Creation of Relevant Edutainment Scenarios for Language Performance through Learning Games

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Abstract

Our paper focuses on the design and development of an edutainment scenario as part of a didactic system for the use of Spanish as a second language in a French context. On the one hand, the combination of the issues of Language Didactics, Computer Science, Linguistics and Natural Language Processing (NLP) could offer solutions and operational systems to language learners. And on the other, serious games have the potential to provide serious content in a playful way. Therefore, we have proposed a teaching system capable of integrating the potential of a serious game in order to offer a relevant solution to language learners. For this purpose, our system has been designed and developed according to the language needs of the learners. We have chosen automatic dictation as a pedagogical activity to encourage learners to use language skills in our serious game. Our system also seeks to provide automatic correction elements as a feedback. The continuation of our project consists of completing and testing our first edutainment scenario for the use of Spanish as a second language in order to assess its relevance through an interactionist approach to foreign language learning.

Keywords: *Didactic System, Serious Games, Edutainment Scenario, Dictation, Feedback, ICALL.*

1. Introduction

Over the past few decades, teachers and learners have gradually replaced paper-based learning materials with digitized and automated resources. This has transformed the way we teach and learn [1]. As a result, language didactics, computer science, linguistics and Natural Language Processing (NLP) are coming together to provide language learners with operational solutions. These systems are capable of offering a didactic added value compared to conventional systems [2]. Such didactic systems can integrate the potential of serious games [3] in order to offer a solution to the language learners needs. This oxymoron (serious game) has the potential to provide serious content in a playful way [4], [5], [6]. Thus, this issue is at the crossroads of two domains; Digital Game Based Language Learning (DGBLL) and Intelligent Computer Assisted Language Learning (ICALL). The use of video games for language learning has been the subject of several research studies such as; W. Lewis Johnson (2005); Chen & Yang, (2013); Agudo et al. (2015); Huang, Yong-Ming (2015); Van Rosmalen, et al. (2013); L. Schmoll (2016); M. Loiseau (2016), Y. Alyaz et al. (2017) to name but a few. Thus, our main goal in this work is to propose a didactic system that is relevant to the language needs of the learner. We therefore propose the design and development of a didactic system that integrates a serious game, second foreign language dictation / transcription and automatic correction adapted to the learners. In this way, our project focuses on the pedagogical and technical design of a learning system; research and development [7].

2. The edutainment scenario model

Firstly, we are interested in the edutainment scenario [8] conceived as a stage of language performance and restitution of language knowledge, based on video games in alternate reality. Such a scenario is based on a first stage of preparation time that would begin with a series of class sessions outside the technical system allowing the preparation of the tasks necessary for language and playful understanding (framed scenario), and a second stage taking place in immersion with the technical system (framing scenario). Our choice to adopt this model is justified, on the one hand, because we consider the time of use of the serious game as a stage of language performance and restitution of knowledge and, on the other hand, because we seek to include the teacher as a guide, before, during and after the use of the technical system (serious game). Secondly, we are interested in dictation / transcription as a positive method for training linguistic skills [9]. Dictation / transcription as learning and training activities are not new; but what could be new to the considerations in this implementation is the combination with a serious game [10]. Third, we are interested in the potential of the direct, immediate feedback to help the learner identify and correct the error himself [6], [11]. Instead of giving a binary response (correct or incorrect), it may be more interesting to show the learner the right word

as feedback. Feedback in ICALL system offers students learning at their own pace and cause less frustration [12].

3. Proposition

We proposed a first edutainment scenario adapted to the language needs (listening comprehension and written expression) of Spanish as a second language. For this, we have aimed at dictation / transcription as a pedagogical positive method. The project targets students of cycle 4 of a French public secondary school, in the third class (13 and 14 years old). The learners are between level A1 and A2 of the CEFRL, in line with the French National Education Curriculum (2018). Regarding the theme to be dealt with, we have chosen the notion "Meeting with other cultures" of the same Curriculum. For the environment, we personally proposed the recreation of the Chiribiquete Natural Park of Colombia in 3D. In this way, we want to encourage the learner to virtually discover notions of the natural, cultural, geographical and historical diversity of the Spanish-speaking world.

3.1 Design method

We considered that the design of our edutainment scenario needed to follow the steps of the PLOT model (Public, Playful, Learning Objectives and Task) [8] since all the steps are in dialogue and therefore all are iterative. Therefore we defined the pubic language needs, the dialogues, the story, and the different elements of the gameplay, the specific language targets and the tasks, all these steps being iterative. Thus, we have developed the framing scenario and the framed scenario of our system. For the framing scenario, five class preparation sessions were planned, and for the framed scenario (the serious game), one immersion session was defined.

3.2 Technical choice

We proposed a 3D exploration game programmed by Unity (a game development platform, compatible with C# and C++ language). We suggested a first person shooter (FPS) in order to offer more field visibility. The gamer is going to be accompanied by an adjuvant player (Non-Player Character) NPC in order to offer the conditions for language situated interaction. The NPC will serve as a language speaker guide (instructions, comments, information and suggestions). In that way, player performs the right action (listening comprehension) and writes the right text (writing expression) in order to complete the game. Regarding the structure of the scenario, we have opted for a nested events [13] that allow the subject to choose which area he will explore first and thus the corresponding task. See figure 1. The player can thus, more or less, decide the order in which he will complete the tasks, as shown in Figure 1. For example, in Zone 1, the subject is free to move back and forth between the different areas (Zone 1, 2, 3) of the game Scène. However, the language tasks (T2, T5 and T8) and playful tasks (T1, T3, T4, T6, T7 and T9) are sequenced as the black arrows show (T1, T3 and T2) in order to accomplish each area tasks.

Fig. 1. Structure of the nested scenario.
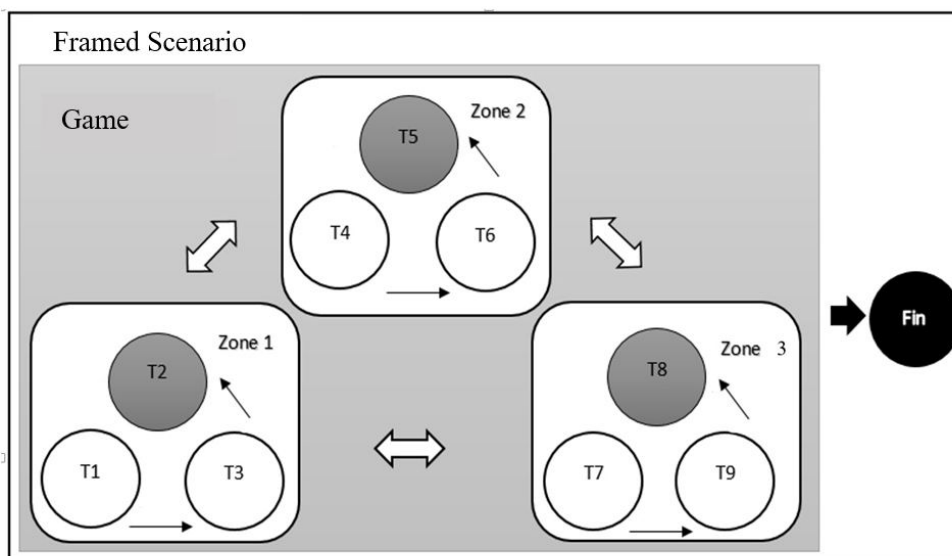
3.3 Tasks
The main mission of the game is to make an inventory of species (plants, animals and rupestrian art) in a virtual logbook. On the one hand, the player must explore the terrain and perform actions such as searching for species, freeing the animals T1, taking photos T3 (playful tasks), and on the other, listening (language task; listening comprehension) and writing down the characteristics of the species (language task; writing expression) T2.

3.4 Dialogue structure
The structure of the dialogues is still based on the Boolean type. However, it does not start from an instruction or a question formulated by the NPC, but from an event triggered by the player who initiates an interaction. As a result, the dialog structure takes the form of a condition tree that offers multiple branches with parallel states. Thus, in Area 2, if (condition) the player takes a picture of the monkey then (action) the NPC says: "*Es un tití. Se trata de un mono de barba roja en peligro de extinción*" (It's a marmoset. It's an endangered red bearded monkey). Therefore, if the player writes in his logbook: "*Se trata de un mono de barba roja en peligro de extinción*" then the NPC says, "*Muy bien. Lo has escrito correctamente*" (Very good. You wrote it correctly).

3.5 Automatic feedback
We want to help the learner identify and correct the error himself through automated feedback. Thus, any mistyped words (spelling or grammar) will be automatically underlined and the correct word will be displayed so that the learner can rewrite it. The idea is to suggest the good word to a possibly mistyped word. As an example, in the same Zone 2, if the player writes in his logbook: "*Se trata de un mono de barba roja en peligro de extincion*" (*extincion* without the graphic accent), then the system will be able to suggest the correct word "*extinción*" by clicking on the underlined word and thus give him the possibility to rewrite it correctly.

4. Experimentation method
Once our first test is carried out, we would like to adopt the triangulation mixed method combining a quantitative and a qualitative approach [14]. This, in order to answer this first research question; How could our didactic system provide operational solutions to the needs of language learners? The analysis will concern the experimentation of a new system (pedagogical objective) and the discussion about it (research objective). We planned to collect and analyse quantitative and qualitative data and then compare the results in order to develop a complete understanding.

5. Perspectives
The continuation of our project consists of completing and testing our first edutainment scenario. Concerning the evaluation, we wish to adopt an interactionist approach to foreign language learning, which would focus on five criteria: language learning potential, adaptation to the learner, focus on meaning, impact, authenticity and practicality [15]. Finally, depending on the results we would like to suggest its extension to other learner's needs and to other foreign languages.

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