led to a thorough departmental overhaul and a change in the curricular design and e-learning policy at all four universities. In the same area, Charréu and Oliveira (2015) drew on their own experiences as university lecturers and reflections related to teacher training from a visual culture perspective at two universities in Portugal and Brazil. They analyzed the digital portfolio implementation process and concluded that it was without question a tool for the integration of various formats and that its most beneficial aspect was the fluid communication that took place between teachers and students.

For their part, Gracia and Wenceslao (2018) conducted a bibliographic review on four self-assessment strategies that presented a high metacognitive level, including the use of digital portfolios. This proposal was based on two perspectives: (1) as a self-regulation strategy to help students assume greater responsibility for their own learning by monitoring and assessing their own efforts through the collection of evidence that allowed them to reflect and gave them a more realistic insight into their achievements; and (2) as an instrument that helped teachers carry out a more comprehensive assessment of the students' progress. In this regard, Dikici (2009) sought to explore the assessment potential of the digital portfolio in artistic aspects of teacher training. To achieve this, 34 Turkish students prepared portfolios over the course of 4 weeks. They then assessed themselves and were assessed by their peers and teachers through an ad hoc rubric. The results revealed greater parity in self-assessment and peer assessment, although the author reported that the students placed more trust in teacher assessments. The study concluded that portfolios could enhance the traditional process, especially if it is done through self-assessment, peer assessment and teacher assessment.

As a conclusion to the section on teacher training, the digital portfolio is presented as an opportunity to interact in a digital environment among students and develop their multimodal skills, in addition to offering the possibility of incorporating videos to certify their teaching competence. In this sense, the importance of the portfolios also being a set of professional evidence was underlined. However, she reported that the use of digital

portfolios required more interaction between teachers and students. Once again, the need for the prior digital competition was stressed. On the other hand, the success of using digital portfolios caused some schools' curricula to change to favor their use.

Employability

About employability, a study by Mohamad et al. (2015) is key to understanding why the digital portfolio is not as widespread in arts education as in other fields. The authors detected an alarming shortage of empirical studies that demonstrate the art and design-related elements of this methodological tool. They used a questionnaire and semi-structured interviews with 23 Malaysian arts education experts in two different phases. The study concluded that digital portfolio makes students owners of their work, thereby allowing them to bridge the gap between university and the workplace.

For their part, Rowley and Bennett (2016) reached similar conclusions. They conducted a study with 335 students of different artistic disciplines at four Australian universities. Through interviews, questionnaires, and discussion groups, they concluded that the digital portfolio was regarded as a tool to ease the transition from the student to the professional world. Although in many cases benefits and problems in other areas of knowledge were identified, the study confirmed the multimodality offered by digital portfolios. The authors also observed that the students often used the portfolio as a repository. Once again, the study highlighted the problems arising from the use of technology and found that the most experienced and pro-technology teaching staff overcame this obstacle most easily.

A study by Thornton et al. (2011), which also highlighted the limitations related to digital competence, sought the opinions of students, teaching staff and music graduates at a university in Pennsylvania, as well as those of employers, on the use of the digital portfolio and its benefits for employability. Through various interviews, they reported general satisfaction, highlighted the importance of the final product and even called on students to buy certain digital cameras to improve their recordings.

In the case of Rourke and Snepvangers (2016), they explored the development of professional identity in students pursing a master's degree in art management and art education students. To that end, they conducted two parallel studies with 40 and 62 Australian artists. In both cases, they highlighted how the portfolio structure helped students make the transition from the classroom to the world of work and highly rated the potential of the digital portfolio for conducting assessments.

For their part, Munday et al. (2017) sought the opinions of participants at a seminar attended by different groups of students. One of the groups consisted of music teachers on an initial training program, who believed that the portfolio served as a tool for building an invaluable personal and professional profile with a view to entering the workplace.

As a conclusion to the section on employability, it has been observed that the digital portfolio is a bridge between the school and the working world, emphasizing multimodality.

As a summary of the three areas, we show the areas and the different categories and subcategories that have been found in the analysis of the literature (Figure 2).

Final Reflections, Conclusions, and Future Implications

The studies reviewed in this article have used several different perspectives and approaches to explore the use and implications of the digital portfolio in arts education. The earliest work was published in 1998 and the 32 studies were spread out over a number of years. There was a slight rise in the number of publications in 2016. Most of the target populations have been in formal education and higher education. The most widely used methodologies have been qualitative and based primarily on the use of interviews and focus groups, followed by narrative/descriptive and mixed methods.

After having reviewed the key content, categories and results of the scientific literature concerning the subject under study, this paper will now offer some final reflections to recap the main ideas expressed in the selected articles.

The most relevant findings of the review related to the conceptual network that has been constructed around the digital portfolio and the connection between the categories and subcategories. Two core themes have guided the concerns of the authors, as reflected in both the analysis of the codes and the results and focus of the studies: development of general competences, and digital competence in particular.

Our analysis of the works revealed the suitability of the digital portfolio for promoting information skills, critical skills, self-regulation of learning and reflection skills. Indeed, "reflection" as a construct was a common theme observed throughout the competences (in relation to both teachers and students) and the categories addressed in the articles. This concept featured prominently in the conceptual network constructed by the content of the works. The reflective nature of the digital portfolio was revealed as the tool's biggest strength, since it allows users to develop their artistic and professional identity, creativity, metacognition and self-regulation of the teaching and learning process. In this regard, the works reported excellent results in relation to structured
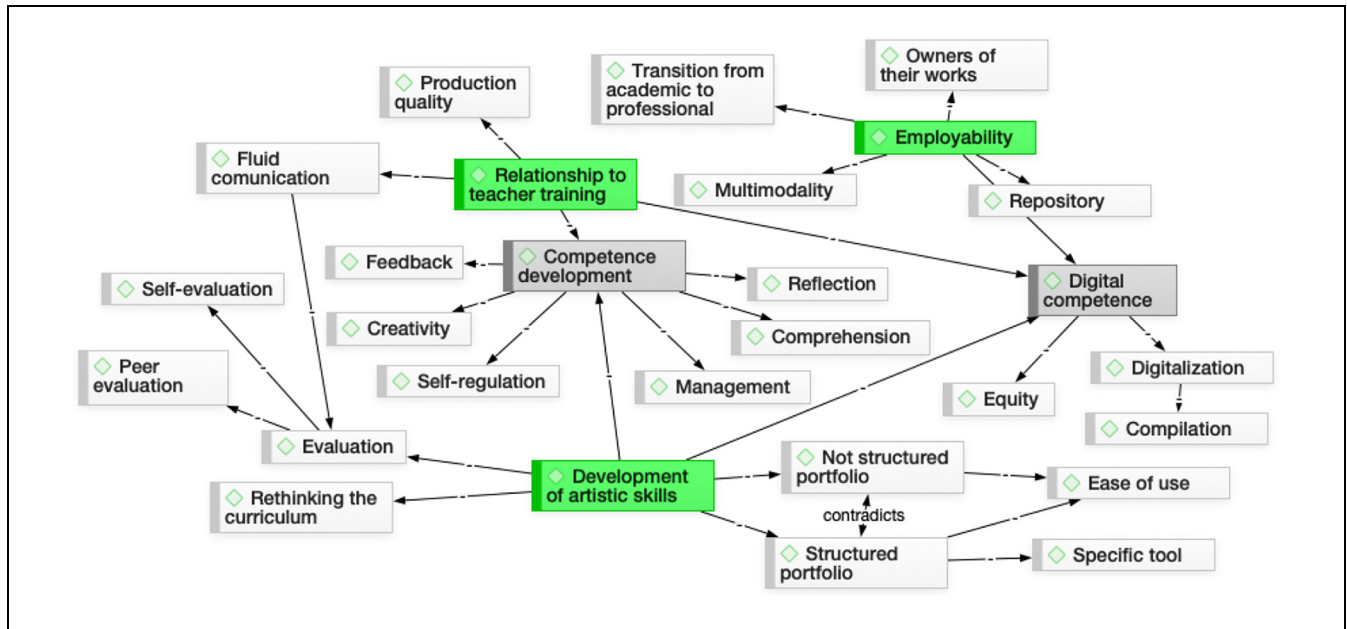
Figure 2. Relationship between the codes extracted from the qualitative analysis.

portfolios, reflective journals and experiences in which teacher-student interactions are enhanced to encourage this reflection process.

With respect to digital competence, the digital portfolio is generally considered as a catalyst for increasing users' digital literacy, rather than as a way to develop these skills. This is also related to the intrinsic multimodality of this tool and the potential for constructing digital narratives in an optimal framework. This multimodality is also very important when discussing artistic education, in which texts are intertwined with music, images, videos, etc.

Another key finding concerned the implications of the studies' results. Many works identified a need for varying degrees of curricular change, from a general rethinking of the entire curriculum and the educational policies that underpin it, to changes in the assessment model, preliminary technological training, and improvements in the design of assessment tools.

It is important to identify aspects that should be addressed in subsequent studies or in educational projects at all levels with a view to making inclusive decisions that can give rise to change. In this case, the gaps detected in the scientific literature speak for themselves: our study identified a severe shortage of experimental studies and very few rigorous assessments of practices. In addition, the literature has virtually ignored certain fields, including non-formal education, which is particularly important in the arts and music, and has also neglected educational levels such as primary and secondary school.

Certain issues appear frequently in the literature, but remain unexplored in practice, including the development of tools to detect the limitations and advantages of the different platforms; the optimization and design of platforms to ensure that digital portfolios achieve the desired sustainability and flexibility; and integration of social networks with digital folders and the best way to achieve this for greater immediacy and communication between teachers and students or between future professionals and their potential audience. Other obstacles to overcome are the resistance to move from physical to digital portfolios, the perception among teachers and institutions that they will lose control of the content of digital portfolios, and the lack of interaction between actors and recipients.

Despite all this, our study concluded that the digital portfolio presents fertile ground for applying educational technology to the arts and offers endless possibilities; however, despite the interest and longevity, it has not been sufficiently explored or optimized.

Declaration of Conflicting Interests

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