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The contribution of the "Musical Notes Challenge" game to the enhancement of situational interest

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VII. MEANINGFUL MUSIC TEACHER EDUCATION

Christos Matziris & Nikolaos Zafranas

The Contribution of the "Musical Notes Challenge" Game to the Enhancement of Situational Interest

Introduction

Recent research points out the important role of interest in the educational process. According to Renninger and Hidi (2016), interest has a double meaning: it refers to a person's psychological state when they are involved in an activity, object or content (for example mathematics, fishing, music) as well as to a predisposition for ongoing reconnection with this activity. This relationship according to Ainley (2017) contains positive emotions, a desire to explore, a connection to the situation or object of interest and a sense that there is personal meaning and value in this relationship. Dewey in his book *"Interest and effort in education"* (1913) was one of the first to argue that interest plays a mediating role between effort and learning. He also argued that providing students with a variety of tools and educational opportunities that promote challenges and autonomy could enhance interest. After a period of inactivity, in the 1980s and 1990s there was a significant increase in studies on interest leading to three main conclusions (Schraw, Flowerday & Lehman, 2001): a) interest contributes positively to attention and learning b) interest varies from person to person and c) interest is caused by a variety of factors such as prior knowledge and unexpected content.

Two types of interest are most often mentioned: situational and individual. Situational interest, which is also described as an early phase of interest development, is the reaction to an external stimulus. It is an emotional state which is usually positive, but can also contain negative emotions such as fear or disgust (O'Keefe, Horberg & Plante, 2017). Situational interest is focused on specific content and can be of limited time duration or can be sustained (Renninger & Hidi, 2016). On the other hand, individual interest, which is also described as a later phase of interest development, is an internal predisposition to connect

with a specific content or situation. It develops slowly through repeated environmental challenges or can be self-generated (Renninger & Hidi, 2016). Situational and individual interest always interact to create interest or lack thereof (Jones, 2009).

The use of games as learning tools promotes critical thinking, risk-taking, enhances students' attention, trains them to work under pressure, have fun, respect rules and better manage victory or defeat in a completely safe environment (Brock et al., 2009; Juul, 2003; Kapp, Blair & Mesch, 2013; Salen & Zimmerman, 2003). All these goals are included in many curricula (Aremu, 2010). They also improve students' behavior and learning outcomes (Kapp et al., 2013). Through interaction and the acquisition of skills, students acquire feelings of self-control, competence and pleasure in the learning process (Brock et al., 2009). Self-regulation and metacognition are also two elements that maximize children's thinking through game experiences (Brock et al., 2009).

Suspension and Restrictions Due to COVID-19

An important unstable factor during the year 2020–2021 was the suspension of school operation for a long period of time. Also, protective measures were taken to prevent the spread of the coronavirus which affected the educational process. These measures included:

- The mandatory use of masks by all (teachers and students)
- Keeping distance and avoiding crowding
- The non-use of common rooms which resulted in the suspension of the music hall
- The recommendation to avoid choir in class (singing)
- The disinfection of musical instruments and the prohibition of the use of wind instruments.

The temporary suspension of elementary school units from 4/3/2021 to 26/4/2021 interrupted the research process, which was completed when the schools reopened. In the distance learning that took place during the suspension time, students practiced learning, reading and performing musical notes through other online applications and tools. The MNC game was not used online, since it was designed to be implemented in the physical presence of students. After the Easter holidays and the students' return to live learning, the implementation was completed.

Methodology

The present study investigates the change in situational interest of third and fourth-grade students through the use of a technologically enriched educational game in order to enhance instruction in music classrooms. The research questions of the current study are the following:

- How does the students' situational interest in the music classroom change after the proposed action?
- What is the flow of students' interest during the implementation of the game?
- In which ways could the music lessons become more interesting according to the opinion of the students?

The participants were 143 third and fourth Grade General Elementary School Greek Students, aged from eight to nine years old (47 were students of the third-grade class of the teacher-researcher, 61 were students of the fourth-grade class of the teacher-researcher and 35 were students of the third grade class of another teacher). The action took place from January to May 2021. A qualitative research approach that includes interviews, open-ended questions and observation was used before, during and after the implementation of a technologically enriched educational game.

The "Musical Notes Challenge" Game

The *"Musical Notes Challenge-MNC"* game aims to familiarize students with the position of musical notes on the staff, to improve aural skills, enhance melodic instrument performance, develop social skills and collaborative learning and strengthen the students' interest in the music lesson. It combines teamwork, a virtual game board, pawns, real cards, a dice and musical instruments. The teacher controls the game through a computer and students earn points through aural and performance activities included in the game. The virtual environment of this game is designed and created by the authors of this paper in Unity Engine, a real-time development platform. Among the advantages of this platform is the facility of creating 2D and 3D games as well as the support of many different platforms (Android, iOs, Windows etc.). The class is divided into four to five groups, each of which chooses the color of the conductor pawn to move on the virtual board (Fig. 1) using a real dice. The aim of each team is to collect as many points as possible.

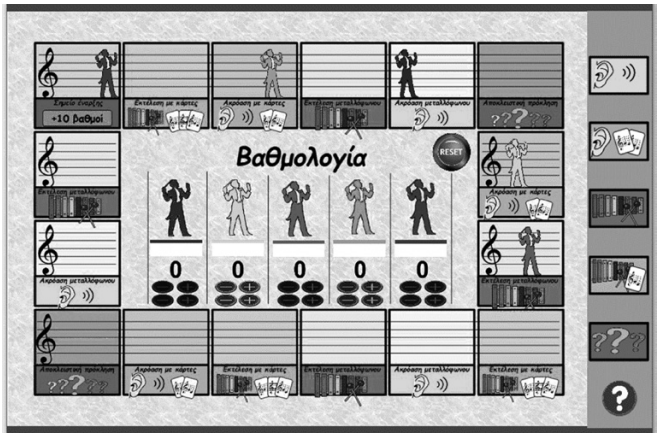

Fig. 1: The main virtual board of the *Musical Notes Challenge* game

Each team rolls the dice in turn. The teacher moves the team's pawn and performs the corresponding test. All teams participate in all tests but the team that rolls the dice wins the most points. There are four tests:

Aural tests (Fig. 2). The teacher plays one of the four passages shown on the board and the students choose the correct answer by lifting the corresponding card. The playing team wins the most points in each correct answer.

Fig. 2: Aural test

Aural tests with cards (Fig. 3). The teacher selects one or two of the 12 virtual tabs displayed and performs them on the glockenspiel or other melodic instrument. Students try to find the correct answers and pick up the corresponding number cards.

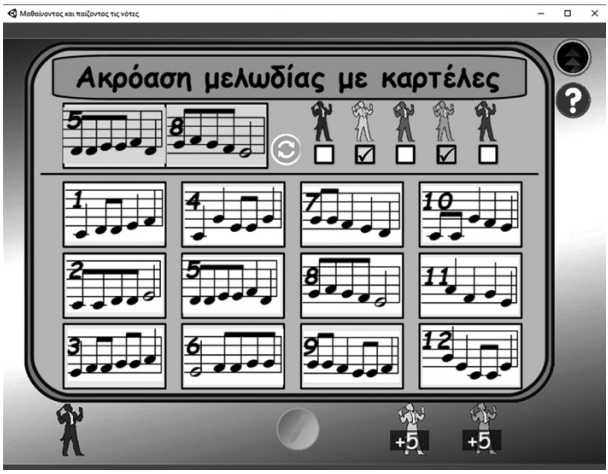

Fig. 3: Auditory test with cards

Melody performance test (Fig. 4). The teacher or the students choose one of the four musical phrases which are then performed by each group of students. The teacher grades the performance and effort of the students in the execution. The playing team's points are quintupled.

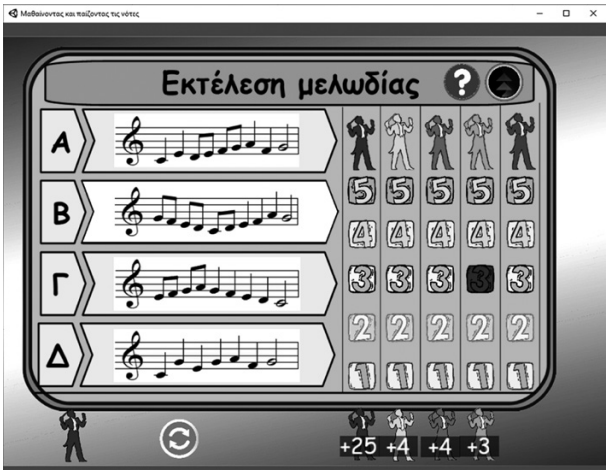

Fig. 4: Melody performance test

Playing a musical passage with tabs (Fig. 5). The teacher selects one or two of the 12 available tabs and scores the students' performance and effort.

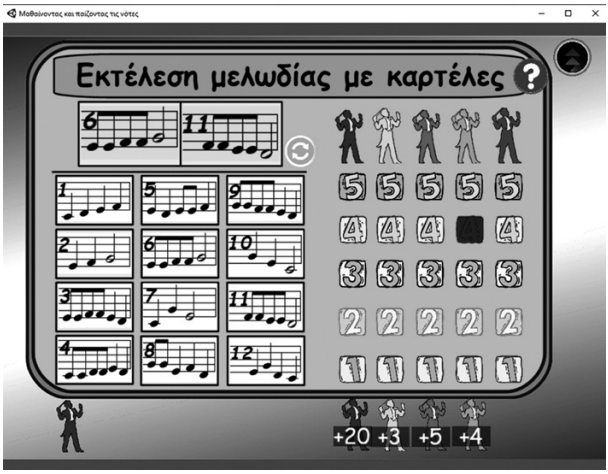

Fig. 5: Melody performance test with cards

In addition to the four tests, the board also has the option of the exclusive challenge (Fig. 6). In this case, the team chooses any of the four tests and performs it exclusively, earning the corresponding points.

Fig. 6: Exclusive Challenge

Data Collection Tools

The questions selected for the interview and the open-ended questionnaires were based on previous qualitative research conducted by Boal-Paheiros & Hargreaves (2001) (e.g. *"What do you think about music lessons at school?"*, p. 107), Bowles (1998), Palmer (2004), Mazer (2012) (e.g. *"What keeps you alert, attentive, engaged, and involved during class?"*, p. 103),

Renninger & Hidi (2011) and Roberts (2015) (e.g. *"What are the most and least interesting music class activities? Why?"*, p. 183) who explored students' interest in the classroom. In the interview conducted before the application of the game, the students' predisposition and feelings about the music lesson were explored. Observation, as a qualitative tool, was applied throughout the action. The teacher/researcher as well as the second teacher focused their attention mainly on situations of students' interest or indifference by keeping an observation diary. Immediately after the first hour of implementing the game, students were given open-ended questionnaires to explore their feelings, preferences, and desire to play the game again (e.g. *"How do you feel about today's music lesson?"*, *"Would you like to repeat today's lesson? Why;"*). At the end of the fifth hour of action, the students were re-interviewed and given an open-ended questionnaire again to explore their feelings about the game as a whole, its positive and negative elements and their preferences about what they would like to do in the next music lessons (Tab. 1 shows the qualitative Data collection map).

	Before action	Implementation of the game					After action
		1st teaching hour of action	2nd teaching hour of action	3rd teaching hour of action	4th teaching hour of action	5th teaching hour of action	
Structured Interview	√						√
Student's diary based on questions		√					√
Observation		√	√	√	√	√	

Tab. 1: Data Collection Map

Results

After the analysis of the qualitative data, a comparative study of the results was performed in order to provide answers to the research questions. The predisposition of the students in the music lesson was classified into 3 categories according to the answers given:

- Answers such as *"It is one of my favorite lessons"*, *"Enjoyable"*, *"I like it a lot"* were classified as positive predisposition
- Answers such as *"So and so"*, *"I like it a little"* were classified as neutral or undefined predisposition
- Answers such as *"I am bored"* were classified as negative predisposition.

Feelings of the students in the music lesson were classified into 3 categories according to the answers given:

- Answers such as *"Fantastic"*, *"Perfect"*, *"Very Good"* were classified as positive feelings.
- Answers such as *"Almost good"* were classified as neutral or undefined feelings
- Answers such as *"Lost"* and *"Sad"* were classified as negative feelings.

Research question 1: Does the students' situational interest in the music classroom change after the proposed action?

The comparison between the initial and the final interview showed that students who had a positive predisposition increased in all classes after the end of the activity. The enhancement of the positive predisposition in the students of the fourth-grade was particularly noticeable. This might be explained by the fact that in the first interview the students of the fourth-grade class did not have a positive predisposition in their majority, therefore the margin for improvement in the final interview was large (Fig. 7).

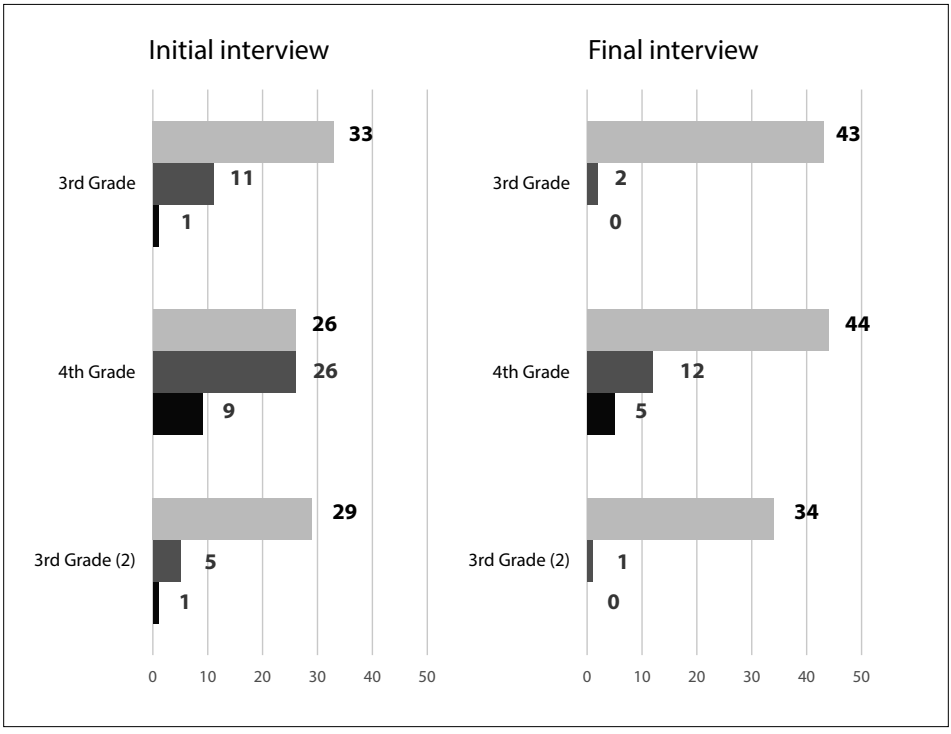

Fig. 7: Predisposition of students between initial (before implementation of the game) and final (after implementation) interview. Note: 1st graph line – Positive Predisposition, 2nd graph line – Neutral/Undefined predisposition, 3rd graph line – Negative Predisposition, 3rd Grade (2): Class of second teacher.

Research question 2: What is the flow of students' interest during the implementation of the game?

As can be seen from the answers to the initial and the final questionnaire (Fig. 8), the vast majority of students expressed positive feelings about the music lesson, which can be interpreted as a sign of high interest during the implementation of the game. There was only a slight decrease in positive emotions in the final questionnaire after the end of the activity, which in combination with the on-site observation made by the class teacher, could be interpreted as slight fatigue after five game lessons.

The high interest during the activity is confirmed by the answers given by the students when asked if they wanted to repeat the game, after the beginning of the action. The vast majority of students stated that they would like to play the game again, emphasizing the positive emotions and positive situations that came from it (Fig. 9).

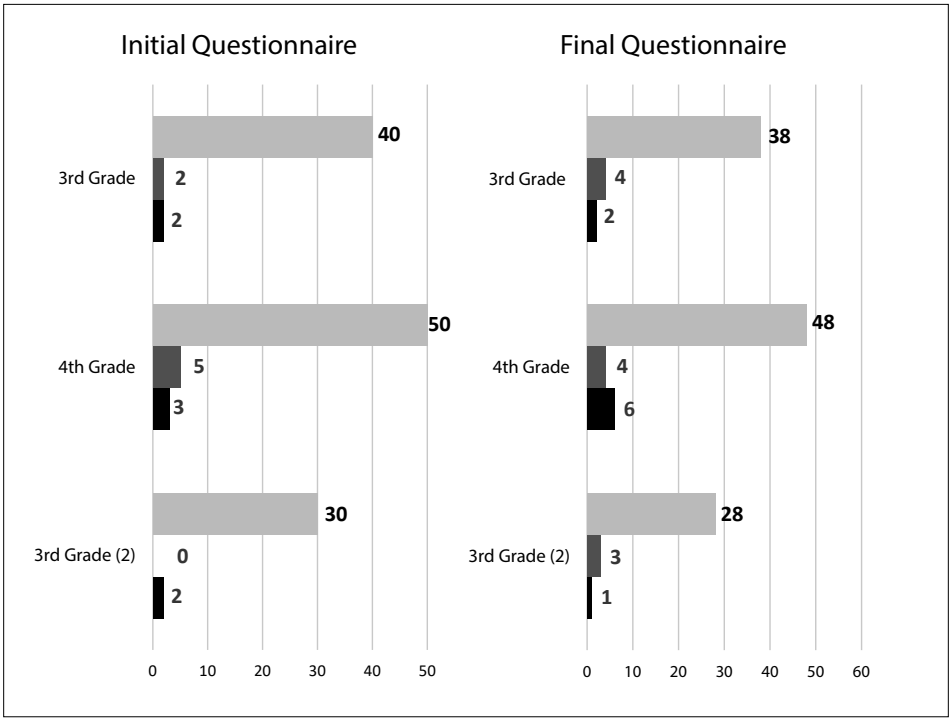

Fig. 8: Feelings of students between initial (after first hour of action) and final (end of action) questionnaire. Note: 1st graph line – Positive feelings, 2nd graph line – Neutral/Undefined feelings, 3rd graph line – Negative feelings.

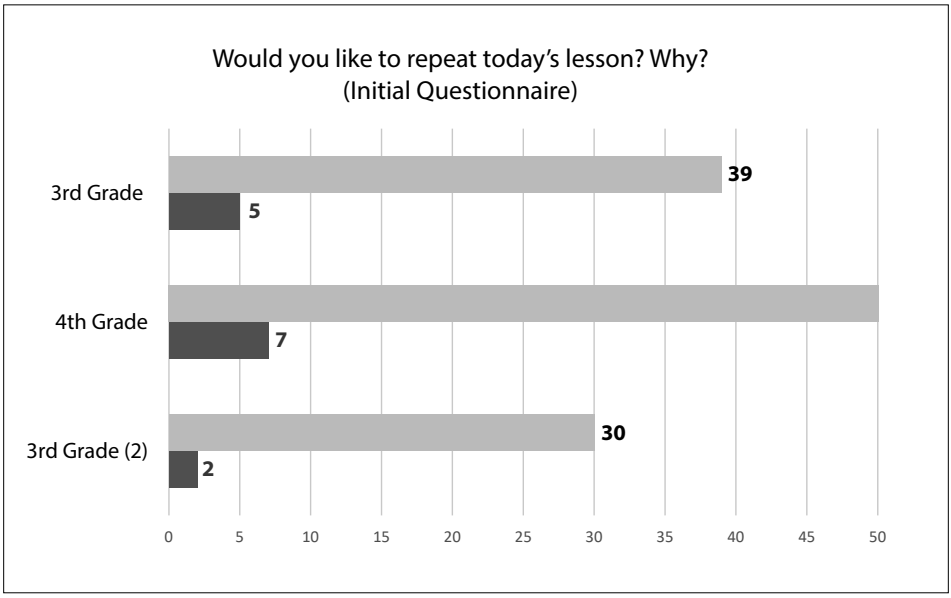

Fig. 9: Desire to repeat the game after the first hour of implementation. Note: 1st graph line – Positive answers, 2nd graph line – Negative answers.

It is also worth noting that most students found the game particularly interesting in a related question that was asked to them, with some recommending the performance of the glockenspiel and cooperation as advantages of the activity carried out. Furthermore, the vast majority of students stated that there was nothing they did not like. A small minority stated that they did not like the fuss, the fact that they lost in the game and the repetition of the same game.

The above findings are also confirmed by the on-site observation of both the teacher-researcher and the second teacher during the action. Although a lot of preparation is required on the part of the teacher in order to implement the game in the classroom (loading the game on the computer, dividing into groups, distributing cards and glockenspiels, explaining the rules of the game), the response of the students to the game was impressive and their interest increased. Only in the last lesson of the action, i. e. the fifth teaching hour, it seemed that the interest started to decrease, but the game had reached its end.

Research question 3: In which ways could the music lessons become more interesting according to the opinion of the students?

This question was explored in the interviews and questionnaires that were given and had two components: the first concerned the situations or activities that would increase interest in the opinion of the students and the second, the situations or activities that the students did not like and therefore reduced their interest. The answers given by the second teacher's

classes were incomplete as most students did not respond and thus reliable results could not be drawn. It should also be noted that the use of a mask was mandatory and no singing (vocal performance) was allowed in the current school year due to the measures against the spread of the corona virus, which had unpredictable effects on the students' responses. Fig. 10 and 11 show the situations or activities that students liked or disliked.

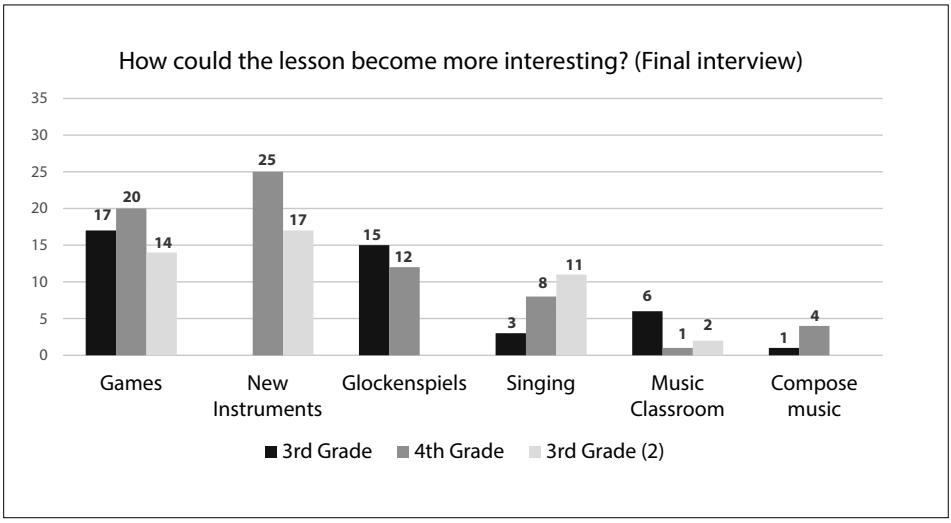

Fig. 10: Activities that enhance student's interest according to their opinion during the final interview. Note: 3rd Grade (2) is the class of the second teacher.

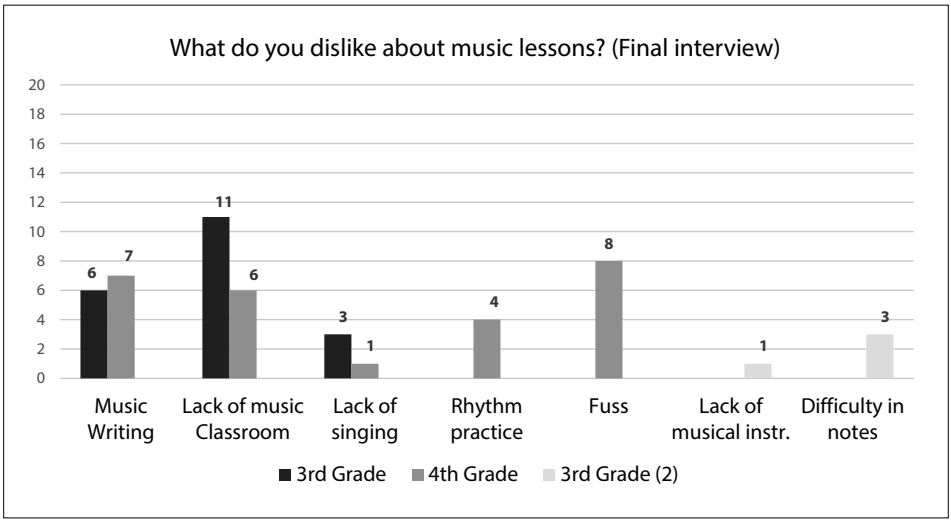

Fig. 11: Activities that reduce student's interest according to their opinion during the final interview. Note: 3rd Grade (2) is the class of the second teacher.

As can be seen in Fig. 10, it is clear that games and performance of musical instruments are among the activities that enhance students' interest. As playing musical instruments was an integral part of the game, it was unclear whether some students preferred to play glockenspiel regardless of the implementation of the game or whether they preferred performing glockenspiel inside the game. In any case, the use of a game with simultaneous performance of glockenspiels harmoniously combined both activities.

In addition, there is a separation of students' preference regarding the performance of glockenspiels and the performance of new instruments. This distinction was not always clear in the answers given, but there was a greater desire for the students of the fourth grade to play with new instruments compared to the students of the third grade, who preferred to practice more on the glockenspiel. Also, the answers given for the students who preferred vocal performance can't be considered valid, as the restrictions due to COVID-19 may have affected the students' answers.

The preferences of the third class of the second teacher were the use of musical instruments as well as games. Singing also got high preferences, but the limitations mentioned above make these results invalid.

The activity that seems to have garnered the most negative student preferences is writing notes. The prohibition of using the music classroom was something that negatively affected some students. The reasons why this happened are beyond the scope of this research, but it should be pointed out that the classroom where the activity is carried out might affect the psychology of some students and possibly their interest in the course.

Positive and Negative Aspects of the Game

In order to investigate positive and negative elements of the game, students were asked for their opinion regarding the positive and negative aspects of the game during the final interview. First of all, a very important positive element in the flow of the game, was the use of glockenspiels. Instrumental performance was assessed as an independent component as it was not clear whether students preferred to perform glockenspiels within the game or independently. Beyond the use of musical instruments, the positive elements of the MNC game, according to the opinions of the students, were the following (Fig. 12):

- Real objects, such as dice and real cards (18)
- The aural tests of this game (18)
- Cooperation (15). Team-based activities seem to have greatly enhanced student interest.
- Scoring, as a key element of the game, gave students a tangible goal (12).
- The exclusive challenge divided the students, as some of them saw it as a positive element (11), while some others saw it as a negative one (6).

- Competition, as an element of the game, appeared to increase the interest and effort of some students (10). However, it should be noted that in very few cases it seems to have worked negatively.

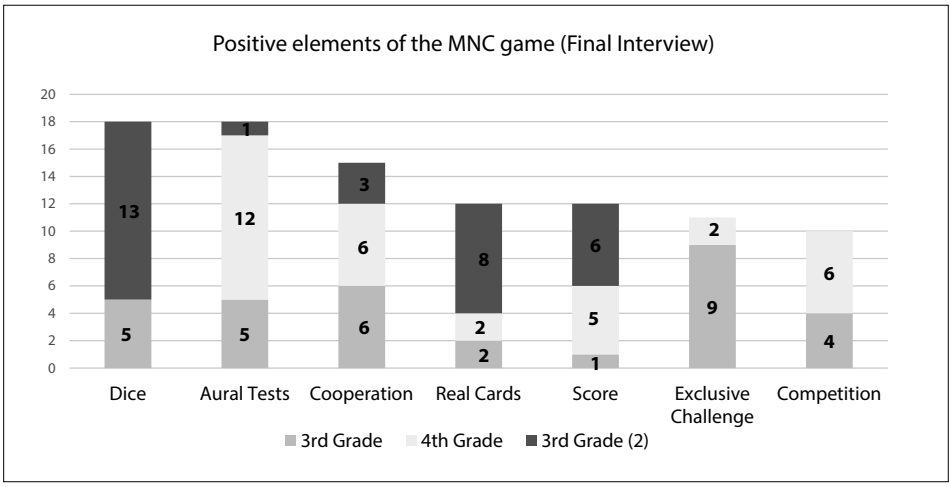

Fig. 12: Positive elements of the MNC game in the final interview. Note: 3rd Grade (2) is the class of the second teacher.

On the other hand, the negative elements of the game, according to the students' opinions, were as follows (Fig. 13):

- The difficulty of the tests (19). This is confirmed by the fact that the class teacher was reading rhythmically the performance notes in the respective tests, as the students were not responding adequately. There were also problems with the rhythmic execution of the patterns, even though the students had practiced the rhythmic values in previous lessons.
- Conflicts (11). In the game flow, some skirmishes between players and teams could not be missing. In general, however, this did not overshadow the smooth flow of the game.
- The defeat (10)
- The exclusive challenge, as previously stated, was seen by some students as a negative element (6).
- Some fourth grade students stated that they got tired of the constant repetitions of the game (6). The reduction in interest during the last hour of the activity was also evident in the observation made by the teacher-researcher, especially among the fourth grade students.

- The reduction of points in case of fuss, although used a few times, seemed to upset some students (5).

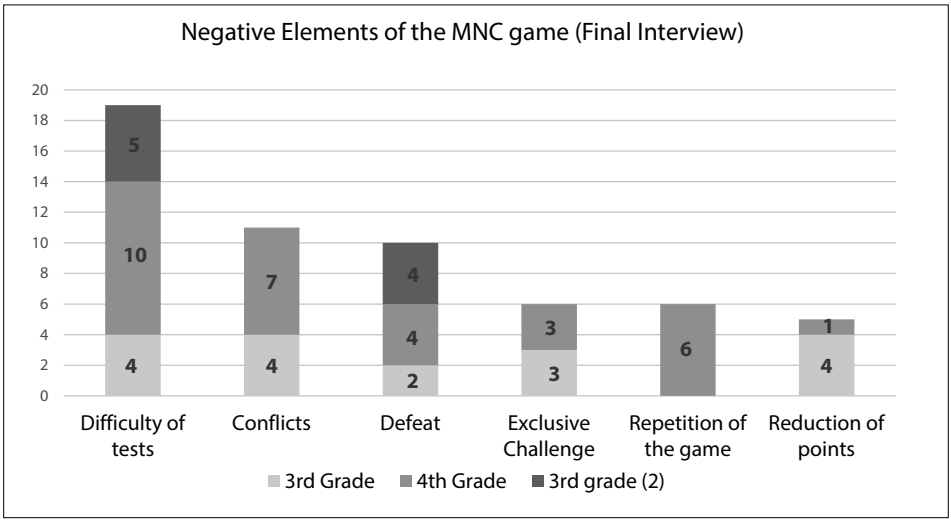

Fig. 13: Negative elements of the game according to the opinion of students. Note: 3rd Grade (2) is the class of the second teacher.

Discussion

The present research highlighted the positive contribution of the MNC game in enhancing students' interest in the music classroom. This was done with qualitative measurements, focusing mainly on students' dispositions, emotions and preferences while data was collected on engagement and individual elements of the proposed games that enhanced interest. The above confirms the findings of previous researchers who point out ways, techniques and strategies to enhance interest (Bergin, 1999; Chen, Darst & Pangrazi, 1999; Hidi & Renninger, 2006; Jones, 2009; Lin, Hong & Chen, 2013; Palmer, 2004; Pérez-Sanagustín, Ramirez-Gonzales, Hernández-Leo, Muñoz-Organero, Santos, Blat & Delgado Kloos, 2012; Plass, O'Keefe, Homer, Case, Hayward, Stein & Perlin, 2013; Renninger & Hidi, 2016; Schraw et al., 2001; Trilianos, 2002). These strategies include:

- The provision of choices in the learning process
- The promotion of making students active
- The interaction of students with each other
- Teamwork

- The integration of game elements in the activities
- Practical-manual activities
- Innovation and diversity (Schraw et al., 2001; Renninger & Hidi, 2016; Palmer, 2004; Trilianos, 2002).

Findings regarding student preferences and the enhancement of interest in music lessons are also confirmed (Bowles, 1998; Temmerman, 2000). Performing musical instruments and playing games are two of the most favorite activities of the students as shown in the results of this research. The same conclusion was reached by Bowles (1998) investigating the preferences of students in the music lesson through a questionnaire of thirteen musical activities. Hartwig (2004) in her doctoral dissertation also came to the same conclusion.

The musical equipment as well as taking an active role in the educational process were pointed out by Saputra (2021) as factors that enhance interest in a research that has many elements in common with the present research, as it aimed to enhance the students' interest through the teaching intervention *"Learning by doing"*. He used mixed data in order to measure the students' interest before the start and after the end of two cycles of action, reaching the same conclusion as the present research, that is, the fact that the use of musical instruments and the active participation of the students contribute to enhancing interest. Furthermore, the usefulness of the MNC music game of the present research in enhancing students' interest confirms the results of previous studies on other music games, such as *Rock Band*, *Rhythm Cat*, *Flashnote Derby*, *Staff Wars*, *Blob Chorus* and *Melody* in which there was an increase in engagement and motivation to participate (Peppler, Downtown, Lindsay & Kenneth, 2011; Lesser, 2019).

The participation, commitment and involvement of the students through the complexity of information provided by the combination of real and virtual environments immersed the students in the game world and, as shown in this paper, strengthened their interest confirming previous research (Faiella & Ricciardi, 2015; Zainuddin, Shujahat, Haruna & Chu, 2020; Apostol, Zaharescu & Alexe, 2013; Magerkurth, Cheok, Mandryk & Nilsen, 2005). Also, the positive emotions developed by the students during the activities seem to have played an important role in the learning process, which confirms the assertion of Strike & Posner (as cited in Lin et al., 2013). Also, as previous researchers have noted, many students emphasized fun as a very important element of play (Kapp, 2012; Plass et al., 2013; Lee & Hammer, 2011).

Limitations

Although the present study confirms the enhancement of interest during and after the implementation of the game, following limitations and facts should be considered:

- The implementation of the game was interrupted for 45 days because of the pandemic restrictions. However, findings show that this interruption did not seem to affect the flow of interest.
- The original design of the game provided that students would roll the dice, work in groups and share cards. Due to pandemic restrictions, the dice was rolled by the teacher while the cooperation of the students and sharing cards was also problematic due to mandatory distance keeping and face mask usage.
- Singing was prohibited throughout the school year. This had an indefinite impact on the students' preferences for the music lesson, as some might have preferred it.
- Conflicts as well as frustration after losing the game are among the negative emotions that affected a small percentage of the students. However, the flow of the game did not appear to be particularly affected by these factors.
- Although the game is offered so that the teacher can provide support when and where needed, some students had difficulty performing musical notes on the glockenspiel.
- The game requires preparation by the teacher. Before implementing the game, the teacher should divide the students into groups, hand out the cards, give the musical instruments and explain the rules of the game.

Conclusion

The use of the technologically enriched educational game "Musical Notes Challenge" seems to have enhanced students' interest in the music lesson, making it more attractive. The vast majority of students expressed positive feelings about the music lesson after the implementation of the game. Performing musical instruments as well as playing musical games are activities that students prefer during music lessons. On the other hand, the activity that seems to garner the most negative student preferences is music writing. Finally, the existence of a music classroom seems to play an important role in their feelings and interest in music lesson.

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