

# GAMIFICATION IN TEACHING MUSIC: CASE STUDY

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## Abstract

The study presented here aims to assess the quality of learning that occurred by the introduction of an educational application in the teaching/learning process of music education – 2nd cycle of basic education. The investigation focused on the use of a set of multimedia materials designed to provide support for instrumental practice (recorder and guitar) and backing vocals, according to the technique of the sing along. The students had access to the materials in two ways: in the first case, they were presented as an activity supervised by teacher in classroom context; in the second, students could gain access to the multimedia materials so proactive, through the Moodle platform. In this case, students were invited to participate in a game, conceived as a step-by-step journey, in which they were required to answer random questions to unlock the desired multimedia materials.

The study reported in this paper adopted a methodology based on the comparative analysis of data from three groups, one in which they use the media materials under the supervision of Professor; in another were presented as a game hosted in the Moodle platform and yet another, with the function of control group, where students were taught the same programmatic content, however without recourse to a game or multimedia materials. The findings seem to point to an increase in the level of internal motivation in groups in which students used the multimedia materials, the group involved in the game seemed to develop parallel skills in other adjacent areas.

## Keywords

Education, Ludic, gamification.

## **1. Introduction**

At the present time, in the first half of the 21st century, the school uses unreservedly the new technologies of information and a various multimedia materials that uses mostly in context of a didactic model where the pedagogy policy prevails. The new modes of socialization are resorting to new mediations anchored in technological artifacts of great complexity (e.g., using augmented reality), able to subvert the educational processes in place: children learn alone, using "smart" machines, with multimedia capabilities, that are interactive and portable. The school institution, still unprepared and little receptive in this field, rarely develops and implements multimedia content. Although consensual the excellent acceptance that this type of teaching objects enjoy with the educational community, there are still no studies that evaluate the quality of results obtained from its application, in particular if available from the internet and through mobile computing devices. Thus, this study seeks to answer the following question: The learning obtained with the help of multimedia materials encourage metacognition<sup>1</sup>? The intrinsic motivation of students presents higher levels in the context of an education policy? Above all, the study presented here aims to assess the quality of the learnings generated by the introduction of an educational application in the teaching/learning process of music education – 2nd cycle of basic education.

## **2. Education: what is it?**

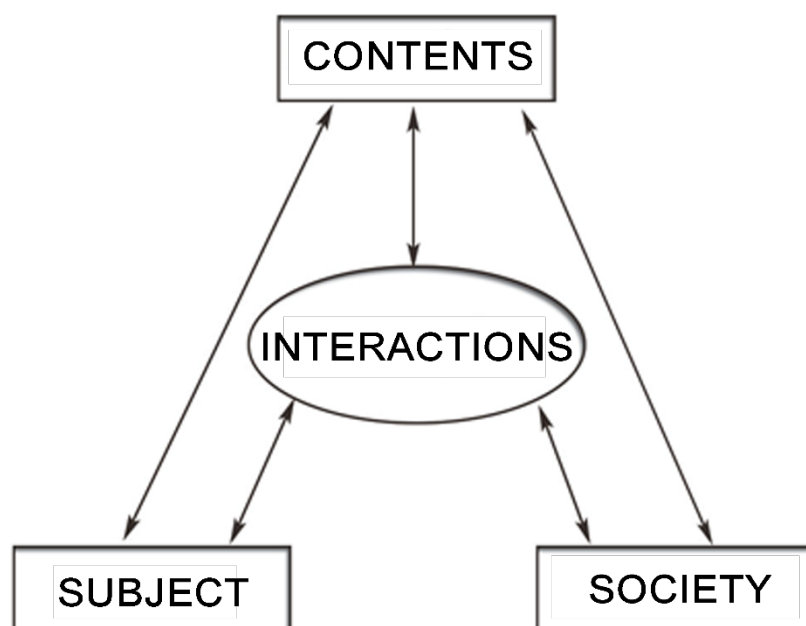
Global phenomenon, education, has resisted all attempts to unique and universally accepted definition. Complex process seems to encompass two fundamental aspects, teaching and learning, being observed in all societies while fundamental mechanism of social reproduction. Education aims to transform society and the existential human constructs, being responsible for the perpetuation of culture, creating mechanisms that allow passing to the next generation cultural modes of being, thinking and acting, necessary for life in society, promoting the individual adjustment to prevailing paradigms and groups into society. A. Maslow (1970) States that education consists in the constant increase of self-knowledge and sense of belonging in the Universe (Maslow, 1970), and the intrinsic learning – the update of knowledge – is more important than the extrinsic learning, especially when it embodies in the mere

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<sup>1</sup> Reflection on cognitive function. Process that involves reflecting on the thought itself. In education refers to the reflection about how you learn.

memorization of facts or law. In this perspective, the role of education ", your goal – the human goal, the humanist objective, the goal as human beings – is, ultimately, the ' person ' self-actualization, to become completely human, the development of the fullness that the human species, or the particular individual, might achieve. A less technical way, (the function of education) is to help the person to become their best (Maslow, 1976). " Currently, the approach to the concept of education is done from various theories, almost always accompanied by reflections whose affairs the problem related versa thematic education, such as the aims of education, the notion of learning, the teaching functions, the place of the student, the scope of the syllabus or the cultural relevance of education” (Bertrand, 2001).

Theories of education are grouped into three main groups, according to their position on the four elements polarizers, the subject (pupil/student/students), contents (disciplinary programs), society (the world, others) and pedagogical interactions (fig. 1) that develop between the poles formerly mentioned, promoted by teachers or by communication



**Figure 1 – The four elements of education polarizers. Diagram adjusted from (Bertrand, 2001, p. 12).**

technologies (Bertrand, 2001).

Academic theories focus on the study of disciplinary content, of reasoning, logic, academic competition, and of Western culture; have as main sources of inspiration for philosophy and classical literature. Among the variations that integrate include technological theories, insofar as these believe the message education is likely to

increase if you use "appropriate technologies" (Bertrand, 2001). According to Bertrand, the term "technology" should be taken in a very broad meaning, covering the most diverse means, including always "the teaching materials of communication of information: computers, television, video, CD, DVD, etc.," and "the latest trend is for hypermedia, internet sites, the means of communication between people, the computerized learning environments and interactive software (Bertrand, 2001, p. 17)."

### **3. How do you learn music – the active methods**

Learning music, mainly instrumental practice, has unique characteristics that distinguish it from all other types of knowledge (Clarke, 2002). Learn to play an instrument requires the acquisition of a wide range of skills, hearing, motor skills, interpretive and expressive reading, all of them of great complexity, all of them requiring thousands of hours of intensive work if you want to acquire a high level of achievement. However, "Although the margins of other disciplines practiced in teaching, the music follows the current trends, orienting itself towards a pedagogy based on the activity of the child". In the case of so-called "active methods", among which stand out those of Zoltán Kodály, Karl Orff and Maurice Maternot. These pedagogies have in common the fact that they left the experience to reach the theoretical knowledge (which only comes much later) and, above all, to support the development of the rhythmic sense. This is a fundamental point in the formation of children, because, at a time when pop music and jazz/popular are so disseminated among youth, all think they're familiar with the rhythmic element, which strongly prevails in those genres; however, this familiarity is only apparent.

The kids, especially the younger ones, have shown enormous appetite for percussion instruments; however, if the left wing in complete freedom, reveal a very limited invention power which manifests itself especially through regular rate in connection with their physiological impulses. Therefore, producing music are not innate, it is necessary to lead them to the discovery of the rhythm, not as an abstract notion, but bodily. Once stimulated, the child develops skills at the level of the sense of rhythm, tonality and lack of frequencies (Karma, 1982).

The interest of active methods is precisely to provide a child psychic awareness of your personal time, serving as a framework for fixed point, at your own pace and invention. Also in this case, it seems that from non-executives – for example through activities such as multimedia games or sing-along's – is more formative than premature conduit

of instincts. In order not to compromise the enthusiasm and curiosity, you might want to let children learning initiative, what happens to the huge freedom provided by an educational multimedia application, and let your discovery impulses if focus on the basis of their intrinsic motivation. In a second phase, the active methods can precisely instinctive musical fitness discipline (Gordon, 1971) that arises under a somewhat lawless and provide also a vocabulary of rhythmic formulae that children can later use in its improvisations.

#### **4. The importance of motivation in musical learning**

Motivation plays a key role in learning and in musical performance (Sloboda & Davidson, 1996). It is generally accepted that motivation has a weight percentage of approximately 20% in overall school performance; the remaining 80% would be distributed by socioeconomic status, intelligence, ability, etc., of the students. However, in the case of musical learning, this percentage is even greater: some studies point to a percentage of influence in the order of 38%. In this area, it appears that the motivation is the driving force which may lead a student to participate in learning activities and acquire musical knowledge and skills constituting the fundamental core of the song. As Clarke "instrumental learning, regardless of school context where you enter, is of unique characteristics when compared to other learnings (Clarke, 2002)." The importance of motivational factors in intellectual performance of children in cognitive tasks, including those related to music, is undeniable. It is known that affect the directions for use, the way you acquire and the way you transfer all the skills and knowledge to new situations.

In this context, there are three major motivational theories: the model of Dweck (fig. 2), which demonstrates that the motivational patterns of children influence their behavior and performance in situations of difficulty or failure of a predictably (Dweck, 2006); the theory of Flow (of Csikszentmihalyi), which suggests that children with more success in music are those that demonstrate greater ability to enjoy the musical activities of intrinsic shape, revealing greater persistence in the face of obstacles because the turn into new learning opportunities (Csikszentmihalyi, Abuhamdeh, & Nakamura, 2005) and, finally, the theory of assignments, Weiner. This is one of the most theories applied to music, because it establishes a direct link between fulfillment, interpretation, motivation and musical performance. Given the importance of motivation in learning

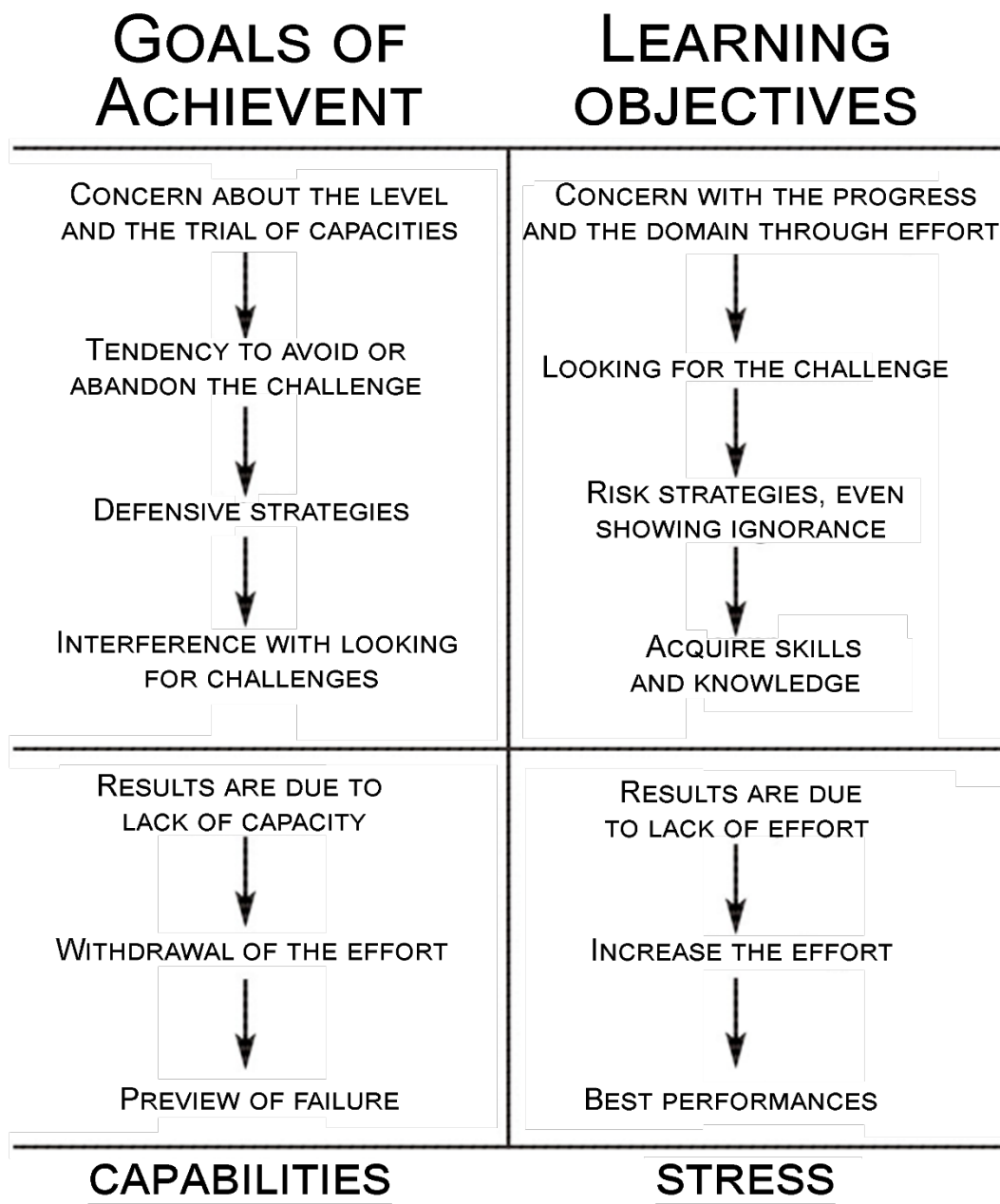


Figure 2 - The process of motivation according to the model of Dweck (*Model Achievement Motivation*).

musical is impossible to ignore educational trends such as ludic activity and the gamification, with huge impact in this area.

### 3. *Ludic, edutainment and gamification*

The game is, first and foremost, an activity that is based on actions; its appeal is rooted in the desire of fun, challenge and in search of genuine pleasure. Spontaneous activity and natural, not restricted by space-time limits, symbolizes learning key moments

during the development process, as it allows to organize and structure the psychic system, while at the same time helps the development of cognitive and affective capacities. However, the attractiveness and success of playful activity can only be understood from the analysis of the components that make up the system of motivation, responsible for adding that keeps the player playing.

The relationship between game and education is not new. More: the game can be considered the primary educational lever. Comparative studies carried out with different pedagogical techniques of explanatory nature, training, audiovisual examples, expository and others, demonstrated that the playful activity is most effective way to render educational, even when this is aimed at the development of personality (Snyder, 1989). It is particularly relevant to stress that all the techniques described above originate in professor (which prepares, proposes and provides to students in the form of lessons) while the game is a voluntary act that springs spontaneously from the imagination of the child without any adult intervention. Is through the game the child processes to your self-education. Being a drive and natural activity on the child, the game can become in the hands of its most complete educator pedagogical tool. However, despite their known effectiveness of ludic while didactic technique, society still don't recognizes their considerable importance, thinking the game less serious activity and even inconsequential, pernicious if referenced, for example, with the new forms of digital entertainment, such as video games.

The relationship between play and learning is ancient and object of study of such disparate areas as science, literature, the arts, or sports technologies. The young live immersed in a cultural environment marked by the omnipresence of all sorts of messages and technologically mediated stimuli. Given this reality, impossible to ignore, it seems to us at all advantageous that the education system to accommodate these technology media, providing favorable conditions for their integration in their pedagogical practices. The games are gaining increasing credibility as educational tools and many studies were carried out in the last decade on the subject, especially in order to know how to increase the learning potential by combined use of educational applications and videogames (Eck, 2006). Due to this perception, that refuses to ignore the impact produced by the phenomenon of videogames, and the enormous development of the digital entertainment industry, a new trend has recently emerged, called gamification. The concept refers to the possibility of applying the elements present in activities outside of the usual contexts them and educational purpose.

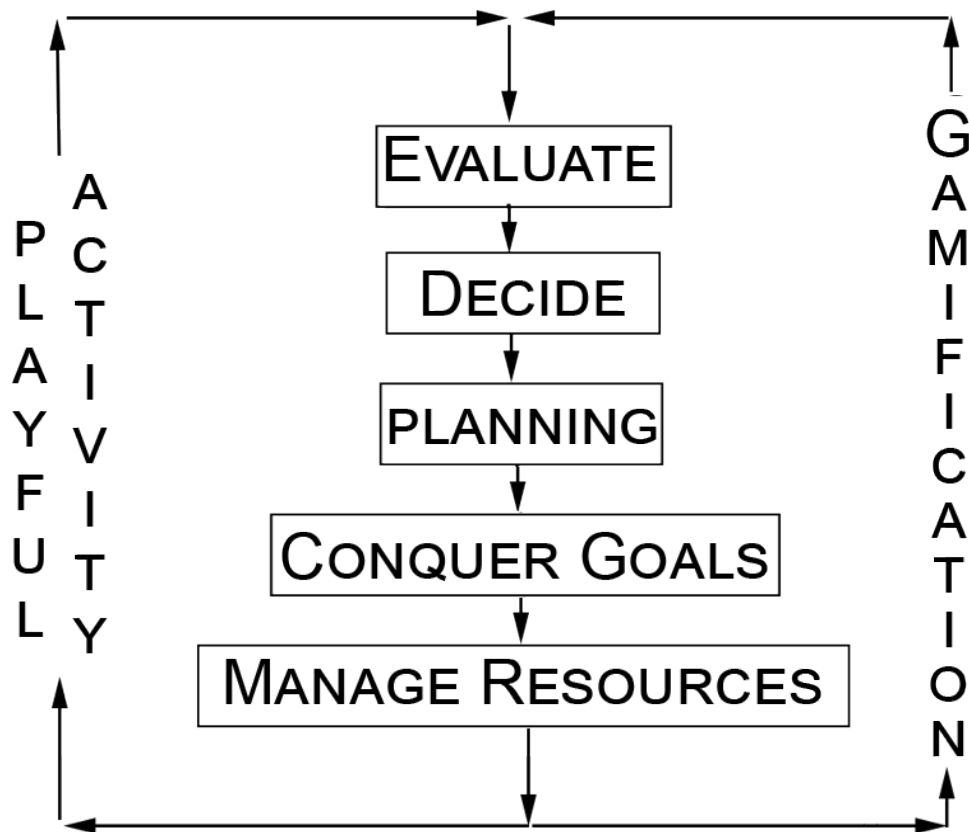
However, introducing gamification technics in educational applications is not without difficulties, namely:

- Very high development costs and little market attractive for producers;
- Resistance to innovation by educational institutions, for the introduction of new technologies for learning is always an unnecessary risk;
- The schools still reluctant to replace the traditional didactic manuals for educational games;
- Prejudices of the educational community regarding the use of video games in the context of the classroom;
- The almost impossibility of evaluating the learning acquired by the educational games through exams (so valued in current societies) and
- The different access to computer equipment that can vary greatly from institution to institution (in the case of most deprived regions within the same country or in underdeveloped Nations).

The gamification of an activity (or another educational nature) refers to the application of elements present in video games in other activities outside of the usual contexts [(Deterding, Dixon, Khaled, and Nack, 2011); (Kapp, 2012)] and with educational purpose, it being understood by "elements of the games" features such as rules, establish clear objectives and reward achievements through scoring systems or trophies (reward system and feedback), launch challenges, develop the second action difficulty levels in order to encourage performances and promote the creation/narratives and plots of avatars, here understood as the embodiment of the imaginary alter-ego of his own person (physical and emotional) in the form of a character. These factors are of such importance that only when all are present, working cooperatively, can speak with property of gamification (Kapp, 2012) and if you can get positive effects at the level of commitment of the individuals in the proposed tasks. Above all, it must bear in mind that the game is structured as a problem requiring solution, a challenge, always retaining, however the ludic nature and entertainment. Interaction with games allows the user to view and Act (or learning and experience) new situations in different ways, gaining the ability to perform collaborative work with new affinity groups and developing resources for further learning in the field of troubleshooting «semiotic nature, relational and ethical (Gee, 2004). From the pedagogical point of view (fig. 3), are to stress the concomitant effects to playful activity, in particular, those that force the player/learner to

- Assess the various situations that put you at random;
- Make decisions;

## GAMIFICATION: PEDAGOGICAL EFFECTS



**Figure 3** - Flowchart of the pedagogical effects related to the use of gamification.

- Calculate long goals, medium and short term;
- Making choices and managing resources and
- Gain a positive reinforcement/reward.

Mediation of learning held with the contest of multimedia materials (video games, sing-a-long 's) involves students in interaction with the teaching objects, developing various concepts and articulating, simultaneously, the theory with practice. Here, the intention is not only animate the ' before promoting the didactic dynamic and interactive learning that challenge learners to cognitively solve practical problems, contributing to the structuring of a constructivist praxis. As stated by L. Alves, "contact with the video games enables young fundamental skills for the success of the teaching learning

process. They provide skills and competencies to remain ' alive ' in life and the world of work "(Alves, 2012).

In this context, it can be concluded that the pedagogical results incidental to interaction with educational games and interactive multimedia materials arising from intrinsic motivational binding associated with the playful challenge, highlight the introduction of the concepts of hidden curriculum and "positive reinforcement" combined with "reward", aiming to enhance the motivational aspect to the detriment of what seems an overly deterministic approach.

#### **4. Context of the study; target audience;**

This study took place in the Group of schools of Padrão da Légua, Matosinhos, which integrates high school with the same name and basic school of Leça do Balio. The group is located in urban space, coexisting in the surrounding area projects, housing cooperatives and other expanding residential areas. In addition, the urban development determined the proliferation of the service sector and trade, to the detriment of agricultural and industrial activities. Socio-professional characteristics of parents of students who attend the grouping are the reflection of strong suburban growth, predominantly belonging to a low-middle class that performs activities in the tertiary sector. About 57% of parents of students present, as education level, basic education and less than one fifth higher education. At the same time, the expectations of students in relation to the pursuit of University studies are low level. However, the educational project of school has as a first area of intervention school success and student personnel, reflecting the status of centrality that attaches to these issues. Being aware that the education of most of these students do not exceed the secondary level, swells the importance of school socialization conveyed in this do, perhaps the only one that many will have lifelong access of students, in relation to the pursuit of University studies are low level. However, the educational project of school has as a first area of intervention school success and student personnel, reflecting the status of centrality that attaches to these issues.

Concerning the definition of the target public, the study focuses specifically on students of the 2nd cycle of basic education, within the subject of Musical education, characterized on the basis of the following criteria:

- Between the ages of 10 and 13 years;

- Access to internet via fixed or mobile devices;
- Be registered users of Moodle platform of the School Group;
- Attending the discipline of music education.



Figure 4 - Sing-along, tabs (classical

#### 4.1. Procedures

The research focused on the use of a set of multimedia materials designed to provide support for instrumental practice (recorder and guitar) and backing vocals, according to the technique of the sing along (figs. 4, 5, 6 and 7).

Sheet music for recorder

The screenshot shows a music software interface with the following elements:

- Title:** O ANZOL
- Staff:** A musical staff in 4/4 time with a key signature of one sharp (F#). The notes are: C4 (quarter), D4 (quarter), E4 (quarter), F#4 (quarter), G4 (quarter), A4 (quarter), B4 (quarter), C5 (quarter), B4 (quarter), A4 (quarter), G4 (quarter), F#4 (quarter), E4 (quarter), D4 (quarter), C4 (quarter).
- Control Panel:** Located in the top right, it includes icons for 'Flautas' (flutes) and 'Notas' (notes), and a 'Flautas' label.
- Character:** A blonde girl playing a recorder.
- Fingering Table:** A table with the title 'LA' and three rows of fingerings: 2, 3, 1.
- Footer:** CRISTINA GOMES

Figure 5 - Sing-along, flute sheet music.



Figure 6 - Sing-along, supporting the vocal practice.



Figura7 - Sing-along, fingerings in the Fingerings in Recorder

The students had access to the materials in two ways: in the first case, they were presented as an activity supervised by teacher in classroom context; in the second,

students could gain access to the multimedia materials so proactive, through the Moodle platform. In this case, students were invited to participate in a game, conceived as a journey of steps, in which were required to answer random questions to unlock the desired multimedia materials.

## **4.2. Methodology**

The research adopted the methodological approach of single case study, observational mode, relying mainly on participant observation as a primary data collection technique (Gomez, flowers and Jimenez, 1996, p. 94, cited by Coutinho and Keys, 2002, p. 227). Drew up a chart of observation of behaviors (Annex 1) organized according to four broad areas,

- Preparation of the lesson where if you want to determine if students have developed or not, if such Metacognition behaviors were voluntary and, if so, what is the relationship with the use and availability of teaching and materials multimedia developed with gamified approach (associated with a playful typology);
- Type of motivation, intrinsic or extrinsic.
- Overlapping areas of interest, especially to school and nature of so-called hidden curricula. In this case it was noted if students shared skills acquired with family and peer groups in extracurricular situations.
- Quality of the results obtained, below, within or above the average for the control group (group who were taught the contents according to a pedagogical system board using the paper-based manual).

Organized three working groups, as follows:

1. CONTROL GROUP: Class attendance (education policy with appeal to traditional didactic objects and disciplinary manual in paper form);
2. Group A: Class attendance (education policy with use of didactic multimedia objects – sing-along)
3. Group B (GAMIFICATION): didactic objects stored in the Moodle platform – sing-along associated with a game, conceived as a journey of steps, in which students were required to answer random questions to unlock the desired multimedia materials. The observation of activities had a duration of 8 weeks,

from 6 January to 24 February, having held twenty-four records, respectively, eight for each of the groups.

## 5. Results and discussion

The data collected seem to be consistent with the conclusions obtained from the literature review referred to above. Overall, there were the following results, expressed in percentage terms:

- **"Lessons preparation"** (chart 1)
  - CONTROL GROUP – 32% (12 in 25) of the students prepared the lesson.

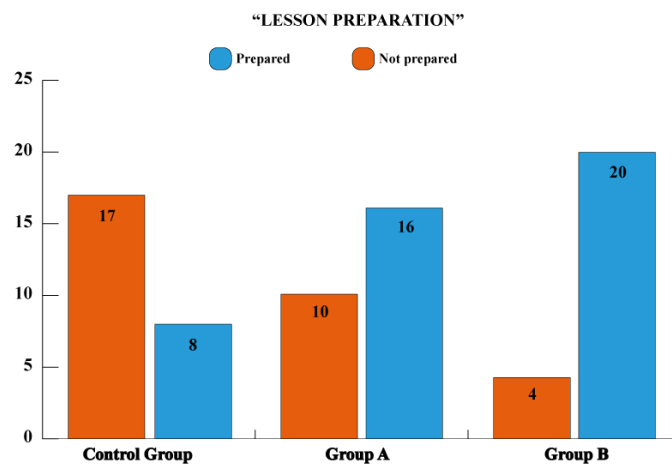


Chart 1-"Lessons preparation"

- GROUP A – 61% (14 in 26) of the students prepared the lesson.
  - GROUP B – 83% (21 in 24) students are preparing the lesson.
- **"Motivation"** (Chart 2)
  - CONTROL GROUP – 48% (12 in 25) do homework on its own initiative.
  - GROUP A – 53% (14 in 26) do homework extracurricular on its own initiative.
  - GROUP B – 87.5% (21 in 24) do homework extracurricular on its own initiative.

- **"Overlapping areas of interest" (Chart 3)**
  - CONTROL GROUP – 4% (1 in 25) shared competences acquired with family and peer groups in extracurricular situations.
  - GROUP A – 38% (10 in 25) shared competences acquired with family and peer groups in extracurricular situations.
  - GROUP B – 79% (19 in 25) shared competences acquired with family and peer

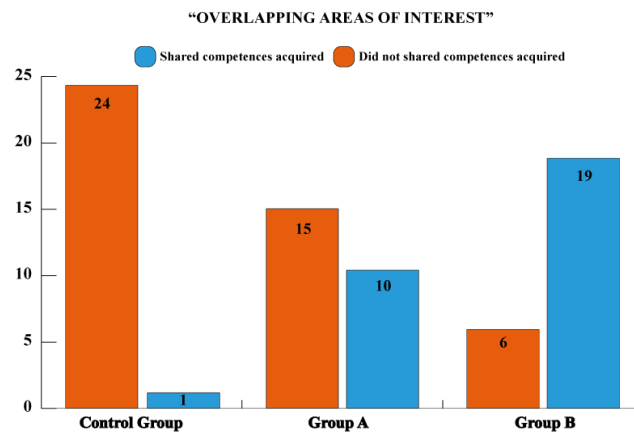


Chart 3 - "Overlapping areas of interest"  
groups in extracurricular situations.

- **"Quality of the results obtained" (chart 4)**
  - CONTROL GROUP – 64% (16 in 25) achieved a rating above 50% in the summative evaluation.
  - GROUP A – 84% (22 in 25) achieved a rating above 50% in the summative evaluation.

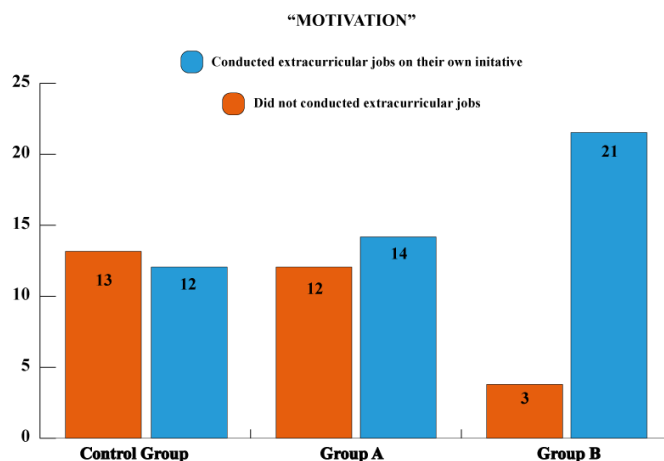


Chart 2-"Kind of motivation"

- GROUP B – 100% (25 in 25) achieved a rating above 50% in the summative evaluation.

The observed behaviors in all parameters indicate consistently qualitative provision of better quality in Group B, and on the quality of the results obtained a success rate of 100 percentage points, which seems to confirm the value of pedagogical approaches and gamification didactic when compared with traditional education systems. This gain in qualitative terms is also evident when comparing the groups A and B (not first, multimedia materials were introduced in the context of the classroom with the teacher's contest), because the results of the second, in all parameters observed (Metacognition, motivation, application of learning in everyday situations, learning quality) were above average in twenty eight percentage points.

## 6. Conclusion

The study that reports the article proposed to assess the quality of the learnings generated by the introduction of an educational application in the teaching/learning process of music education – 2nd cycle of basic education. The research adopted a methodological approach of single case study, observational mode, being that the conclusions obtained seem to point to an increase in the level of internal motivation in groups in which they used the multimedia materials. In fact, the Group B (with access to the multimedia materials and the associated game) has been shown to have developed quality skills in all the areas observed, as well as other adjacent domains, such as socialization and the recovery of hidden curriculum.

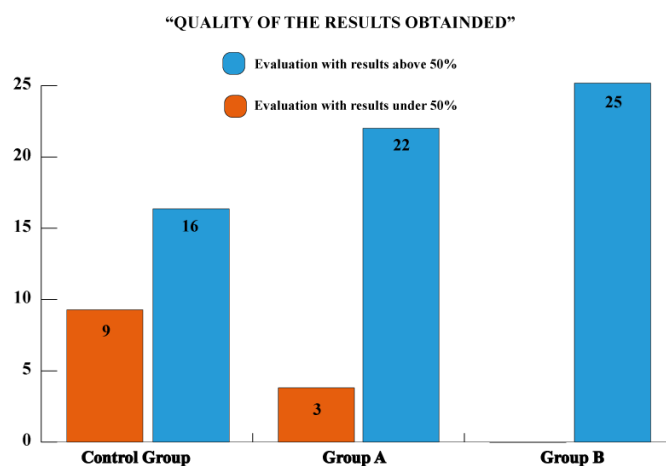


Chart 4 - "Quality of the results obtained"

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