

The 'professional digital competence': Exploring the perspective of primary music teachers in Spain

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Abstract

The terms 'Digital competence' or 'Professional digital competence' are frequently used, yet their understanding remains varied and elusive. Moreover, existing research in education heavily focuses on the study of digital competence among students, with comparatively limited attention given to teachers. In this study, we aim to investigate primary music teachers' perspectives on 'professional digital competence' in Spain. This entails understanding their conceptualizations on (1) the term itself, (2) the cultivation of related skills and (3) its practical application with students. Additionally, we seek to compare primary music teachers' viewpoints with those of teachers from other subjects. Through a qualitative multi-case study involving purposeful sampling of 20 participants, the results suggest that our music teachers, regardless of their self-stated technological skills, possess a limited understanding of the 'professional digital competence' and express negative or pessimistic beliefs towards its development and implementation. Furthermore, they feel compelled to use educational technology despite their reservations. Our findings similarly indicate that their beliefs are not meaningfully different from those of non-music teachers in the same context. In discussing the implications, we suggest that these beliefs may lead to stress and anxiety among participants, necessitating support from educational administrators. Additionally, we propose that future research should further investigate both why and how our participants feel/are pressured to use technology, and the particular disadvantages of technology in music education identified in our analysis of their beliefs.

Keywords

Competence, digital, education, music, teachers

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Introduction

The concepts of ‘digital competence’ or ‘professional digital competence’ are frequently used but lack clear definitions (Ilomäki et al., 2016; Spante et al., 2018). Moreover, research and policy documents have primarily focused on students’ digital competence, leaving less attention to teachers’ abilities and perceptions regarding supporting students for active participation in a digital society (Skantz-Åberg et al., 2022). Prior research, however, establishes the significant relevance of teachers’ professional digital competence for both music and non-music teachers (Sanders & George, 2017). In this study, our purpose is to investigate primary music teachers’ perspectives on topics related to the concept of ‘professional digital competence’, including their understandings of the term and its development, as well as their beliefs regarding its practical implementation. In addition, we aim to compare their perspectives on these matters with those of non-music primary teachers in Spain. Accordingly, the present study is guided by the following research questions:

- Q1. What do primary music teachers understand by the concept ‘professional digital competence’?
- Q2. How do they experience the development of their own professional digital competence?
- Q3. What are their views on the practical application of their professional digital competence in teaching?
- Q4. How do their opinions on the above relate to those of their counterparts from other subjects?

In this study, our approach does not align with any particular theory concerning educational technology or professional digital competence. Instead, we adopt an open stance, giving space for the perspectives of our participants to naturally unfold. Similarly, we delve into comprehensive understandings and beliefs by considering these terms as interchangeable with conceptions, attitudes, perspectives, opinions, views, experiences and theories (Pajares, 1992).

The investigation into teacher perspectives and theories is justified by the inherent interconnectedness between their beliefs and the pedagogical approaches employed by educators (Maggioli & Parkinson, 2008). Our results may indeed inform policy and teacher education regarding educational technology since analysing the perspectives of professionals in the field can unveil areas for legislation and educational development. Moreover, focusing on the specific investigation of teachers’ theories in educational technology has been recognized as an area in urgent need of attention (Hew et al., 2019). In addition, the case of music teachers is underrepresented in the context of our research aims, and its investigation in a comparative manner represents a novel approach to the existing literature.

Framework

Regarding the conceptualization of teachers’ ‘professional digital competence’ in extant research, Skantz-Åberg et al. (2022) found in their review study that the term is ill-defined. These authors were successful in identifying seven concepts closely attached to its definition, however: (1) ‘technological competence’, in terms of teachers’ ‘basic skills in using digital tools’ (Johannessen et al., 2014, p. 303); (2) ‘content knowledge’, concerning teachers’ ability to relate the content of what is taught with technology; (3) ‘attitudes to the use of technology’, as a factor influencing the extent to which technology is used in teaching; (4) ‘pedagogical competence’, in terms of teachers’ ability to integrate technology into their teachings; (5) ‘cultural awareness’, regarding teachers’ appropriate use of technology in relation to the cultural context of their students; (6) ‘critical approach’,

concerning teachers being aware of the implications of using technology in teaching and being critical in their selection of technological resources and (7) ‘professional engagement’, which refers to teachers’ leadership in using technologies not only within their lessons but also in other professional contexts, such as performing administrative tasks.

Within a more general scope that does not specifically regard teachers, ‘digital competence’ has commonly been defined as comprising four aspects: ‘(1) technical competence, (2) the ability to use digital technologies in a meaningful way for working, studying, and in everyday life, (3) the ability to evaluate digital technologies critically, and (4) the motivation to participate and commit to the digital culture’ (Ilomäki et al., 2016, p. 655). Additionally, it is commonly used as a synonym for ‘digital literacy’, ‘new literacies’, ‘multiliteracy’ and ‘media literacy’ (Spante et al., 2018).

Several theoretical perspectives exist in extant research regarding the development of teachers’ digital competence. Regarding the context of this study, DigCompEdu (Digital Competence Framework for Educators) was developed by the European Commission to define the digital competencies that educators in Europe need to possess in order to effectively integrate digital technologies into teaching and learning processes. This framework advocates for six different competence areas: (1) ‘Professional commitment’ in using technology, (2) Ability to identify and create high-quality ‘digital resources’, (3) ‘Digital pedagogy’, regarding skills to successfully include technology in teaching, (4) Using technology for ‘Evaluation and feedback’, (5) ‘Empowering students’ by fostering collaboration and autonomy and (6) Being able to ‘Facilitate the [development of the digital] competence’ among their students (Redecker & Punie, 2017). In addition, the Spanish Ministry of Education, through the *Instituto Nacional de Tecnologías Educativas y Formación del Profesorado* (INTEF, 2017) expanded and adapted DigCompEdu to the specific reality in Spain (INTEF, 2017). In doing this, five main areas of professional teacher development in relation to their digital competence are identified: (1) ‘Information literacy’ (being able to retrieve, organize and store digital information), (2) abilities for ‘Communication and collaboration’ in digital environments, (3) skills for ‘digital content creation’, (4) knowledge on ‘security’ (including data protection and sustainable use of technology), and (5) ability for ‘problem solving’ with respect to technological issues (INTEF, 2017). Similarly, the current educational legislation in Spain (LOMLOE, 2020) includes the students’ digital competence as a transdisciplinary skill at school and emphasizes the teachers’ role in reducing gender gaps in technology. Moreover, this legislation promotes the inclusion of elective courses in compulsory education to develop students’ digital competence. The aforementioned theoretical perspectives on the development of teachers’ digital competence, when viewed comparatively, notably emphasize the importance of teachers acquiring skills for selecting and effectively utilizing technology in teaching. In contrast, Spanish national perspectives place a stronger emphasis on competencies related to data protection, digital security and the reduction of gender disparities (INTEF, 2017; LOMLOE, 2020).

In terms of the music education field, the gendered nature of technology in music lessons is suggested by the identification of a stereotype in analysing music teachers’ perspectives; one that assigns masculine qualities to its use and attributes higher interests and skills among boys (Armstrong, 2013; Finney & Burnard, 2010). In addition, music teachers typically show a positive attitude towards the use of technology in music education (Waddell & Williamon, 2019). In this vein, they report on its potential for linking students’ formal and informal music learning experiences (Quinn, 2010), to facilitate music learning experiences (Vries, 2013), foster music students’ motivation (Kim, 2013), deliver an inclusive music education (Wise et al., 2011), its usefulness for lesson preparation and administrative purposes (Eyles, 2018), its capacity for fostering a student-centred approach (Spieker, 2020) and student collaboration (Adkins, 2016), for enhancing musical creation and student agency (Powell, 2019), as well as its role within the field of special educational needs (King & Himonides, 2016). These positive views on the use of technology in teaching

are greatly shared by teachers of other subjects (Akram et al., 2022). Similarly, these do not seem to vary in relation to the specific context of primary teachers (Chomunorwa et al., 2022; Wijnen et al., 2022). Teacher beliefs on educational technology are, however, suggested to fluctuate in accordance with the Technological Acceptance Model (TA) (Davis, 1985). This model takes into account internal factors of individuals, including their motivation and self-efficacy in using technology, along with external factors such as how technology is perceived by others. In addition, these beliefs are also proposed to vary according to how teachers can blend technological knowledge with pedagogical and content knowledge (Mishra & Koehler, 2006).

On the other hand, the literature regarding technology identifies issues, challenges and even defies the traditional conceptions on its positive outcomes in education (Bulfin et al., 2015). The challenges and downsides on the use of music teachers' digital competence mainly regard the lack of access to technology and faulty hardware in schools (Powell, 2019; Waddell & Williamon, 2019), teachers' lack of time and opportunities to engage in professional development regarding technology (Eyles, 2018; Ruthmann & Dillon, 2012), lack of sufficient pre-service teacher education (Stevens, 2018), the high costs of purchasing technology (Vries, 2013), a disconnection between curriculum statements and teaching praxis (Crawford & Southcott, 2017) or Internet connection problems (Eyles, 2018). Furthermore, there are teachers who feel pressured to use technology, making educational technology a source of stress and anxiety (Fernández-Batanero et al., 2021).

With respect to research on teachers' beliefs regarding their professional digital competence in Spain, the studies in the international literature are comparatively scarcer than those contextualized in the Anglo-Saxon world. There is, however, evidence of limited knowledge and use of technology by music teachers in Spain (Álvarez-Núñez et al., 2021; Colás-Bravo & Hernández-Portero, 2023). On the contrary, existing research also suggests that teachers in Spain possess positive attitudes as well as good skills in utilizing new technologies; however, they may lack a thorough understanding on their educational purposes (Álvarez-Núñez et al., 2021). In addition, there is evidence on teachers' insufficient ethical education in using educational technology (Domingo-Coscolla et al., 2020). Furthermore, the use of technology is suggested to be extremely limited in one-to-one music tuition, with sound and sheet music editors being almost the sole technological tools employed in this context (García et al., 2021).

In summary, several theoretical frameworks have been presented; conceptualizations of the term are found to be equally varied. In addition, both teachers' and music teachers' views regarding the development and practical use of their digital competence include positive beliefs as well as challenges and issues; these seem to be reported in the literature from both similar and distant geographical contexts.

Methodology

This study is part of a comprehensive research project that seeks to explore attitudes, motivations and perspectives related to music in educational settings. Each study within the project has its own framework and set of research questions. The ethics committee at the University of Málaga has granted approval for the procedures employed in the present study. The study design adheres to the case study framework that employs both a descriptive and comparative multi-case study methodology (Yin, 2009). This methodology aims to examine the perspectives of music teachers and compare them with those of non-music teachers, as the two cases of interest. It encompasses the principle of comparison, suggesting that a deeper understanding of social phenomena can be achieved by examining them in relation to two or more distinctively contrasting cases (Bryman, 2012).

In this study, a total of 20 participants who served as primary school teachers in southern Spain were involved. Specifically, 10 participants were music teachers, while the remaining were teachers of other, varied subjects. To select the participants, we sent an invitation message to participate in research through teachers' social media groups. The participants who responded thereafter received by e-mail further information on the study, a consent to be signed electronically and a short questionnaire aimed at retrieving (a) sociodemographic information (age, working place, gender), (b) information on teaching subject and experience, and (c) how they rate their skills in regard to technology. For participant selection, we employed purposeful sampling to ensure a diverse range of subject profiles, thereby enriching our results by encompassing various populations (Yin, 2009). This approach allowed us to consider the inclusion of participants that varies according to the following variables, which are distributed across both groups (i.e., music and non-music teachers) in approximately the following percentages: urban/rural participants (60%/40%), age ($M = 39.25$, $SD = 8.64$), males/females (30%/70%), public/private schools (70%/30%), and self-perceived technological skill that includes low, medium and high levels in approximately equal quantity.

After selecting our participants, we requested that they engage in an unrestricted written expression by composing an essay sharing their emotions, experiences and reflections on the topic 'the meaning, use and development of the professional digital competence' in their profession. This approach was conceived as an alternative means to gather data, aiming to enhance the comprehensiveness of our findings (Bullough, 2014). Subsequently, the participants underwent individual interviews conducted either through video conference or in-person sessions. These semi-structured interviews consisted of a series of questions, including: 'How would you define the concept of professional digital competence of teachers, with your own words?', 'How may a music teacher develop it?', 'What skills does this competence demand, in your opinion?', 'How do you assess your own professional digital competence, and why?', 'How relevant is it for your profession, in your opinion?', 'In what ways do you typically apply this competence in your professional field?', 'What are your experiences in putting this competence into practice?', etc. Additionally, there were other questions specifically formulated to encourage interviewees to elaborate on or clarify their thoughts. The interviews were recorded and had an average duration of approximately 40 minutes each. Subsequently, the recordings were transcribed. To ensure anonymity, we assigned alphabetical letters to the participants and merged the obtained textual data. Thematic analysis was conducted using MAX-QDA, following the steps outlined by Braun and Clarke (2006): (1) Familiarization with the data, (2) Initial coding, (3) Identification of themes, (4) Reviewing themes, (5) Labelling themes through constant comparison and (6) Report writing. Throughout each stage, the authors engaged in discussions to reach a consensus, resulting in the development of codes and themes aligned with our research questions. Approximately 70% of the analysis was conducted before reaching saturation, a point where no new information or themes emerged from the data. To ensure a comprehensive analysis, however, all of the collected data was included in the analysis process.

Results

Our results are presented below in sections corresponding to each research question. Participants are represented by letters, with the first letter indicating the participant label and the second letter denoting whether they belong to the 'm'usic or 'n'on-music case. The number in brackets indicates the frequency of appearance of the accompanying code or theme. In addition, we include selected participant quotes that are particularly relevant in illustrating their perspectives, as they offer insights and evoke a vicarious experience for the reader (Sandelowski, 1994). An overview of the themes resulting from our analysis of the responses of the music teachers who participated in this research is represented in Figure 1.

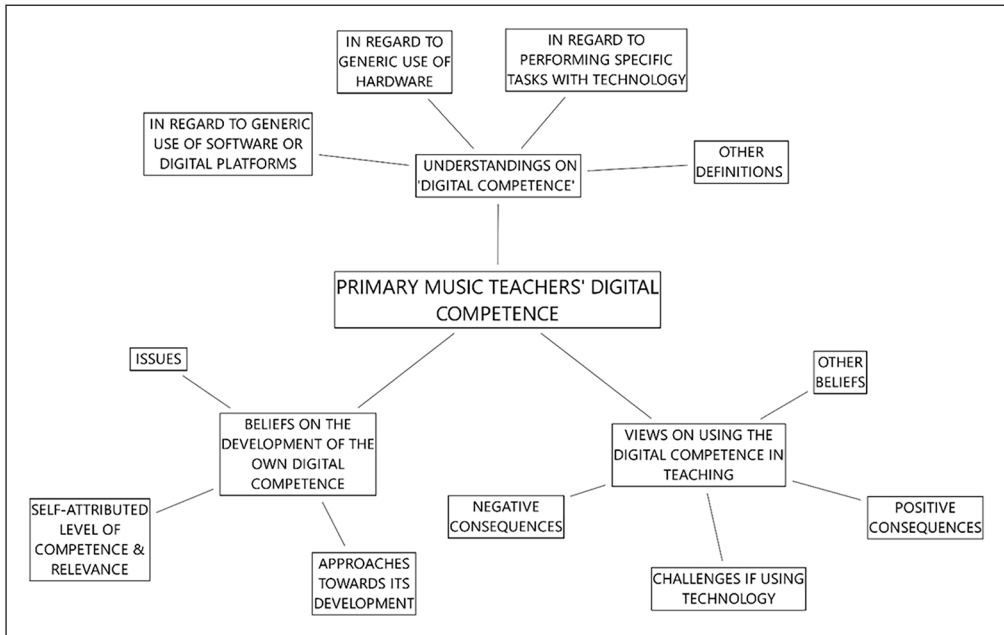


Figure 1. Themes derived from the analysis of our music teachers' perspectives on 'professional digital competence'.

Music teachers' understandings of the concept 'Professional Digital Competence' (Q1)

Four main themes emerged in the analysis of our music teachers' understandings of the concept 'digital competence'. These themes respectively regard an association of the concept to their generic skills in (a) using specific hardware, (b) using specific software or digital platforms; as well as their particular skills in (c) performing specific tasks with technology or d) other, varied definitions. In regard to the first, 'Using computers' (31) is the most frequent code, with expressions such as 'learning how to use computers' (Mm); followed by 'Tablets' (15), 'Digital blackboards' (8), 'Projectors' (4), 'Smartphones' (3), and 'Copiers' (2). In regard to the use of specific software or digital platforms, their responses were varied as represented in the word cloud map in Figure 2.

In regard to the theme 'Performing specific tasks with technology', the most frequent codes included 'Creating or participating in social networks' (6), with expressions such as 'in terms of social media, I use them moderately and productively' (Qm); followed by 'Watching, making and editing video' (3), 'Developing a school radio' (3), 'Building a chroma' (2) (i.e., a technique used in video production to replace the background of a scene with a different image or video), 'Music notation software' (2) and 'Sound recording' (2). Other, less identified codes included many different aspects, for example, 'Parents-teacher communication' (1), 'Writing blogs' (1) or 'Karaoke singing' (1). Finally, with respect to the music teachers' understandings of the 'Digital competence', we identified other, diverse beliefs comprised within the codes 'Using digital resources/media in your lessons' (3), 'To be updated on new technologies' (2), 'Using new technologies in supporting learning' (2), 'For preparing lessons' (1) and an 'Ever-changing definition' (1); with expressions such as

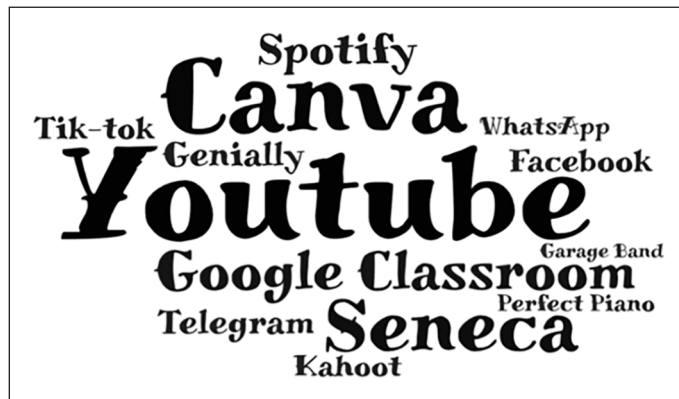


Figure 2. Word cloud map of the software and digital platforms mentioned by our music teachers. The more prominent or central a word appears, the more frequently it has been identified across participants.

Well, I suppose it [the professional digital competence] is about using, let's say, the digital tools and resources that we have today and implementing them in the [music] classroom. (Km)

To stay up-to-date with all the new technological developments and to be technologically current. It is also not necessary to have highly advanced knowledge. (Om)

Music teachers' beliefs on the development of their own Professional Digital Competence (Q2)

The main themes in relation to the analysis of our music teachers' views on the development of their own digital competence regard 'Issues' or problems (10), 'Self-attributed level of competence & relevance [for the profession]' (18) and 'Approaches towards its development' (11). In terms of the problems that they mention, these regard 'Not sufficient training' (2), 'Time and/or effort demanding' (2), 'Easier for younger teachers' (2), 'New technologies as substitute of textbooks' (1) and 'Impossible to become fully updated' (1), comprising in many cases negative attitudes, with expressions such as:

I do want to allocate a portion of my [professional] education time to [topics related to] my subject, and it appears that if you don't dedicate everything to digital tools, you may be considered out of touch with the current trends. (Nm)

Training [in relation to the teachers' digital competence] is important, especially for those who have been teaching for a longer time, but also for some colleagues who don't want so much novelty, so much technology. (Om)

The theme 'Self-attributed level of competence and relevance' consists of varied ranges of such, according to our analysis; for example, '[I have] Good/very good digital competence' (3) or '[Digital competence is] Important or very important' (8), 'Sufficient [digital competence]' (3), 'Insufficient or in need of development' (3) and 'Medium-level competence' (3). Similarly, the theme 'Approaches towards its development' reveals varied manners such as 'By taking CEP's [i.e., the educational administration in Spain] courses' (4); 'By trial-and-error' (3), 'By asking my children' (1), 'By teachers' social media groups' (1), 'By Internet tutorials' (1) and 'By asking

colleagues' (1); comprising expressions such as 'I learn by asking and browsing, thanks to my daughter who knows everything' (Lm).

Music teachers' views on putting into practice their Professional Digital Competence (Q3)

In relation to putting into practice their digital competences, our music teachers' expressions regard mainly issues, such as those comprised within the themes 'Negative consequences [of using technology]' (14) and 'Challenges [if using technology]' (35). The codes regard 'Adequacy of technological resources at school' (14), 'Lack of sufficient maintenance of technologies' (10), 'Demands much preparation/lesson time/effort' (5), 'Pressure to use new technologies' (5), 'Missuses of technology' (4), 'Excessiveness can be harmful' (3), 'Technologies do not always work as they should' (3), 'Teachers doing the work of IT-technicians' (2), 'Using new technologies hinders other skills' (1), 'Each school has different facilities' (1), 'Adequacy of spaces' (1), 'Colleagues unable to help with IT' (1) or 'Theft of school digital components' (1); for example:

I believe that [New Technologies in education] are meant to bring benefits; but I would like to think that, like everything in society, they should be viewed as a tool rather than something we are obliged to follow without question. (Sm)

Nowadays, with computers, kids are totally hooked on technology; in my opinion, way too much. When they come to school, we even encourage it because they can't seem to get off their screens, and all their social life revolves around them. I wonder, are these technologies really helping us at all? Or are they just forcing us into a digital world that makes us miss out on real life? (Nm)

We also identified, however, positive beliefs on using the professional digital competence, such as 'Make lessons more attractive' (7), 'Enhances students' motivation' (5), 'Using technology saves time' (2), 'Simplifies the learning process' (1), 'Empowering students' (1) and 'Make lesson contents more visible to the surrounding community' (1), with expressions such as:

It's not the same when you just come in and say, 'Alright, let's do a round of questions!', than putting up a digital Trivia on the board with different aspects of music. And when it comes to group projects, they [the students] go crazy for it [if using new technologies]. (Sm)

There are awesome tools [in regard to educational technology]; especially since we have a generation of kids who are very visual. It's a generation that has learned to handle things with their little finger on mobile phones and tablets, actually. (Pm)

In addition, we did not observe substantial differences in our analysis that could be attributed to our participants' genders, their self-assessed technological skills, urban/rural context or type of school.

Comparing the views of music and non-music teachers (Q4)

In comparing the views of our music and non-music teachers, we identified the same themes across both groups. However, non-music teachers do not mention the use of music-specific resources, such as 'Perfect piano' or 'Garage band'; whereas they mention the rest of resources as their counterparts. In addition, a few new codes in relation to negative attitudes towards the use of technologies in teaching emerged from the analysis of our non-music teachers' responses,

including ‘Ever changing administrative technologies in bureaucracy’ (3), ‘Technological demands continuously increasing’ (2), ‘Engenders social inequality’ (1) and ‘Reachable beyond working hours [thanks to technology]’ (1). Examples of the non-music teachers’ expressions within the aforementioned codes included:

I feel useless. Why? Because this year they [the educational administration] make you prepare certain things, fill out forms, learn a computer system, and all that. But the next year, they tell you it’s no longer valid, that you have to do something else. (. . .) Now you have to learn the new thing for this year, or else you’ll be left behind. In other words, there’s no consistent model here. Every year, there’s a different model, and digital competence becomes invalid in every aspect. It’s never valid because there’s no clear path. Each year brings something different. (Hn)

It seems that if you don’t incorporate a computer, projector, or some form of technology into your lessons, you’re not considered to be teaching effectively in today’s world. (In)

Discussion

In regard to our first research question, that is, ‘What do primary music teachers understand by the concept professional digital competence?’, our music teacher participants associate the term mainly with generic or specific skills in using hardware and software (including digital platforms and social networks), such as video and sound editing or the creation of and participation in social networks. As a result, our participants’ focus when thinking about digital competence seems to be overwhelmingly unbalanced towards the mere development of technological skills, thus overlooking specific aspects of the teaching profession in relation to it. Examples of the aforementioned regard neglecting aspects, such as the ability to select and adapt technology to social contexts and particular students (Johannesen et al., 2014), the development of a critical approach in selecting and using technology (Ilomäki et al., 2016) or just reflecting on the many pedagogical questions that may be associated with this term (Skantz-Åberg et al., 2022). Furthermore, their conceptions seem to overlook many of the skills that their closer curricular and legislation frameworks underscore regarding teachers’ digital competence. For instance, DigCompEdu emphasizes using technology for evaluation/feedback, empowering students and developing their autonomy (Redecker & Punie, 2017). Similarly, INTEF aims to foster collaboration and autonomy in using new technologies (INTEF, 2017).

With respect to our second research question, that is, ‘How do primary music teachers experience the development of their own professional digital competence?’, according to our analysis, those participating in this study mainly show negative attitudes and comment on issues, irrespective of their gender or self-perceived ability with technology. This finding situates our sample apart from typical teachers in other studies, as their beliefs do not seem to vary in terms of the proposed models and depending on factors such as their self-efficacy or enthusiasm regarding technology (Davis, 1985; Mishra & Koehler, 2006). Furthermore, their mainly unfavourable views concurrently depict a sample that diverges from typical research in the field; music teachers’ (Waddell & Williamon, 2019) and non-music teachers’ (Akram et al., 2022) beliefs and attitudes in extant research are commonly positive towards the development of technological skills that may be useful in their profession. Our music teachers are indeed concerned about their level of achievement regarding their professional digital competence (which seems quite varied in our sample, according to their self-evaluations), as well as on different approaches towards its development. Typical examples of issues that they express in relation to the development of their professional digital competence include not having sufficient training on educational technology, finding educational technologies too time- and effort-demanding, the impossibility of being fully updated or the

substitution of textbooks by new technologies. In contrast to the differential characteristics of our sample described above, these concerns are largely shared by other samples represented in the international literature and pertaining to geographically/culturally distant places (Eyles, 2018; Ruthmann & Dillon, 2012). Furthermore, their self-reported limited knowledge on and understanding of educational technology is coincident with the findings of extant research that similarly explores music teachers in Spain (Álvarez-Núñez et al., 2021; Colás-Bravo & Hernández-Portero, 2023).

With respect to our third research question, that is, 'What are primary music teachers' views on the practical application of their professional digital competence in teaching?', we predominantly identified issues, challenges or negative beliefs among the views of our music teacher participants; and, to a lesser extent, positive views. Their beliefs on this topic mainly regard problems in preparing lessons, pressure to use new technologies, ways in which an overuse of technology can be harmful for children, lack of adequate technologies and these receiving a poor maintenance. This result may align our participants' views with Selwyn's (2016) critical viewpoint on educational technology, highlighting the need for a more balanced perspective on educational technology; one that considers not only the positive but also the negative consequences of its use from the standpoint of educational praxis. Additionally, they express concerns about technologies not working as they should, teachers having to perform IT-technicians' tasks, or even theft of school digital components. On the contrary, their positive beliefs included how using educational technologies favourably impacts students' motivation and learning processes, saves time or helps in raising awareness of in-class activities among the surrounding community. Many of the aforementioned positive and negative beliefs are already represented in existing international research regarding geographically distant populations (Kim, 2013; Powell, 2019; Vries, 2013). However, the predominance of a pessimistic view on using educational technologies seems particular of our sample and align our participants' views with those represented in other studies in Spain (Colás-Bravo & Hernández-Portero, 2023; Domingo-Coscolla et al., 2020). Furthermore, there are beliefs that are not so common in the international literature, such as to be concerned about technology theft and feeling pressured to use new technologies despite their downsides. This last result strongly connects our study with the critical standpoint on educational technology, which emphasizes how research and educational administration may disregard the practicalities of educational technology by only taking into account its benefits (Bulfin et al., 2015). In our participants' words, 'It seems that if you don't incorporate a computer, projector, or some form of technology into your lessons, you're not considered to be teaching effectively in today's world'.

Finally, in regard to our fourth research question, that is, 'How do primary music teachers' opinions on the above relate to those of their counterparts from other subjects?', according to our analysis and in the case of our sample, the teaching subject does not appear to be a factor that significantly influences teachers' attitudes or beliefs on topics related to professional digital competence. This result is in agreement with our review of existing research regarding teachers of non-music subjects (Akram et al., 2022; Chomunorwa et al., 2022; Wijnen et al., 2022).

Conclusions

This study depicts a sample of music teachers that is quite uncommon in their beliefs and attitudes if compared to those represented in the international literature; albeit not as much if compared with studies pursued in geographically closer realities. Our music teachers' beliefs towards the development of their professional digital competence are mainly negative, reporting on issues such as the excessive time and effort required by these technologies, the impossibility of staying fully updated and the substitution of textbooks by new technologies. Similarly, our music teachers acknowledge several positive impacts of educational technology, yet they tend to hold predominantly pessimistic

views on its use, regardless of their self-reported technological skills. They feel indeed pressured to use technology despite their attributed downsides. However, as a limitation, the results of this study should be taken with caution, as, in line with the case study methodology (Yin, 2009), it is impossible to know to what extent they are contingent to the participants. Further studies employing quantitative and qualitative methodology may support or contradict our results and therefore contribute to this field of research in this particular context.

Implications

The lack of a thorough understanding on the professional digital competence that we found among our music teachers may lead to disregarding their potential benefits for students as well as possible areas for professional self-development. Furthermore, the predominantly negative beliefs that we found with respect to the development of music teachers' professional digital competence may be passed on to their students. To counteract these issues, we propose that the educational administration and school principals in Spain should listen and address music teachers' concerns and demands in relation to the development of their digital competence and to the use of educational technology. In addition, if music teachers continue to perceive themselves pressured to use educational technology despite the downsides and challenges that they attribute to it, feelings of anxiety and stress in regard to educational technology may be expected (Fernández-Batanero et al., 2021). Furthermore, the fact that we found many differential characteristics in our sample if compared with those that are present in typical, international studies in the field, warrants further studies that may continue to shed light on the particularities of the Spanish context in regard to teachers' professional digital. Finally, in light of our results, future research may focus on delving more deeply into the reasons why and how these teachers feel/are compelled to use technology and on the specific drawbacks of technology in music education that have arisen from our analysis of their beliefs.

Declaration of conflicting interests

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Ethical review

This study is derived from a research project which has undergone ethical review and has received approval from the University of Malaga (ref. 132-2021-H).

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