

Educative Sound Game

Jogo de Som Educativo

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Resumo

Este artigo apresenta um jogo que recompensa as crianças quando estas se mantêm silenciosas na sala de aula. O personagem virtual do jogo só está feliz quando a sala de aula não é ruidosa e recompensa os alunos aumentando a sua pontuação no jogo.

O som é capturado através de um microfone e o personagem pode ser visualizado, por toda a turma, utilizando um quadro interactivo ou um vídeo projector. De acordo com o Plano Tecnológico da Educação as escolas portuguesas estão a ser equipadas com quadros interactivos e videoprojectores (Ministério 2008), proporcionando condições para que o jogo possa ser amplamente utilizado.

Palavras-chave: jogos sérios, educativo, som, ruído.

Abstract

This article presents a game that rewards children when they are quiet in the classroom. The game's virtual character is only happy when the classroom is silent and rewards children by increasing their score in the game.

Sound is captured through a microphone and the character can be shown to all the class using an interactive whiteboard or a video projector. According to the Educational Technological Plan the interactive whiteboards and the video projectors, necessary to play the game, will be available in Portuguese schools (Ministério 2008).

Keywords: serious games, educational, sound, noise.

1. Introduction

Noise caused by the students talking to each other while the teacher is trying to explain something or while another student is asking a question can prejudice cognitive learning. To deal with this sort of disturbing behavior the teacher may resort to several classroom management strategies. For example, rules can be established so that students know when they should pay attention and keep silent. The names of the well behaved students could be shown in an honor board or they can receive stars, smiley faces or points to reward their good behavior (Arends 1995). However, none of that clearly quantifies and shows the students how much noise they are making. Indeed, perhaps the students do not perceive how much their behavior is disruptive. Our hypothesis is that, if children are more aware of the noise they are causing, perhaps it will be easier for them to change their habits. To show the students the sound level of a classroom we propose a game, the Sound Game, which measures the sound level and shows that information to the students. This game will be detailed in the next section. Related work about educative games can be consulted in section 5.

2. The Sound Game

The Sound Game measures the sound level in the classroom and transmits that information to students so that they can quantify how much noise they are causing.

The game runs in a computer that is connected to a video projector or to an interactive whiteboard (Figure 1). That way all the students can see the output of the game and know the sound level of the classroom. Sound is captured through a microphone connected to the computer where the game is running.

The Sound Game is populated by characters that are only happy in the silence. If there is silence, the character will reward the children with points. If there is too much noise, the character is unhappy and points will be withdrawn, so that the score can even become negative. Keeping silent is a clear goal and according to (Chen 2007) good games should offer clear goals. The game can also create opportunities for social interaction (Sweetser 2005) as children try to convince each other to stay silent in order to attain a higher score in the game.

The children, together with the teacher, can choose with which character they want to interact: a smiley face (Figure 1), a nature landscape with a live sun (Figure 2) or a cat (Figure 2). The sound spectrum is represented with all the characters. In the smiley face, the sound spectrum is below the character. In the landscape, the sound spectrum is the horizon line. In the cat, the sound spectrum is the cat's fur. The sound spectrum is represented to show, in real time, that the character is really listening to what the children are doing. Providing this sort of direct and immediate feedback is one of the components of the Flow Theory that, again according to Jenova Chen, should be applied in the development of games (Chen 2007).

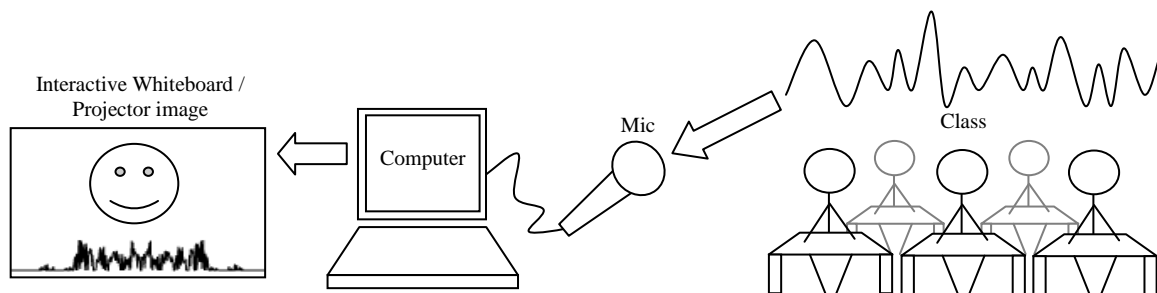


Figure 1: The Sound Game framework



Figure 2: Possible characters of the Sound Game

Besides the already mentioned characters, there is also other type of characters, the evolutionary characters, similar to the Tamagotchi (Bandai 2010), which change through time. The game has two types of evolutionary characters, an egg and a seed. The quieter the children are, the faster the egg will hatch, revealing a newborn creature, and the faster the seed will grow into a flower. This evolution takes several hours of game play. So, if the teacher wants to use this game during several classes it is possible to choose these long term characters. If the teacher only wants to use the game during a single class, then the non evolutionary characters are more appropriate.

We hope that the evolutionary characters will raise the children's curiosity because they do not know what will come out of the egg or what the seed will turn into. To discover this, they will have to be quiet.

The game also possesses an interruption button. Let us suppose the students are doing group work and that they are allowed to talk to each other. The teacher can then interrupt the game so that the score will not decrease.

3. Application of the game in Portuguese schools

This game can be applied in Portuguese schools, as there is a government plan to equip each classroom with a video projector and each three classrooms with an interactive whiteboard (Ministério 2008). So there is, or will be, in some time, equipment that can show the game output, with the character and sound spectrum graph, to all students. Teachers are receiving formation about information and communication technologies so that they will know how to use the interactive whiteboards and the video projectors (Ministério 2008).

The game output can also be displayed in the students' laptops, for example, in the Magalhães Computer, which is being made available to first grade students in Portugal (Portal 2010). However, we believe that if the game character is shown to the whole class that will reinforce that the group behavior is important to the game score.

Contacts with schools are already under way to test this game and receive feedback from the teachers and students.

4. Likely problems

As the game captures the classroom sound, teachers may think that their voices are being taped and that certain phrases, removed from their context, might then be used for other purposes. It will be necessary to strain that the game does not keep any recordings of the voices in the classroom. It only measures the sound level of the classroom. The game can also be used anonymously without any information that identifies the teacher or the students. Furthermore, all data about the game scores can be deleted if the teacher wants to, so that no trace that the game was used remains. It will also be reinforced that the sound level data, necessary to calculate the score, is only used in the context of the game and will not be transmitted to any outside entity.

Some problems can also arise in what relates to students' parents, in case they are against the use of the game or if they think the game violates their children's privacy. Parental permission

may have to be obtained prior to the use of the game. However, this permission is obtained by the teachers and is therefore, outside, of our scope.

5. Background

Games have already previously been used for educative purposes. For example, in (Hall 2009), the authors created a game that allows children to explore bullying situations and think about ways to face and solve them. (Lobo 2009) presents a game that motivates children to recycle waste materials. Power Explorer is a game that encourages teenagers to decrease energy consumption at home (Gustafsson 2009). In (Miloš 2009) the focus is on the development of educational games that can be used on mobile devices. In (Leite 2009) and (Pereira 2008) a robot cat plays chess with children. However, none of these games directly addresses the prevention and reduction of classroom noise caused by the students talking to each other. The game proposed here focus on that very specific problem, classroom noise, a problem that can prejudice children's learning and cause vocal stress to the teachers.

6. Conclusions and future work

We proposed a game that gives children a new sort of reward when they are quiet in the classroom. The reward is provided by the Sound Game, which is populated by virtual characters who enjoy silence. When the students are quiet the virtual character is happy and they receive points. Traditional rewards include strategies such as compliments and appraisal for good behavior, showing the well behaved students' names in an honor board or giving them stars or smiley faces. However, none of these strategies quantifies and shows how much noise the students are causing. The Sound Game shows the sound spectrum and the score is affected by the sound level in the classroom, captured through a microphone. A video projector or an interactive whiteboard can be used to show the game's virtual character to all students. Contacts are being made to test the game in schools.

It is also important to stress what this game is and what it is not. This game is not the solution to the complex problem of classroom indiscipline. This game is another resource that the teacher can use to reward the students for their behavior. User tests will evaluate how efficient this new resource is.

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