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Playing or learning? Playful learning in teacher's musical training

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Abstract. The various methods and strategies of playful learning (game, gamification, simulation, etc.) have become elements of methodological innovation increasingly used in university teaching. This article presents a study on a gamified musical education practice, carried out in a core subject of artistic education of the Degree in Primary Education, with a group of second-year students (n = 90) from a Spanish university. The application is carried out in groups of five students, over six weeks, and the final implementation of the project is carried out with primary school students from the Middle and the Upper Cycle (8 to 11). Following a mixed, qualitative and quantitative case study methodology, different aspects of the designed activities are coded and evaluated in order to be analysed: a) the interactions among participants, b) the curricular musical contents, and c) the gamification strategies used. The results reveal a high degree of involvement, collaboration and adaptation to the curricular musical content, moreover, they underline game strategies linked to classification, obtaining feedback and challenges.
Keywords: playful learning; music pedagogy; primary education; teacher training.

[es] ¿Jugar o aprender? El aprendizaje lúdico en la formación musical del maestro

Resumen. Los diversos modos y estrategias del aprendizaje lúdico (juego, gamificación, simulación, etc.) se han convertido en elementos de innovación metodológica de uso creciente en la docencia universitaria. En este artículo se presenta el estudio sobre una práctica de educación musical ludificada, llevada a cabo en una materia troncal de educación artística del Grado de Maestro en Educación Primaria, con un grupo de alumnos de segundo curso (n=90) de una universidad española. La práctica se realiza en grupos de cinco alumnos, a lo largo de seis semanas, y la aplicación final del proyecto se realiza con escolares de primaria de Ciclo Medio y Superior. Siguiendo una metodología de estudio de caso, con análisis de datos cualitativos y cuantitativos, se codifican y evalúan diferentes aspectos de las actividades diseñadas, con el fin de analizar: a) las interacciones entre participantes, b) los contenidos musicales curriculares, y c) las estrategias de ludificación empleadas. Los resultados revelan un alto grado de implicación y colaboración, adecuación a los contenidos musicales curriculares, y predilección por estrategias de juego ligadas a las clasificaciones, la obtención de *feedback* y los desafíos.
Palabras clave: aprendizaje lúdico; didáctica de la música; maestro de primaria; formación docente.

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1. Introduction

A priori, playing and learning do not need to be seen as oppositional or exclusive. Nevertheless, as we progress through school stages, a distance seems to emerge between them within the collective imaginary, to such an extent

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that the act of playing and the act of studying occupy different moments and different functions. Many authors and pedagogical movements have linked play with learning, particularly in the preschool context (Hassiger-Das et al., 2017; Zich, Ortega-Ruiz & Sibaja, 2016), and also in later educational stages, under the generic concept of playful or gamified learning (Garris, Ahlers & Driskell, 2002). This is explained in the *Horizon Report*: *2014 K-12* (Johnson, Adams Becker, Estrada & Freeman, 2014), which proposes the gradual incorporation of aspects associated with play in contexts not usually involving play, to promote student involvement. Systematic reviews of the concept, such as the generic study by Ortiz-Colón, Jordán and Agredal (2018), or studies explicitly related to gamification practices or the use of play in university teaching, in Lozada and Betancur (2017) and Prieto (2020), indicate a growing interest in this question.

The era of technology and the multimedia society of the 21st century have also contributed to the emergence of a new dimension of play (video-games, online games, etc.) in which children lose the freedom and space to develop their own initiative (Elkind, 2008). In a society which tends towards uniformity and globalisation, and from a perspective which is critical of such "advances", these changes provide sufficient evidence of the need to consider a redefinition of infancy and early childhood (Bautista & Guzmán, 2003; Tulloch & Randell-Moon, 2018).

For its inhabitants, a globalised and interconnected world means sharing trends, tastes, behaviours and values, enjoying the same achievements, and experiencing the same lacks or illnesses. Some authors have gone as far as to claim that we live in an essentially gameful world, in which we not only play the same games, but in which we consume and participate in an induced and self-serving confusion between reality and fiction (Deterding, 2014). In the area of playful learning, the educational world has developed diverse techniques and tendencies which are both hybrid and ambiguous.

The link between musical education and play has a long history. Among the many lines of research within music education, one particular focus is the analysis of data and results on the benefits of incorporating collaborative dynamics such as, for example, those related to group play. Collaboration and play are frequently linked to the fostering of creativity and to practices of co-creation that have proved to be effective in developing team-work competences, such as the identification of common objectives, commitment, communication, leadership, socialisation, and group identity (Carrión, 2019; Criss, 2010).

The main objective of this article is to explore the extent to which playful learning or game simulation strategies are effective in developing teaching competences in musical education. It does this within the context of the musical training provided as part of a university degree in Primary Education. A case study is used to identify the predominant training input and methodological characteristics found within a specific academic context.

2. Theoretical foundation.

2.1. Playful learning: play and gamification

In playful learning, learning takes place primarily because children (or adults) are active, involved, and interacting socially. The activity in itself attracts them and the theme worked on seduces them and captures their attention (Hirsh-Pasek et al., 2015). According to some authors, it is for this very reason that, conceptually speaking, rather than being oppositional, play and learning are complementary or equivalent terms (Hirsh-Pasek & Golinkoff, 2008). In fact, fields such as pedagogy and psychology support the use of play not only as a source of motivation and to foster predisposition towards learning, but also as a strong tool to boost intellectual, emotional and social development, with positive long-term effects on the individuals' learning capacities and overall development (Perdomo & Rojas, 2019; Singer, Golinkoff & Hirsh-Pasek, 2006).

In the first instance, when talking about playful learning it is important to distinguish between gamification processes and the use of play itself, in terms of the different types of free play, play guided by (or semi-guided) the teacher, and rule-based play. With the first two types of play, it is important that the students themselves regulate the different phases and manage their own levels of involvement in the activity, including their own rules, in such a way that the teacher only needs to intervene occasionally, thus avoiding controlling the dynamics of the activity (Weisberg, Hirsh-Pasek, Golinkoff, Kittredge & Klahr, 2016).

By contrast, rule-based play comes with its own specific rules. During the development of this kind of play, the teacher tends to explicitly control the activity, managing the rules of the game itself, while the participants share in this control when it is their turn, along with phases or moments involving improvisation or chance. Whichever modality is used, play has been used to integrate curricular content at different times and in very distinct educational contexts, fostering learning in a participative, interesting, meaningful and socially interactive environment (Hassinger-Das et al., 2017).

The term "gamification" was coined for the first time in 2002 by the British software programmer, Nick Pelling, creator of video-games such as *Arcadians* (1982) and *Frank!* (1984), and owner of an important consultancy firm (*Conundra*), specialised in the combination of electronics, IT and games. The term is also equivalent to "playful learning", generally understood as the conscious use of elements related to play in different contexts (Robson, Plangger, Kietzmann, McCarthy & Pitt, 2015).

Since the conception of the term, gamification has been consciously applied in fields as diverse as marketing, politics, medical science, online business and, of course, in education and professional training. The underlying strategy in gamification is to maximise positive elements, such as motivation, competition, socialisation, etc., which generally flourish the moment we create a specific situation within the parameters of a game (Lieberoth, 2015). In view of this, a list has been made of the strategies and mechanisms pertaining to play that function a priori to boost this kind of behaviour or associated responses. Among the most common resources found, it is worth highlighting aspects such as achievement levels, challenges and tests, reward systems, the use of avatars, relations involving competition, cooperation and collaboration between users, and the use of narrative (Borrás, 2015; Teixes, 2014).

Some of the main techniques used in playful learning processes are also recognised in English under the acronym PBL: *Points, Badges and Leaderboards*, to which motivational or competitive elements, such as levels, prizes, and challenges, can also be added. Finally, another category of elements also present in gamification strategies are rewards related to pleasure or aesthetics, which are hedonistic in nature and linked to psycho-sensorial experiences: sensations, fantasies, complicities, and the recognition of oneself and others, among others (Werbach & Hunter, 2014).

Unlike play, the experience of gaming in educational contexts involves transferring or adapting the mechanics of games (especially those of video-games) to teaching, in order to achieve improvements in the learning process and the results obtained, with or without the use of technological elements (Deterding, 2013; Deterding, Dixon, Khaled, & Nacke, 2011). The elements of (video)gaming used most in classroom adaptations include stages and visual progressions, competition and cooperation, with appeals to social commitment, freedom of choice, freedom to fail and feedback within short timeframes (see the adaptation of the *Escape Room* concept in García-Lázaro 2019). Narrative development is frequently added to these aspects, understood as a dimension which articulates and catalyses action (Contreras, 2017). In summary, the goal is to introduce content to students in a fun and motivating way and in an environment in which they become active agents: they are involved and having fun while achieving educational goals. We could therefore conclude that, in gamification, the teacher becomes a designer of playful activities aimed at promoting learning, while the student assumes the role of user-player (Ardila-Muñoz, 2019).

2.3. Play in musical education

Game-oriented approaches represent one of the most distinctive characteristics of the methodologies or methodological approaches (active, instrumental, creative…) that emerged in musical education in the 20th century (Hemsy de Gainza, 2004). For example, play is an important component of the pedagogical proposals advanced by the Hungarian pedagogue and composer Zoltán Kodály (1882-1967), whose development involves substituting academic music training for a new playful-social dimension of musical learning, without renouncing the precision and fluidity of vocal practice (Gualt, 2016). In this regard, Kodály's method has had wide application and acceptance in teacher training contexts (Lucato, 2001). Alongside this particular reference, we find a group of pedagogues who remain a point of reference today (Orff, Willems, Dalcroze, etc.) for aligning themselves with the first postulates of constructivism and its subsequent developments (Navarro, 2017).

Hein (2014) summarises the most common musical games into three categories: those linked to memory skills (drill and skill), rhythmic games, and playful-educational activities using musical toys. In line with constructivism, gamification in music teaching represents another tool to foster the learning of music in an active and student-centred way, taking into account the starting point or initial state of each individual, and focusing on their centres of interest (Clapper, 2014). In this way, and as with other curricular subjects, an approach to musical education rooted in constructivism will have greater effect on the emotional, intellectual, social and physical development of the subject, and, as a result, on their overall development (Scott, 2009). Evidence is available in the field of music education which highlights the benefits of using methodologies related to playful learning (Ray, 2008; Scott, 2009, 2011; Shively, 2015). From the perspective of initial teacher training, Cleaver and Ballantyne (2013) emphasise that, in the field of music education, the constructivist perspective of the teacher is shaped by subjective elements (such as their experience and musical tendencies, their ideologies and beliefs, their training background, etc.), as much or even more so than the academic training they receive as future teachers. In any event, we agree with Restrepo (2006) that it is essential for teachers to have a favourable view of constructivist approaches for any real change to occur within the educational system.

As argued above, gamification practices originated and are closely related to the world of video-games and other gaming features of the digital industry. In a stimulating exercise, and from the perspective of synesthesia, Politis, Margounakis, Aleksii, & Karanikas (2017) analysed the relation between music, or a set of auditory stimuli, and the visual-narrative development of video-games, including the perspective of gamified learning. The concept of the *serious game* also comes into play within this context, which is to say the video-game created for specific training purposes (see an example focused on teaching children how to sing in García-Hernández et al., 2014). Most of the experiences documenting gamification in music education maintain this link with technology. For example, in general educational contexts to cover curricular content in an innovative way, with results highlighting the motivational benefits of using gamification and the effects on the development of transversal competences (Gomes, Figueiredo & Amante, 2014; Gomes, Figueiredo, & Bidarra, 2014). Other studies focus specifically on gamification practices

applied to instrumental learning, as with violin students, for example (Margoudi, Oliveira & Waddell, 2016; Margoudi, Waddell & Oliveira, 2017). Finally, we find the experiences and results of using technological tools created to work on users' music skills, such as in the case of the celebrated online platform *Troubadour* to develop musical self-training through gamified activities (Pesek, Vucko, Savli, Kavcic & Marolt, 2020).

We conclude this section with the stimulating reference to the concept of flow, coined and developed by Csikszentmihalyi (1990, 2000), to refer to the state achieved by individuals when they dedicate themselves fully to an activity, especially in recreational contexts. In this sense, *flow* has been identified as one of the ingredients that generates pleasure and facilitates learning in gamified environments (Hamari & Koivisto, 2014). The concept is already linked to aspects related to fluidity, rhythm, creativity and inspiration in the music, creator or interpreter within the field of music itself (Burnard, 2012). Carolyn Wagner, for example, has developed reflections and proposals for transferring some elements that trigger the flow experienced by video-game players to piano pedagogy (Wagner, 2017).

3. Methodology and research objectives

We have used a descriptive-interpretative methodology, following a mixed, qualitative-quantitative paradigm based on a field study in which a specific training practice is analysed (Rio Sadornil, 2003). Data has been collected and analysed from the position of participant observer, as teachers of a core subject in music education of the degree in Primary Education. The sample comprises a regular group of second year students (N=90), divided into three subgroups of a similar size (A1, A2 & A3), enrolled on the second year of the degree programme at a Spanish university. Each of the three sub-groups was then divided into random working groups of five members. This meant that the teacher-researcher was able to maintain regular practice in the classroom while also acting as investigator, without changing the usual dynamics of the course or the distribution of the pre-established groups, and presenting a report at the end of the process responding to the research questions set (Creswell & Creswell, 2018). In this sense, the role of the teachers as participant researchers is akin to the processes followed in action research, without the recurring reflexive cycles that characterise this kind of practice. Nevertheless, the process followed shares the strong collaborative component characteristic of action research (teaching team, group of students, faculty-school) and the willingness to examine one's own work in order to improve it (Cain, 2003).

The study is organised according to three research questions:

- What dynamics of interaction are generated among the participants (pre-service teachers and school children) in the gamified music activities?
- What kind of music content is worked on in the activities designed?
- What kind of play strategies and preference levels are used in the practices designed by the pre-service teachers?

The study is therefore carried out in relation to the results of a practice in which degree students receive initial training and, subsequently, follow the guidelines provided to co-create a simulation activity, with play elements, adapted to the current curricular of music education at primary level (Catalonia, 2015) and the different elements specified in the competency-based development of the Area of Artistic Education (Generalitat de Catalunya, 2016). This practice has been included in the subject over the last four academic years, and concludes in the final session with the activities being carried out at one of the primary education schools that collaborates in the degree practicum, with this session carried out at the collaborating school. In the case of this project, technological resources are limited to the use of devices to reproduce sound or to watch images used to accompany the activity. The reason for this limitation is that the teachers want students to prioritise their corporal and instrumental resources (voice, percussion, movement, etc.), as well as other materials created by themselves, thus moving away from the concept of gamification in the strict sense of the term, linked and restricted to video-games and the use of technologies, and adopting the construct "playful learning activity" as an alternative.

Conceptually, the academic practice also develops the idea of the *Interaction Learning Event* (ILE), formulated by Karl M. Kapp as a paradigm characteristic of educational processes or proposals linked to play, gamification and simulation (Kapp, 2012). According to this author, strategies related to teaching practices like this are justified when they are related to any of the objectives listed in Table 1, linked to motivation, reflexive practice, behavioural intervention, and experiential gains. Each objective in the table is also assigned training needs in relation to the professional competences that pre-service teachers will need to develop throughout their practice.

Table 1. General objectives of ILE (Kapp, 2012; Kapp, Blair & Mesch, 2014) and their links with the teaching objectives under study

ILE-aims	**Training needs**
Overcome discouragement	Increase pre-service teachers' participation by designing and creating musical activities
Provide opportunities for deep thought and reflection	Generate discussion throughout a joint didactic development process
Change behaviour to positive attitudes	Overcome prejudices and empower students to use musical language
Promote real and contextualized practices	Promote teaching roles in real professional situations with students

The process is developed in four phases across a period of six weeks and during twelve sessions of ninety minutes. In the first phase, two training sessions are provided to the whole group (N=90) on the origins, characteristics and examples of playful learning in music education (with and without technology). In the second phase, once the random groups have been created, the students are asked to design and elaborate a music learning activity within the parameters of play-based learning. In order to ensure the diversity of the proposals, different disciplinary areas are assigned (melody rhythm, pitch, and body-dance). In the third phase, the proposal is applied with peers, helping to introduce significant improvements, mainly in relation to the rules and the development of the activity. The fourth and last phases consists in applying all the activities to the mid- and upper-cycle students of a primary school (N=106). This approach adds a second dimension to the simulation, in which university students assume the role of teacher and act accordingly. A competency-based assessment table was elaborated consensually by the teachers on the module to assess the university students (see Annex 1).

The data related to the objectives of the study and the research questions has been obtained by watching the recordings carried out during the realisation of the activities at the school, as well as the written work (descriptive, reflexive and self-assessment) presented by each group of students. The recordings have been analysed with the support of ATLAS.ti 8 software in order to analyse the qualitative data. Six observation categories of the taxonomy proposed by Kapp, Blair and Mesch (2014: 57-58) [see Figure 1)] were used in this process. The recorded material was codified on the basis of these matrix categories, involving the analysis of a total of fifteen activities designed and applied by the pre-service teacher students. By way of example, the following table [2] presents the main characteristics of the activities designed by the five working groups from class A1.

Table 2. Summarised information of the five activities designed by group A1 of the sample

Name of the activity	**Curricular dimensions (*)**	**Musical contents**	**Narrative overview of the game or simulation**
The Island of Silence	Perception and listening. Expression, interpretation and creation.	Pitch of sound and tuning.	The participants are located in "The Island of Silence". At this place the Queen of Silence lies asleep and captivated by a pirate. The players must transcribe the musical notes of a song from a series of clues to awaken and save the queen.
The lost notes mystery	Interpretation and production.	Musical figures and rhythm.	An orchestra conductor has his scores stolen before a concert he is supposed to conduct. The participants have to reconstruct the rhythms of the music to help him to be able to attend the concert.
Li Blu's challenge	Perception, comprehension and valuation. Interpretation and production.	Tone and musical instruments.	Participants read a letter from Li Blu, the magical character of the game, in which they are invited to overcome four challenges around musical instruments and their sounds.
Music Trivial	Perception, comprehension and valuation. Interpretation and production.	Recognition and melodic interpretation of a song.	Participants are divided into two teams that must compete by answering questions, organized in three levels of difficulty. The winning team can choose the song they want to listen to and sing it in a karaoke version.
Lost in the jungle	Interpretation and production.	Musical pitch. Musical instruments and their sounds.	A group of explorers is moved to the jungle. They must check there aren't any dangerous animals before camping. Divided in two groups, they must identify the sound of some animals and represent them with their body. After that, they have to associate the animals with the sound of a musical instrument.

(*) Based on the current curriculum (Generalitat de Catalunya, 2016)

A descriptive coding process has been used to identify and group the main (inter)actions of the different phases of the application of each activity (Saldana, 2016: 102).

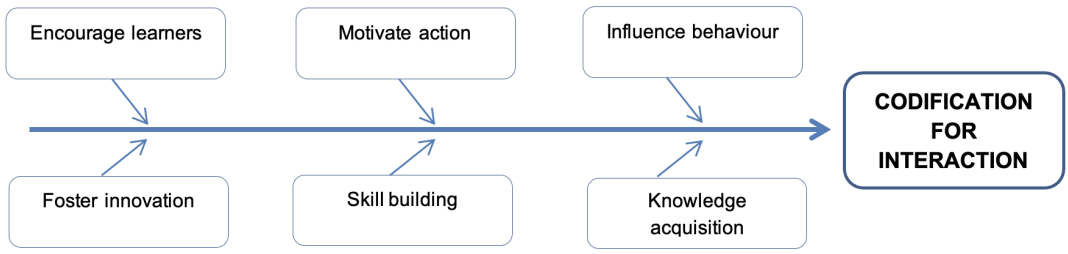

Figure 1. Matrix categories used to analyse the interactions, based on Kapp, Blair y Mesch (2014).

The final part of the study was dedicated to analysing the gaming strategies used in the different proposals (N=15). This process provides us with information about the preferences and affinities of future teachers and which game dynamics they feel more confident with and more motivated and predisposed to use. To do this, we used the taxonomy related to the constitutive elements of gamification in learning of Ortiz-Colón et al. (2018). As a core concept, this includes three aspects which we have used as categories of analysis: the dynamics, the mechanics, and the components. In this case, the information is extracted from the analysis of the written reports elaborated by the pre-service teachers, using the observation table and frequency register (see Annex 2), thus triangulating the data from the observation, the application of the activity in the school context, and the information from the reports written by the university student working groups.

4. Presentation of findings

4.1. Interaction between the participants

In relation to interactions (inter and intra group: between school children, between pre-service teachers, between the pre-service teachers and the school children) identified in the series of activities proposed, and their correlation with the type of curricular content worked on, the analysis and codification of the action is organised according to the taxonomy of six matrix categories described above. The following provides a justification of the criteria adopted to extract the codes presented in Table 3.

a. Learning reinforcement: The interaction codes obtained refer in particular to communicative actions between participants through which involvement and engagement is fostered and sustained over time. In the coded actions, verbal interaction is reinforced and learning is externalised as the activity is carried out.
b. Boost action: The instructions related to the activity and how to develop it are mainly unidirectional (from the pre-service teachers to the school children). Nevertheless, interactions do occur as a result of the difficulties the children have understanding or in response to their requests for help or clarification. Mainly, the actions are coded in relation to the manipulation of the musical instruments or objects designed, the management of the rules or instructions provided.
c. Change behaviour: The codes created respond to interjections of approval and disapproval, that also help to create or show expectation, promote competition and show surprise or satisfaction.
d. Foster innovation: Instructions or dialogues that boost the school children's initiative and foster their creativity are coded.
e. Skill building: Situations are identified where actions are planned, strategies are executed, solutions are sought and there is cooperation between participants.
f. Knowledge acquisition: This refers to the identification of situations in which the key contents of the activity appear, or concepts related to their development, moments when participants are assessed, as well as an evaluation of the overall activity.

Table 3. Results of the codification of the participants' interactions, grouped into six pre-established categories (Kapp, Blair & Mesch, 2014).

Matrix categories	**Codification for interaction**
Learning reinforcement (Dynamics that encourage participation)	Ask questions Give answer Offer feedback Welcome Show positive attitude
Boost action (Motivate action)	Follow instructions Ask for help Play with tools Deliver objects Suggest resources
Change behaviour (Influence the behaviour of participants)	Approve/disapprove Create expectation Promote competitiveness Generate surprise
Foster innovation (Actions related to creativity)	Be creative Design an activity
Skill building (Search and implement solutions)	Make a plan Execute a strategy Find solutions Cooperate
Knowledge acquisition (Learning curricular concepts)	Conceptualize Joint reflections Assess

4.2. Musical learning observed

The study aims to determine if the use of playful components in music teaching can help to define and clearly identify the disciplinary components of the music training proposed. In the first instance, the content has been discussed, selected and, as a result, assimilated by the future teachers, alongside their reflection and elaboration of the gamified teaching strategy.

Table 4 presents a summary of the musical learning promoted in the activities, linked to the curricular sections outlined in the document on competency-based implementations in artistic education (Generalitat de Catalunya, 2016). The analysis interrelates actions promoted in school children with disciplinary elements and the musical concepts underpinning learning during the practice. The result shows a diversity of learning in which each coded category is linked to the notable diversity of elements that these activities comprise.

Table 4. Results of the analysis of the musical activities designed and the learning objectives proposed

Curricular content	**Learning objectives related to activities**
Musical vocabulary: musical instruments, musical notation, dynamic and speed concepts, measures, tuning.	Identify tone Recognize instrument images Read the notes on the staff Interpret some dynamics with your voice Read the tempo of a song
Sing and play: musical repertoire, instrumental technique, voice tuning.	Sing a song Interpret a rhythm Recognize a melody
Music and dance performance: musical expression, choreographic creativity, musical coordination.	Learn a dance Interpret music with your body Interpret a rhythm with body percussion
Make a rhythm or melody: musical creativity, musical writing.	Invent a rhythm Complete a rhythmic and melodic sequence Write dictated rhythms Place or reorder notes on the staff

Identify musical patterns: musical reading and sign interpretation.	Arrange a rhythmic sequence Play a beat Associate the score with the audition

4.3. Gamification strategies

In the first instance, we analyse the dynamics as a unique focus point that enables us to classify the type of game used. In this section we observe a set of actions that are developed according to a programmed sequence with pre-established aims. Figure 2 shows the results of the analysis of the fifteen activities. Among the ten elements observed, the elements obtaining the highest registers are *feedback*, *social interaction* and *cooperation*. This result is consistent with the idea that, when faced with a challenge or problem, participants need to pull together and work as a group, establishing relations and links between them while also creating and sharing knowledge.

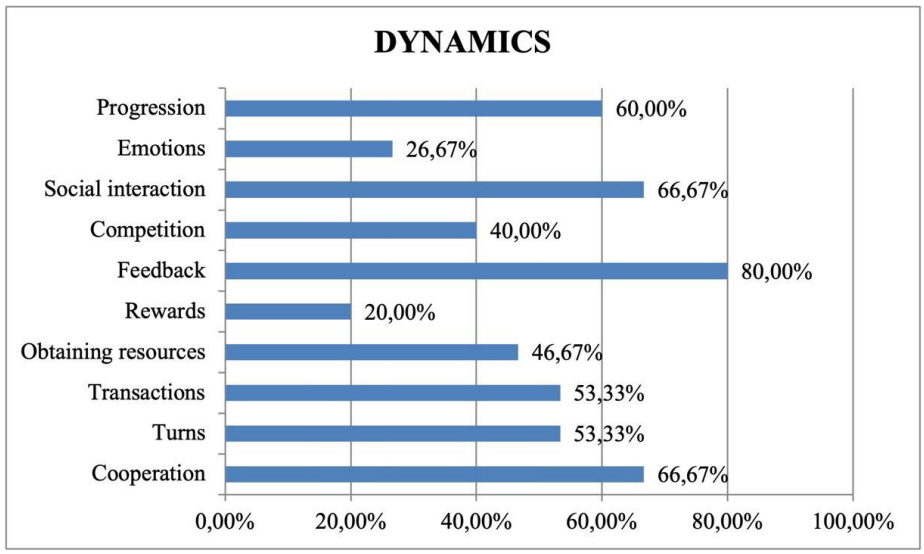

Figure 2. Frequency of use of the elements associated with the *dynamics* in the gamified activities (N=15)

In the second place, we analyse the dimension of the *components*, in order to find out what kind of challenges guide the action and are shared by the players, who are focused on solving the challenge presented. Specifically, of the different activities analysed, the most notable component is that of *classifications*: different skills and dimensions of music education are developed throughout the game, involving the classification of specific elements (instruments, musical figures, etc.). After this we find *teams*: there is a goal shared by all players which they have to resolve in teams. And also *searches*: the strategies in this section focus on finding or discovering a concept behind a question or statement, recognising a melody, finding the correct order, etc.

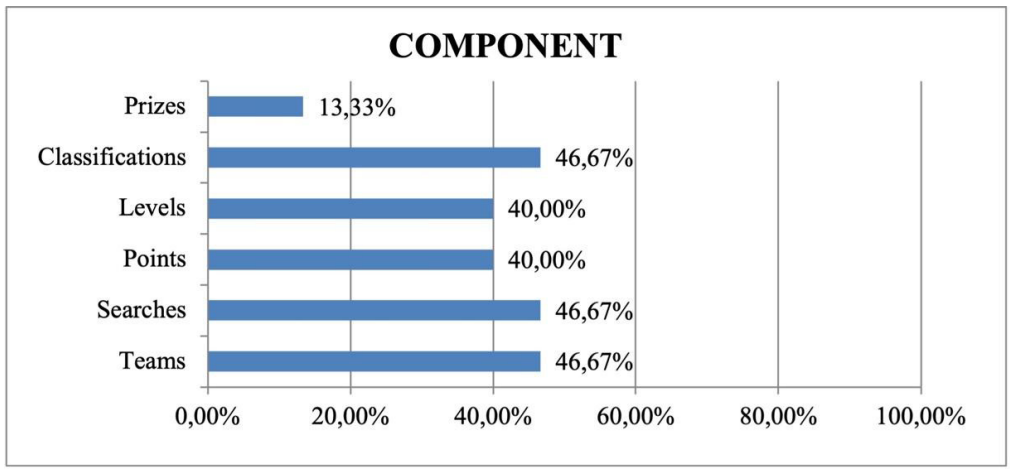

Figure 3. Frequency of use of the elements associated with the component in the gamified activities (N=15)

Finally, the third dimension observed relates to the *mechanics* of the game. In this case, three aspects are identified: *challenges*, *markers* and *achievements*. The element that predominates the most is the first, which is directly related to the aim of boosting participants' motivation. Challenges prompt immediate results and invite the instant engagement of all participants. In view of this, overall, the elements related to the mechanics of the game must be understood by all those involved. Consequently, we can infer that effective elaboration and communication of the mechanical elements of the game will have a direct correlation with the communicative competences of future teachers.

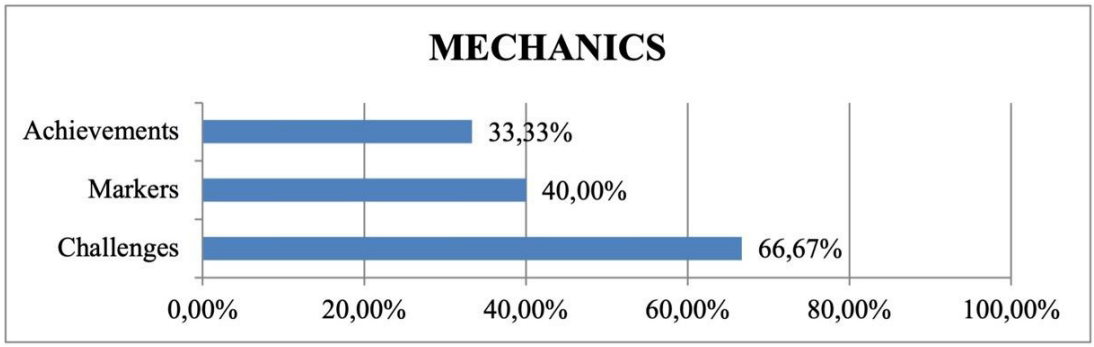

Figure 4. Frequency of use of the elements associated with the *mechanics* in the gamified activities (N=15)

5. Discussion and conclusions

The in-depth review by De Sousa, Durelli, Macedo and Isotani (2014) highlights three main factors in the combination of gaming elements and learning objectives, namely: a) increase in motivation, b) competence building in specific skills, and c) increase and improvement of learning achievements. These results are partially consistent with the meta-analysis of Hamari et al., (2014), the results of which present three main categories in studies on educational gamification: a) those that contribute to motivation studies b) psychological effects, and c) behavioural results. In our study, the main objective and research questions formulated are situated in the mainstream of a good part of the existing literature. At the same time, it is certain that the disciplinary dimension (music and music teaching) brings a distinctive character to the study. In view of this, the following section highlights some previous findings in the field with which we will compare our own findings.

As in the case of Koops and Taggart (2010), we observe that games as a resource are highly valued and used in schools considering the benefits highlighted up to now. In view of our study, and in line with these authors, it seems relevant and appropriate to propose work on music education in initial teacher training, using playful learning strategies that enable key disciplinary concepts to be worked on in a socially active, practical and creative way. On similar lines, it seems logical that lightening the curricular level of the subject can help reinforce future teachers' confidence and interest in applying such methods in the classroom.

This kind of practice, produced in collaboration with schools, and with a final application with the target students, provides an excellent opportunity to develop specific professional competences. Future teachers prepare themselves and immerse themselves in a professional context where gamification is welcome and included in the daily practice of the music classroom. Morante and Castellano (2019), for example, have reported how, in addition to the music learning developed, the school children also develop "highly significant" capacities through the playful musical experience, thus helping to break down barriers between different areas of the curriculum. We can therefore infer that future teachers experience similar benefits when working on music teaching in a playful way and when elaborating activities such as those evaluated in this article, since they mainly promote practical skills consisting of solving questions and challenges with varying degrees of difficulty. This also represents a suitable practice within the framework of competency-based university teaching, which is to say that this provides applied training which brings together a set of different forms of knowledge (Zabala & Arnau, 2014).

In response to the three questions formulated, regarding the interaction between participants (in the roles of degree students and primary school students), the results reinforce the idea of bidirectional relations in which an interrogative register predominates, alongside brief peer dialogues. In accordance with the dialogical creative-musical approach between teacher and student proposed by the much missed Marcelo Giglio, we see how strategies and dynamics associated with play increase the collaborative perspective of the training process (Giglio, 2013).

On the other hand, the study shows that gamification in teacher training degrees is a suitable and effective way of working on the practical application of the basic musical content that should be acquired by future generalist teachers, whose relation with the discipline is frequently marked by low self-perceptions of mastery and efficacy (Holden & Button, 2006). At the same time, students' initiative and creativity is also promoted, fostering connections with the social reality, critical thinking, as well as links with their future professional context. These results concur with those presented by Van As and Excell (2018), in whose case, based on a sample of future preschool teachers, music teaching acted as a mediating element to boost their predisposition towards using games in the classroom.

Finally, the results highlight the fact that game-based music learning which follows the strategies developed in the practices analysed encourages the school children who carry out these activities to self-regulate their own learning. And they do this, according to what we have observed, in a way which is mediated by the fostering of feedback activities and the stimulation of collaborative social skills.

6. Scope and limits of study

This article discusses the relations between music education and gaming on the basis of a case applied to the music training of pre-service primary teachers. The results and conclusions will be relevant in other teaching contexts. In the first instance, the theoretical foundations and conceptual analysis reveal terminological diversity in relation to the construct known as "playful learning". We consider it useful and necessary in this study and in future developments to reflect and provide examples from the field of music education to clarify key concepts such as gamification, play, game, simulation, etc. Overall, these strategies and resources are positively evaluated in processes whose transformational goals involve boosting motivation and empowering participants, establishing collaborative dynamics, and activating feedback processes between teachers and students.

The limitations of the results presented are those related to case studies and qualitative approaches in respect of their limited transferability and generalisability. Other reports on practices similar to those analysed here are needed, using larger sample sizes and also approaching the theme from a transversal or comparative perspective, comparing different programmes or different educational stages.

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ANNEX 1

Evaluation of the practice: "Gamified activities of music learning"			
Work developed	**Items evaluated**	**Descriptor**	**Value between 1 and 10**
Implementation	**Application of the activity**	The implementation is original and creative	
		The working group maintain good internal coordination	
		The tools, techniques and resources used are varied	
	Command of subject	Work with elements of music language is prioritised	
		The activity is adapted to contents recommended for this educational stage	
		An inclusive approach to artistic education is used	
	Interaction with the primary school children	All the members of the group interact with the children	
		The children are encouraged to take a leading role in the development of the activity	
Written document	**Objectives**	Objectives are well written and specific to the activity	
	Contents	The contents are well chosen and coherent with the activity and level of the students	
	Key competences	One of the eight key competences of the educational stage (Primary) is worked on	
	Curricular scope and dimensions	The specific scope and dimensions of artistic education are specified in a way which is consistent with the activity	
	Methodology	The main elements of gamification of the activity are defined	
	Assessment criteria	Assessment criteria have been elaborated and are coherent with the activity proposed	
	Description of the activity	The activity is described in a comprehensible and structured way	
		Details are provided of the material needed and the pedagogical sense of the activity	
Total grade			
Mean grade			

ANNEX 2

			Group A1					
		Elements observed	Group 1	Group 2	Group 3	Group 4	Group 5	Total
Gamification strategies	**Dynamic**	Progression						
		Emotions						
		Social interaction						
		Competition						
		Feedback						
		Rewards						
		Obtaining resources						
		Transactions						
		Turns						
		Cooperation						
	Component	Prizes						
		Classifications						
		Levels						
		Points						
		Searches						
		Teams						
	Mechanics	Achievements						
		Markers						
		Challenges						
Observations								
Group 1:								
Group 2:								
Group 3:								
Group 4:								
Group 5:								