A Custom and Dynamic Game using Gamification Techniques to Children from 4 to 5 years old

Improve English Language Learning Process

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Abstract — **The learning process in children is currently a complex activity, since children tend to lose concentration easily. In many cases it is difficult for the teacher to identify if the children were able to understand the class. Therefore, the main objective of this work is to improve the learning process of the English language through a dynamic game. For this purpose, an interactive game was developed with a focus on gamification, where children have fun learning. The result of the game was satisfactory; in the game the children listen and see the fruits and colors on the screen. An initial test of teaching fruits and colors was done in a traditional way "Teacher - student", in this first case of a total of 24 children, 17 understood their teacher. On the other case the test "Game - Student" demonstrated the success of the game with 21 children who understood what the game showed and improved their rating, and that is the proposed in this research.**

Keywords - game; gamification techniques; learn; english; childrens.

I. INTRODUCTION

The game is a natural, free and spontaneous activity, acts as an element of balance at any age because it has a universal character, at any stage of human life the game is used, with different purposes, such as education, health, entertainment. There is a growing interest in gamification, as well as in its applications and implications in the field of education, as it provides an alternative to attract and motivate students during the learning process. [1].

Students devote much of their free time to video games or similar recreational activities, so bring their training to the dynamics that are behind the games, can motivate them in their studies, encouraging healthy competition among them or even guide them in the learning processes [2].

In today's digital generation, a series of applications were developed that use gamification techniques to attract the attention of end users, gamification has become a popular tactic to encourage specific behaviors and increase motivation and commitment [3].

Focusing on education, through these applications, the student is motivated to learn in a fun way. The use of techniques that simulate games in educational applications can be very advantageous, these applications are more entertaining for students and more useful for teachers to obtain real data to work.

Depending on the dynamics pursued, the teacher must exploit a gamification technique or another. For example, if the teacher seeks to awaken interest in the game in the student must apply the dynamics of the reward. If, on the other hand, it seeks to attract interest in the activity, the teacher can apply the dynamics of the competition [4].

The activities carried out in the context of gamification seek to achieve three clear objectives: loyalty with the student, by creating a link with the content that is being worked on. On the other hand, it seeks to be a tool against boredom and motivate them. Finally, he wants to optimize and reward the student in those tasks in which there is no incentive other than learning.

Currently the manipulation of technology by children is becoming more usual, a situation that is not negative if you control what kind of information they manipulate and if it helps their development. When focusing on children it is difficult to select the correct gamification technique, since children get bored easily, so one of the main objectives of this research is to determine which gamification methods to use, to get the attention of the children and that they learn while playing.

In the context of this work we propose to use gamification techniques to develop a videogame for children from 4 to 5 years old, so that children improve their knowledge of the English Language.

The rest of the paper is organized as follows. Section II describes the Literature Review, where we mention similar jobs. Section III presents the proposed game; we present the architecture and the main windows of the game. Next, in Section IV tests and results are detailed, finally, we end up the paper highlighting the conclusions and giving some future research lines.

II. LITERATURE REVIEW

For the literature review, a search of information in scientific databases was carried out. The initial documents found were selected for their relevance and importance for the purposes of this research, a long list of research papers and reports in the field has been published.

TABLE 1 shows a collection of a total of 120 representative publications found.

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TABLE I. NUMBER AND TYPE OF PUBLICATIONS

Type of Publication	Total
Journal	35
Conference	60
Tesis	15
Book/ Book Chapter	10
Total	120

Of all these works it can be mentioned that:

Games are today one of the best forms of social interaction worldwide, there are thousands of games that improve the lives of people [5]. In terms of gamification, there are also thousands of applications that benefit society, in [6]. Is presented a mobile application using gamification techniques to determine the behavior of the user with respect to energy consumption, Gamification is mostly defined as "the use of game-play mechanics for non-game applications" [7]. Any application, task, process or context can theoretically be gamified.

In the area of education, the use of game mechanics is experiencing an important advance in primary, secondary and higher education. One of the most prominent examples of the use of video games in secondary education is Trace Effects [8], a video game developed by the United States Department of State to teach English and American culture to foreign high school students.

In gamification and education, several research works have been carried out, which are indexed in the best scientific data bases, which include:

At work [9], The authors mention that the incorporation of elements of the game is aimed at solving problems such as dispersion, inactivity, non-comprehension or the sensation of difficulty through the act of involving the student. They conclude that with the use of game techniques, students dedicate more time to the activity and become more involved in it.

In [10], affirm that using gamification in e-learning, allows a more efficient and implicatory learning behavior, [11] He talks about the stimulus that video games provoke on the production of dopamine, "a chemical substance that favors learning by reinforcing neuronal connections and communications." And, according to the authors, "educational games have shown that students' socioemotional skills increase, such as critical thinking, creative problem solving and teamwork.

Another of the key points that has already been mentioned before and that is shown in: [12] is the ability of gamification to motivate students and to give teaching a more attractive character. One of its advantages is that it incorporates what really matters from the world of video games without using any specific game and in turn increasing the level of involvement of students [13].

This means that it extracts the elements of the game that make it fun, adapts them and applies them in the teaching process. The author in [14] says that people like to play, but daily face activities that lack motivation.

Finally in [15], the authors conclude that gamification is presented as an alternative whose main objective is to influence the behavior of students regarding the achievement of a meaningful learning derived from the enjoyment of the realization of the learning activity conformed with elements of the game, for which it is necessary to identify which are the elements that intervene in the gamification construction of a teaching and learning process.

As mentioned above, there are several research projects that carry out studies similar to what was proposed in this research, which allows us to determine that current research will be useful in the entire scientific and academic community of the world.

In this research we propose the development of a dynamic game that facilitates the learning process of the English language in children from 4 to 5 years old.

III. GAME TO LEARN ENGLISH

To develop the game, Game Maker Studio 2 was used; this IDE has its own programming language that is GML (Game Maker Language), one of the advantages offered by this IDE is the possibility of programming a video game using the tools of "Drag and Drop".

A. *Architecture*

For the development of the game we propose the following architecture (see Figure 1).

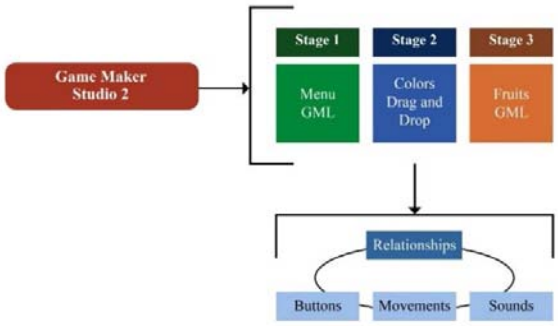

Figure 1. Architecture

This architecture contains three different modules:

- The first one is the main menu, it has buttons with different directions that connected to the others stages and exit.
- The second is called “Colors” and it was programmed with Drag and Drop technique.
- The third and first module are programmed with GML (Game Marker Language). Addionality, there is a button that allows to return back to the menu and the

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objects have programmed the sound of the colors and fruit pronunciation.

B. Objectives

The main objectives of the application are:

- Improve learning process of English language in children from 4 to 5 years old,
- Use the first core drive called Meaning (see Figure 3) of the Octalysis Model proposed by Yu-Kai Chou [16], on gamification, to develop the didactic video game that allows reinforcing the knowledge of the English language in children of 4 to 5 years.

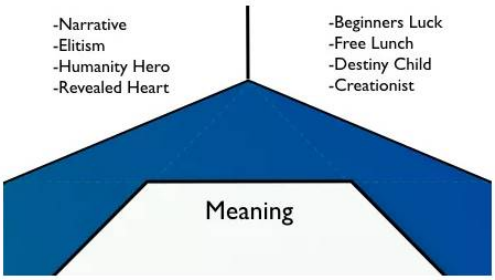

Figure 2. Epic Meaning & Calling

- Implement teaching tools that allow the game to use the VAK learning model (visual, auditory and kinesthetic) making use of the sounds, characters and user interaction, allowing the process of learning the English language to be carried out in a way fun

C. Game Structure

In this game, the main objective is to generate attention in children for supporting English language skills. For this, we considered tree stages.

The first stage is colorful and pleasant and contains two options of different games actioned by buttons, is the main view (see Figure 3).

Figure 3. Main Window

The colors stage, simulates a game where the children shoots objects that slide down, these objects are colors in English, when the children shoots in the color, a voice is used that correctly pronounces the color, for interacting with the game, to move the spaceship uses the arrow keys and the space bar to shout and destroy the color words (see Figure 4).

Figure 4. Color stage

Fruits stage, there is a character which is controlling with the arrow keys in a laberint, trying to catch the fruits.

In the same way as in the colors stage, the pronunciation is listened while child is doing these actions (See Figure 5).

Figure 5. Fruits - stage

The gamification technique used is: Epic Meaning & Calling, Epic Meaning & Calling, which is the first main unit of the Octalysis Gamification Framework [16].

This is the impulse where people are motivated because they believe they are engaged in something that is bigger than themselves. Games activate this principle often. Many times in games, the world is about to be destroyed, and somehow, you as a player are the only qualified candidates to save the world.

IV. Test and Results

For ensuring English skills in children, it was developing academic reports before and after use the game. The report evaluated children in an individual way with grades from 1 to 10, through a review of the pronunciation and vocabulary.

The interview was applying in 24 children, and the following was considered:

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- In the first interview before use the game, children obtain an average result of 6,5/10 which indicates that child is in process of learning, (see Figure 6).

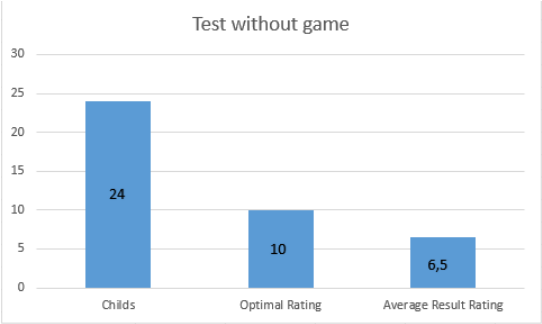

Figure 6. Data before using the game

- The second interview after use the game, they got a new average result an average of 8.5/10 and it indicates that child improves their knowledge, (see Figure 7).

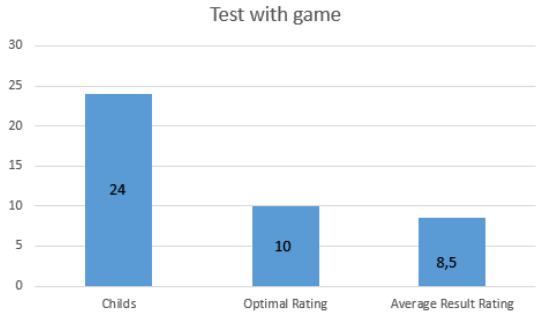

Figure 7. Data after using the game

These interviews showed that children started to develop a competitive ability, and this motivates to improve their English language skills.

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V. CONCLUSIONS

Gamification is being used with force in the educational-professional field in order to achieve better results in learning. The development of the didactic video game managed to motivate students and teachers, promoting a greater commitment and improving academic performance.

In the proposed game of this research the main objective is to get volunteer attention from children for improving their English knowledge. We are currently working with more children to validate our research; additionally, they are creating new stages to learn the alphabet, numbers, etc.

Through the use of gamification techniques, the improvement of the attention and concentration processes of the children is highlighted at the moment of using the videogame, this has allowed to strengthen the knowledge acquired in the English language, awakening curiosity and enthusiasm in the children.

From the information gathered, it can be said that gamification is a process that induces motivation in several areas and education is an area with great potential for the application of gamification and its different techniques.

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