Pedagogical Foundation to Promote Students' Engagement and Creativity While Co-creating a Music Learning Game

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Abstract: Learning-game co-creation is a pedagogical activity where learners draw on their knowledge of a specific topic to collaboratively create a learning game that peers can later use to gain a new understanding of a topic (Kafai & Burke, 2015; Kangas, 2010). Indeed, this approach offers important learning opportunities, as students call upon their acquired knowledge to create the different components of their game (e.g., rules, objective, dynamics, elements), all while also calling upon their creativity and encouraging their engagement with the activity. Studies exploring game creation as a learning activity have allowed us to identify and understand the common phases of this process. However, it is less clear to determine which are pedagogical principles the teacher should consider when implementing this approach into their own "teaching reality." In this paper, we present a pedagogical experience based on co-creating a music learning game with seven young musicians (age: 10–14). More specifically, our paper presents the educational, operational, and conceptual models that enabled us to establish a robust pedagogical foundation upon which we built this learning activity that, to our knowledge, had never been explored in our field (music education). Therefore, we will explain how we used each model to a) structure the set of activities that enabled the participants to create their own music learning game, b) guide the researcher's pedagogy act to co-create a music learning game with the students, and c) understand the participants' creative response towards this learning activity.

Keywords: Creative pedagogy, Game co-creation, Music Education, Creativity, Engagement

1. Introduction

The domain of music pedagogy shows a growing interest in diversifying the existing teaching methods to integrate pedagogical activities that better adapt to the interests of the new generations (Upitis et al., 2015) and further develop their creativity (Burnard, 2017). For example, music teachers are integrating into their lessons various digital tools that students use in their daily lives (e.g., mobile phones or tablets) for various purposes (e.g., explore different interpretations of a musical piece, share pedagogical resources, follow-up with practice, etc.) (Upitis & Abrami, 2017). As well, music teachers are starting to integrate more creative pedagogy approaches (Burnard, 2017; Lin, 2011), notably to foster students' creativity through creative musical activities such as composing (e.g., Burnard, Boyack & Howell, 2017), improvising (e.g., Burnard & Boyack, 2017), or creating invented partitions (e.g., Erman, 2011). Despite this growing interest, many pedagogical workshops and training offered for music teachers still focus on improving instrumental technique or performance, paying less attention to strategies that could allow them to develop a more creative pedagogy (Crow, 2008; Uszler, 1996). Furthermore, while some creative approaches are already documented in music (Burnard, 2017), they provide very few specifications about the pedagogical principles or foundations necessary to successfully implement this type of approach.

Given the above, there is an urgent need to explore scientifically more creative pedagogical approaches that could adapt to the domain of music pedagogy. Also, it is necessary to provide a clear description of the pedagogical principles and strategies necessary to implement such a creative pedagogy approach effectively. Our doctoral study aimed to step in that direction by documenting and analyzing a pedagogical experience based on co-creating a music learning game with seven young students (10–14 years old). We were interested in exploring this approach as, according to the literature, game creation fosters students' creativity by establishing creative links between the subject studied and the creation of different game elements (ex.: the story, the characters, the game world, etc.) (Kangas, 2010; Navarrete, 2013, Schanzer, Kirshnamurthi & Fisler, 2018). Moreover, according to a pilot project conducted by Marin-Jimenez (2018), this approach seems to adapt to the context of teaching and learning music.

1.1 Co-creation of learning games

Game co-creation as a learning activity refers to a process where students call upon their previous knowledge to create, in collaboration with other students, a learning game that aims to be played by their peers or less advanced students (Kafai & Burke, 2015; Kangas, 2010). During this process, learners determine their game's

pedagogical (e.g., learning goals and learning mechanics) and playful aspects (e.g., game objective, rules, elements, etc.).

According to the literature, this process seems to positively affect students' creativity and engagement. As for creativity, it invites students to use their knowledge in a creative way (Baytak & Land, 2010). For example, creating new characters (e.g., Navarrete, 2013; Schanzer, Kirshnamurthi & Fisler, 2018) or game worlds (e.g., Kangas, 2010) based on the learning concepts they chose to integrate into the game. As well, game co-creation calls upon students' critical thinking and problem-solving skills, as they must choose, among all the ideas shared by the group, those that work the best for their game (Vidoni & André, 2017). Finally, by creating a learning game with their peers, students develop social skills important for any collaborative creative process, such as openness to new and different ideas (Fernandez-Rio & Morales-Salles, 2020), negotiation, and leadership (Vidoni & André, 2017).

Regarding engagement, game co-creation seems to foster different factors that support student engagement. For example, the literature suggests that students appreciate game co-creation activities, as they often represent a positive experience (i.e., fun, amusing, interesting) for them (Fernandez-Rio & Morales-Salles, 2020; Schanzer, Krishnamurthi & Fisler, 2018; Vidoni & André, 2017). Moreover, co-creating games enable the acquisition of "extra" knowledge perceived as valuable by the students (Reynolds & Harel Caperton, 2011). For example, students might have to learn how to do basic coding (e.g., Scratch) or how to use design software (e.g., Canva) to create elements for their digital or non-digital game. Indeed, this knowledge also develops their feeling of competence, enabling them to successfully create their game (Reynolds & Harel Caperton, 2011) and feeling proud about the outcomes (Schanzer, Krishnamurthi & Fisler, 2018). Finally, game creation fosters students' sense of autonomy, as they can make decisions and establish their strategies during the creation process (Vos, Van der Meijden & Denessen, 2011).

1.1.1 The implications of pedagogy on the development of students' creativity and engagement

The pedagogical act (Shulman, 1987) implemented by the teacher plays a crucial role in the development of learners' creativity and engagement (Beghetto & Kaufman, 2010), which is one of the main goals of creative approaches such as co-creating learning games (Kangas, 2010). According to the literature, some of the pedagogical factors that promote students' creativity while learning are:

1. Integrating innovative and engaging teaching strategies (e.g., Kaplan, 2019).
2. Designing a learning environment that stimulates creativity (e.g., Cochrane & Antonczak, 2015; Richardson & Mishra, 2018).
3. Adopting an open and flexible attitude towards students' creative expression (e.g., Chen, 2008; Cremin, Barnes & Scoffham, 2009; Tran et al., 2017).

However, the strategies and intentional design of learning environments to support creativity in children have been very few explored in the educational research literature (Beghetto & Kaufman, 2014). As studies have reported, teachers interested in adopting more creative and innovative approaches, notably game co-creation, hesitate to do so because they lack the pedagogical strategies to do it (Kangas, 2010). In other words, they need reference models to do this adequately and securely.

The following paragraphs present the theoretical and conceptual models that guided our study to create a robust pedagogical foundation to co-create music learning games with seven young music students. More precisely, we will describe how we used these models to structure the activities that led participants to create their music learning game; guide the researcher's pedagogy act while co-creating games with the participants; and understand the participants' creative response towards this learning activity.

2. Participants and context of the experiment

Seven young students (six boys and one girl, aged 10–14) who were learning different instruments (e.g., guitar, piano, violin, cello, saxophone, and flute) in an out-of-school context[1] participated in a 10-week pedagogical experience animated by the researcher (Marin-Jimenez). Each week, participants worked in collaboration towards creating an analogic music learning game about music theory. The sessions took place once a week (on

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[1] Students that learn a music instrument in an out-of-school context in the north-western part of the globe (i.e., United States and Canada), usually attend to their lesson once a week, after school hours, in a private setting, such as: the student's home, the teacher's home or music studio, online, or at a private music school.

Saturdays) for three hours at the LaRFADI (Laboratoire de recherche en formation auditive et didactique instrumentale), a research laboratory located at the Faculty of Music at Laval University in Quebec City, Canada. Every session was recorded (video and audio) for further analysis. The laboratory is equipped with different resources, which are useful to achieve the game creation process. For example, digital tools (e.g., iPads, laptops, and a projector), as well as several music instruments (e.g., a grand piano, percussions, guitars, boomwhackers) and movable furniture (e.g., tables and chairs) allowed the participants to accomplish different tasks in collaboration or individually as needed.

3. Models that built the pedagogical foundation to co-create music learning games

3.1 To structure the game co-creation activities: Creative and Playful Learning Model (Kangas, 2010)

The Creative and Playful Learning (CPL) model of Kangas (2010) proposes four developmental phases (orientation, creation, gameplay, and elaboration) to co-create a learning game with students within a playful learning environment:

1. Orientation: this phase aims to familiarize students with the learning theme and later integrate it into their game. To do so, students can do autonomous research on the subject, or the teacher can give a brief presentation on this topic.
2. Creation: based on the concepts studied in the previous phase, students create, in collaboration, the first prototype version of their game (i.e., they develop the game's components such as rules, aesthetics, story, world, theme, etc.).
3. Gameplay: during this phase, students test, analyze, improve, and retest their game as needed until the final version of their game is achieved.
4. Elaboration: this phase aims to revise the knowledge that students have gained during the process. To do so, the teacher asks key questions to students about what they learned and their overall experience in creating their game.

In the context of this doctoral project, these four phases allowed the researcher to structure a set of activities that would adequately guide the participants towards co-creating their own music learning game. As a result, the participants succeeded in creating "The war of six clans", a music trivia game where the learning objective was to reinforce the learning of precise musical concepts such as rhythm, note values, scales, and instruments (figure 1).
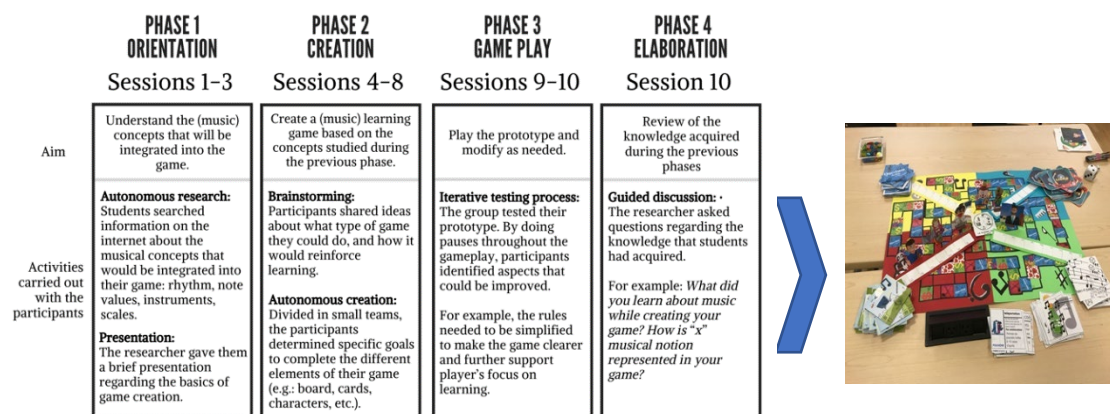

Figure 1: Activities based on the CPL model (Kangas, 2010) that allowed the participants to finish their music learning game "The war of six clans"

3.2 To guide and evaluate the pedagogical act of the researcher: creative pedagogy (Lin, 2011)

As one of the intended goals of co-creating games with students is to nurture and develop their creativity and engagement, the researcher referred to the model of Creative Pedagogy of Lin (2011) to ensure that her actions and choices were geared towards that objective.

The Creative Pedagogy model (Lin, 2011; 2014) illustrates the meaningful relationship between the pedagogical act and the learner's creative potential development. More precisely, the model proposes that students' creative

potential can be developed through the <u>interconnection</u> of three essential components: *creative teaching*, *teaching for creativity*, and *creative learning* (figure 2).
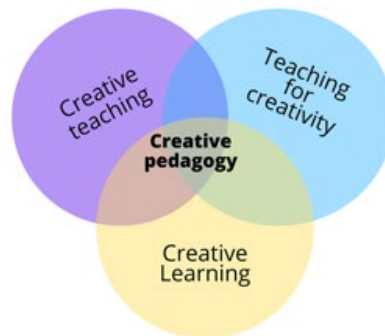

Figure 2: The three components of Creative pedagogy, as presented by Lin (2014)

3.2.1 Creative teaching

The first component, *creative teaching*, refers to the teachers' actions that foster students' creativity and encourage their autonomy (Lin, 2011). For example, activities that: a) call upon students' imagination to generate and develop new ideas (e.g., Cremin, Burnard & Craft, 2006), b) create links between the subject studied and their interests and experiences (e.g., Hagay et Baram-Tsabari, 2015; Rankin et Brown, 2016), and c) promote social interaction (e.g., share ideas, give and receive feedback from peers) as well as individual autonomy (e.g., complete creative tasks individually, which will contribute to the group's goal) (Cremin, 2009; Toivanen, Halkilahti et Ruismäki, 2013).

In the context of this study, these *creative teaching* principles led the researcher to prioritize activities that would encourage students' creative expression and autonomy while creating their game. For example, rather than presenting the musical concepts through a presentation, the researcher preferred to have the participants research the music concepts that they would integrate into their game autonomously (i.e., by searching the concepts on the internet individually or in teams). Indeed, she considered that this activity would further stimulate participants' curiosity and autonomy, as they could formulate different questions about the subject and create research strategies to find information.

3.2.2 Teaching for creativity

The second component, *teaching for creativity*, refers to the teacher's efforts and attitudes to create a positive learning atmosphere that supports students' creative development (Lin, 2011). To do so, *teaching for creativity* encourages teachers to adopt an open and welcoming attitude towards students' different ideas, so they can highlight their originality and help them develop their initial ideas into concrete realizations (Richardson & Mishra, 2018). This component also invites teachers to take a step back to become more aware of learners' creative (or less creative) responses and provide support accordingly (Barbot, Besançon, & Lubart, 2015). Finally, *teaching for creativity* also refers to the teacher's efforts to accommodate the physical (e.g., Kangas, 2010) or virtual (e.g., Schiavio, Biasutti & Antonini Philippe, 2021) learning environment to encourage learners' creative expression (Lin, 2011). For example, the disposition of digital (e.g., iPads, computers) or non-digital (e.g., papers, colours, cardboard, etc.) resources can support the visual representation of students' ideas (Cress & Holm, 2016; Richardson & Mishra, 2018). Also, the furniture's placement within the learning space (e.g., placing the tables in a circle rather than inline) could further encourage students to collaborate with others (Gundersen, 2019; Starkey et al., 2021).

In the context of our project, the principles of *teaching for creativity* led the researcher to adopt an attentive and supportive attitude towards students' creative responses. For example, when participants were creating the game's characters (creation phase), she identified that some participants expressed their character ideas best when they drew them by hand. In contrast, others were more comfortable using design software like Canva. In response to this observation, the researcher provided all the necessary materials (e.g., pencils, erasers, coloured pencils, and paper, as well as computers and iPads) to support these two different ways of expressing creativity within the group. Also, when the researcher noticed one participant was following a drawing tutorial on YouTube to improve his drawing skills (figure 3), she provided all the material he needed to practice (e.g., paper, pencils,

colours, etc.), and she also encouraged his effort and provided constructive feedback needed until he completed his design.
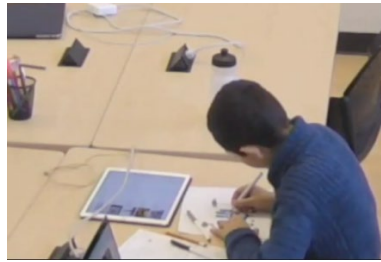

Figure 3: Strategic deployment of resources (e.g.: coloured pens, papers) within the learning space to support participants' creative intention (e.g.: design a character by hand)

Also, when the researcher noticed that participants wanted to share an idea with the group, she invited them to use the projector to present their idea and stimulate group discussion and feedback (figure 4).

Figure 4: Strategic disposition of resources (e.g.: projector) within the learning space to support participants' creative expression (i.e., present his character ideas to the group)

Finally, these principles also guided the researcher's choices regarding the set-up of the (physical) learning space. For example, throughout the creation phase, she formed "collaborative working stations" with the laboratory's tables (figure 5). According to the researcher's observations, this furniture set-up further encouraged participants to share ideas, collaborate, and discuss with each other.

Figure 5: Strategic furniture placement within the learning space to promote participants' creative expression and collaboration

Thus, *creative teaching* and *teaching for creativity* interconnect to nurture learners' creativity. However, creative pedagogy is only effective once these two components correspond to the students' *creative learning* experience, which is the last component of the creative pedagogy model (Lin, 2011).

3.2.3 Creative learning

The third component, *creative learning,* refers to the process where learners construct new learning from the application of their creative skills (Beghetto, 2016) or habits which, according to Lucas (2016), can regroup into five different creative dimensions: 1) being inquisitive (i.e., constantly ask questions to understand a topic better) (e.g., Chappell et al., 2008), 2) being imaginative (i.e., generate new ideas and explore various possibilities to solve a problem) (e.g., Pinter, 2017), 3) being disciplined (i.e., use critical thinking to make important decisions, establish strategies, and solve problems) (e.g., Gundersen, 2019), 4) being collaborative (i.e., collaborate with others to discuss, negotiate, or accomplish common goals) (e.g., Kangas, 2010) and 5) being

persistent (i.e., being perseverant when encountering challenges or difficulties during the creative process) (Lucas, 2016). However, *creative learning* also manifests through different factors of learner engagement (O'Neill, 2013). For example, when students learn actively by being in control of their work (e.g., by making decisions regarding the consulted sources of information, the sequence of activities to be completed, or the pace at which they will achieve them) (Cremin, Burnard & Craft, 2006). Also, when students manifest a certain degree of autonomy to make their own choices about which tools, resources, and strategies they will use to complete their tasks more efficiently (Schmenk, 2005).

In this study, the researcher referred to the principles of *creative learning* to better understand the participants' creative responses while co-creating music learning games. Indeed, this information allowed her to evaluate if her *creative teaching* and *teaching for creativity* strategies were effective.

Based on Lucas's (2016) model of 5 dimensions of creativity, the researcher carried out a deductive thematic analysis (Rossman & Rallis, 2016) of the recorded sessions to identify specific moments which seemed to indicate a creative learning response from the participants. One of these examples was identified during the orientation phase when participants were autonomously researching information about the musical concepts they would incorporate into their game. Indeed, this autonomy-supportive activity (*creative teaching* strategy) seemed to encourage several creative dimensions (Lucas, 2016).

First, participants were "being inquisitive" as they constantly asked concrete questions (to the researcher or their peers) about the musical concepts they were researching, either to solve doubts or to know more about a topic that interested them. Also, this activity fostered participants' creative dimension of "being disciplined" as they set clear and specific research goals and established strategies to complete the task on time. For example, some participants decided to work in pairs, so one could search for information on the internet while the other took note of significant findings. Indeed, these self-regulation strategies indicate a certain degree of engagement, as they refer to an active learning experience (an important factor of engagement, according to O'Neill, 2013). Moreover, participants mobilized their creative dimension of "being collaborative" as they helped each other to resolve doubts that arose during their research. For example, as participants had to research information about different musical instruments, we observed that a violinist asked a pianist: "How many keys does a Grand Piano have?" and a pianist asked a guitarist: "How many strings does a guitar has?". Indeed, this collaborative response was also fostered by the researcher's strategic placement of the furniture (*teaching for creativity* strategy), as she set up the tables facing each other to incite exchange and discussion among the participants. Finally, the researcher's attentive attitude (also *teaching for creativity* strategy) seemed to foster participants' engagement, notably through specific engagement factors (O'Neill, 2013) such as "perceived challenge", "perceived support", and "competence". Indeed, this attitude helped her to identify and provide support to participants having more difficulties in understanding certain musical concepts that were being studied, notably scales. This support was important, as this experience could frustrate participants, affecting their engagement level and impeding their creative expression during the task. Consequently, these participants perceived the activity (i.e., autonomous research of complex musical concepts such as scales) as attainable because the researcher's support allowed them to overcome the difficulties and persevere until they accomplished the task. Also, by respecting the other participants' autonomy (i.e., those who understood scales), the researcher fostered their feeling of competence, as they could complete the task by themselves and use their knowledge to help others.

Figure 6 below resumes this example by presenting the interconnection points between the three components of Lin's creative pedagogy model (2011) and several aspects of each component observed while completing the activity of autonomous research (orientation phase). Then, the picture presented in figure 7 highlights some of the numbered aspects in figure 6.
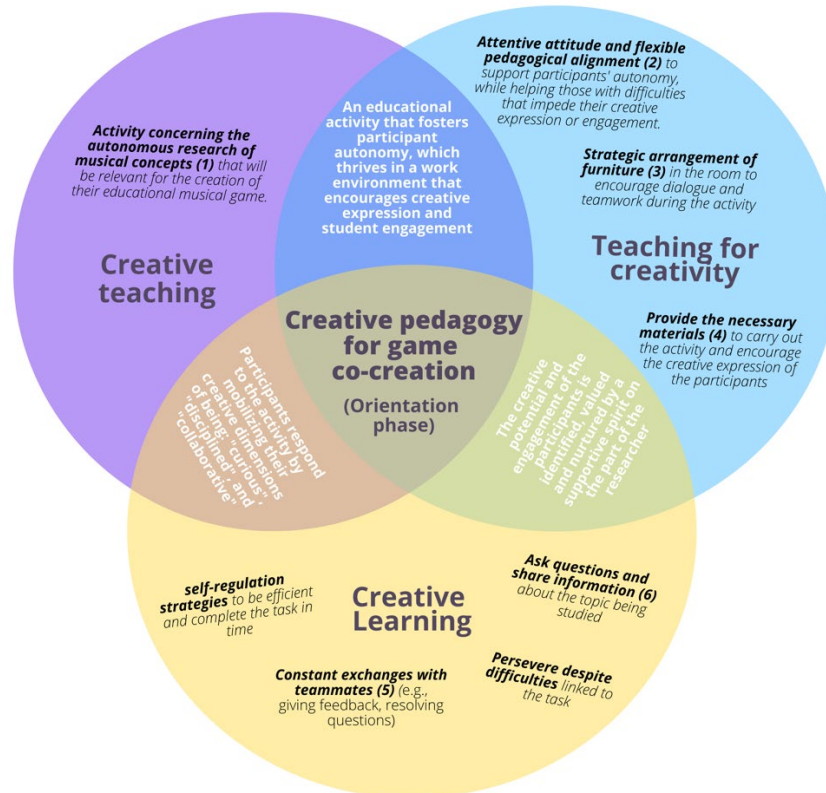
Figure 6: Interconnection of the three components of creative pedagogy (Lin, 2011) while co-creating games with the participants during the orientation phase

Figure 7: Observed interconnection of the three components of creative pedagogy during the orientation phase

4. Conclusion

This paper presented the theoretical and conceptual models necessary to establish a robust pedagogical foundation to co-create a music learning game with seven young music students. First, the Creative and Playful model of Kangas (2010) was used to create a four-phase structure of activities that enabled the participants to create an original music learning game successfully. Then, as one of the main goals of this approach was to develop students' creativity, the researcher referred to Lin's three components of the Creative Pedagogy model (2011) to guide her pedagogy approach. First, the *creative teaching* component led the researcher to prioritize activities that supported participants' autonomy (e.g., autonomous research of information) while co-creating their game. Then, the principles regarding *teaching for creativity* allowed the researcher to create a positive learning environment that promoted participants' creativity. To do so, she adopted an attentive attitude towards participants' creative response to encourage their creative strengths and provide support when encountering challenges. Then, she encouraged participants' creative expression by strategically using the available resources within the learning space. For example, she offered paper and coloured pens so participants could visually represent their ideas (e.g., sketch game characters). Also, she allowed them to use the projector

to present their ideas and receive feedback from their peers. Finally, the principles of *creative learning* allowed the researcher to understand better participants' creative responses to this type of approach. For example, during the orientation phase, participants mobilized different creative dimensions (Lucas, 2016), such as: "being inquisitive" (i.e., by asking concrete questions to understand the musical concepts they would eventually integrate into their game); "being collaborative" (i.e., by helping their peers to solve their doubts and provide feedback about their creations), and "being disciplined" (i.e., by establishing their strategies to complete their tasks on time).

Finally, this phase also fostered participants' engagement through different factors (O'Neill, 2013), such as autonomy (i.e., as they were in control of the decisions regarding their game) and competence (i.e., as they were able to complete most of the tasks by themselves). These outcomes, which are a portion of Marin-Jimenez's doctoral study, respond to the need identified by Kangas (2010) for providing more resources that would guide teachers' "pedagogical thinking" to implement innovative and creative approaches such as co-creating learning games, in our case, within a music teaching context.

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