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# Analysis of the use of ICT through music interactive games as educational strategy

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**Abstract**

Information and communication technologies have been quickly introduced in all professional and leisure environments. Nonetheless, this process has been slower in educational spheres. ICT contribute and will contribute even further to the renewal of teaching by bringing innovation and creativity. For this reason, we have conducted an investigation in order to ascertain whether through a methodology based on the use of new technologies (ICT) musical knowledge and consequently academic performance of a group of students from 3rd year can be improved. To achieve this goal, two groups of students were selected: one was experimental, who received encouragement (22 learners) and the other group that was controlled (24 students), who worked in Music classroom in a traditional way. The results show that musical learning through the use of ICT improved in 100% of the parameters analysed. For this reason, it is concluded that it is essential that teachers must seek new teaching methods and strategies to achieve a greater effectiveness of their action as a teacher, and these techniques should be undoubtedly closely linked with the introduction of ICT in the classroom.


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*Keywords:* Music education, ICT, Game-based learning, Secondary education.

## 1. Introduction

New technologies are being introduced rapidly in all professional, recreational and gradually also in educational settings. ICT contribute and will contribute even further to the renewal of teaching by bringing in innovation and creativity (Hernández, Pennesi, Sobrino & Vázquez, 2011), two aspects that are certainly necessary, as the current teaching-learning process begins to turn into a monotonous routine sometimes, and therefore some fresh air comes in handy in order to get adapted to the new social and learning demands that schools require nowadays. The impact

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caused by ICT in education and training is unprecedented and it requires new skills and competencies that affect both educators and trainers, and, to a greater extent, students (Adell & Castañeda, 2010; Attwell & Hughes, 2010). This implies that we must introduce the cyber and virtual world in the education and training of our school, so teachers should not ignore this point of approach that we could have towards them.

Indeed, the Society of Knowledge and Information requires a transformation in the teaching-learning processes. Professional experts are required to address the respective fields of knowledge from the perspective of an open and flexible curriculum, aimed at the relevant student learning (Pavon, 2013). Knowledge and teaching-learning process undergoes constant redefinition; it is something dynamic that keeps being rebuilt, transformed; it is the "liquid knowledge" (Area, 2011) of our technological society. Thus, the information and communications technology (ICT), are revealed to be as beneficial for changing traditional learning environments into more diversified and interactive learning environments, where one can build knowledge through active and collaborative learning techniques that promote teacher-student and student-student interaction. A proper use of these technological tools in the classroom allows the creation of new educational models and educational management. In this sense, ICTs shape the environment for the development of innovative and relevant projects that take place at different levels of education scenario. This is the "emerging pedagogy" that Adell and Castaneda (2012) speak of.

However, many teachers fear the introduction of computers in the classroom, claiming that they will lose communication with students, which is already pretty reduced. However, the personal communication that can be generated with the interactive use of media and new technologies, offers us a marvellous opportunity to act on the complexity of learning as a living process, not only intellectually, but deeply affected by emotional and motivational issues such as study habits, previous knowledge, learning styles, expectations and special interests (López-Chao, Lopez-Chao & Mato-Vazquez, 2014).

Now if the educational framework has been slow to react to the strong impact of technological advances (Lopez-Pena, Lopez-Chao & Lopez-Chao, 2015), this delay is most evident in the field of music education, area characterized by the lack of mobilisation and the use of old-fashioned teaching methods. Indeed, although far from academic environments (Romero, 2004), technologies also started to be introduced in the musical environments; but in the current context of music education, the introduction of ICT cannot stay out of the classroom, because as Giráldez says (2005:137) "the possibilities of “digital learning" in the field of music education are immense, and when it is implemented correctly, it forms a highly dynamic and participatory learning environment". Therefore, we agree with the author (Giráldez, 2007) and the statement that in the field of music, mediated by technology, music education should not be excluded and there must be a "meeting point" in the classroom.

This work arises from the need we find to approach to students from 3rd Compulsory Secondary Education (ESO), teenagers, most of them forced to stay in school against their will, and generally more interested in computers, than they are in studies. This is one of the educational levels where we find it more difficult to properly develop the teaching task, because the attitude of students is of rejection of school activities in many cases because they see no practical use. This attitude is exacerbated in some areas, such as Music, as it is one of the least well-considered subjects, because until recently it was taught by unqualified personnel, and received the treatment of an “easy course”, and therefore once they have to make even a little effort to pass it, it results in an abandonment (Chao-Fernandez, Mato-Vazquez & Lopez-Pena, 2015).

Thus, taking into account that the concerns of adolescents with these characteristics are closely related to the use of information technology, new technologies, Internet, etc., we thought that a good way to approach them and the contents of the area of Music could be through a musical educational game, designed by one of the authors for its use on a computer, and which has won an Award for Educational Innovation (Chao-Fernandez & López-Pena, 2007), through which, in a playful way, students get a closer look at an unknown and new world while it serves them to approach the fundamental musical content of that educational level. To check the results of its use, we conducted a study as described below.

## 2. Aim

The main aim of this research is to find out whether through a different, innovative methodology, based on the use of ICT, combined with an educational game, students improve their knowledge and therefore their school grades.

## 3. Methodology

### *3.1. Sample*

The study was carried out during the 2013/14 school year a state-run school located in the centre of certain town. According to Arias (2006), we selected two groups of students from the 3rd grade of Secondary School: an experimental group (GE), which received the proposed methodology (22 pupils), and a control group (GC), which were 24 students that worked in a traditional way during Music hours, which served as a comparative method. The sample was therefore of 46 people.

### *3.2. Procedure*

The procedure carried out was as follows: in first place, at the beginning of the course, we made the initial diagnosis in both groups of their previous musical knowledge of their educational level concerning musical language (L.M.), instruments, (INS.), musical forms (F.M.), and history of music and composers (H.M.).

To estimate these values a test with a broad battery of questions was designed (developed taking into account the curriculum of Music of 3rd year of ESO, and all of them included in the musical game that will be used later) to determine the initial knowledge of students on the basic elements of musical language - extension signs, setback notes, syncopations, etc.; musical instruments and their characteristics as well as their family classification; the most important composers of every musical period, along with their most characteristic works; and the fundamental characteristics of the different musical forms.

The results, quite similar and low in both groups, as the average mark does not reach the pass mark in any group in any of the analysed areas (Table 1).

Table1. Average mark of each group in the previous knowledge diagnose test

| | L.M. | INS. | F.M. | H.M. |
|---|---|---|---|---|
| Average Mark EG | 3,1 | 4,3 | 2,1 | 1,6 |
| Average Mark CG | 3,2 | 4,2 | 2,2 | 1,8 |

After getting these results, we started complementing the usual Music course of group GE with the systematic use of the computer application "Musichao, musical educational game", in order to help consolidate the musical skills of 3rd graders concerning musical language, instruments, musical forms and history of music.

The game consists of a home page with 59 questions organized into five blocks, each of which seeks to respond to a different aspect of the aforementioned curriculum. It is arranged as follows: there is a home box, identified with the figure of an eighth note, that once the game starts, it will move, reaching the position in which the learner is at whenever they throw the dice. If the player fails the question, the cursor goes back two squares as a penalty. From this box the different groups of questions, structured in a spiral, and each identified with a different pattern.

To the right of the screen, there are buttons of interest for all users. From here the students can start the game by clicking on the button TIRAR DADO (Throw dice). To the right of said button, there is a number, which shows a number randomly each time the learner plays, as if it were indeed a dice. Below we find three buttons, where one can check the total number of responses that the student has taken ("CONTESTACIONES", Answers). The number of right answers can be checked on the "ACIERTOS" (right answers) box and the failed answers on "ERROR". Each correct answer will add 10 points and failed ones will subtract another 10.

Given the educational purpose of the game, the student will be able to access the button “LEARN MORE” in each question, to learn more about each of the offered response options.

In addition, always seeking a greater educational impact, on the questions referred to composers, musical forms and instruments whenever it is possible, we are given the opportunity to hear a fragment of a representative musical work (those are included either when there are recordings, and only in cases where the current law allows it).

The teacher can also use each working day the game results as an aid to the evaluation, as when the game ends, the screen shows the results achieved by each student, as it always indicates the total number of answered responses,

including the number of those answered right and the number of failed answers, enough data to make a diagnosis of each particular situation.

## 4. Results

Throughout the academic year we analysed the results of both groups through assessments (similar questions to those included in the educational game were always included as well in the different tests, as the game was designed and based on the curriculum of 3rd year of ESO) and data collection in the GE group from the notes taken by the teacher in the class in which the game was used, obtaining the conclusion of the results from the 1st (1ª Ev.), 2nd (2ª Ev.) and final evaluation (Ev. Final), as shown in Table 2, after GE had been offered a different vision of musical learning.

Table 2. Average mark of each group through evaluation results

| | Results EG | | | Results CG | | |
|---|---|---|---|---|---|---|
| | 1ª Ev. | 2º Ev. | Ev. Final | 1ª Ev. | 2º Ev. | Ev. Final |
| Average Mark L.M. | 3,9 | 4,8 | 5,9 | 3,4 | 3,8 | 4,1 |
| Average Mark INS. | 4,6 | 5,3 | 6,5 | 4,4 | 4,5 | 4,8 |
| Average Mark F.M. | 2,5 | 3,4 | 4,8 | 2,4 | 2,6 | 3,1 |
| Average Mark H.M | 2,7 | 4,3 | 5,4 | 2,0 | 2,5 | 2.8 |

The results show that musical learning improved dramatically with the use of new technologies, making activities and living the learning process as a progressive, fun and educational experience. Thus, in the GE group, the average marks increased significantly in all aspects analysed, widely surpassing the pass mark in 3 of those aspects, outstanding an especially striking improvement in the section referring to the history of music and composers. However, in the GC, although results improved regarding the initial diagnostic evaluation, the pass mark was not reached in any of the aspects.

## 5. Conclusions

We consider it to be essential the fact that teachers seek new work techniques and strategies to achieve a greater approximation to different students, and that those are closely linked to the introduction of ICT in the classroom (Cacheira, 2014). Teachers should feel the obligation to introduce the cyberspace and virtual world into the education and training of their students, adapting themselves to new social and learning demands (Marqués, 2013).

Our long teaching experience allows us to say that over the working years, one takes awareness of how important it is not only master a subject, but to know how to transmit knowledge and motivate students to bring them forward to learning. Therefore we are trying to achieve the primary objective in Education, which is meaningful learning. We found in the computer game an invaluable weapon to achieve our own style of teaching. We have yet to note the good results achieved with the introduction of the computer in the classroom. To summarize, we can say that:

- The obtained result was magnificent as it aroused great interest and excitement among the students, perhaps the innovation that involves the use of computer equipment in combination with the music class game.
- Its use was highly motivating for students.
- It enabled students to acquire experience and knowledge in a very enriching way.
- It entertainingly developed the capacity of students to solve questions.

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