360 virtual tour and escape room design as a video games-based learning process for diagnosis and strengthening of the English language

Diseño de recorrido virtual 360 y sala de escape como proceso de aprendizaje basado en video juego para el diagnóstico y fortalecimiento del idioma Inglés

MORENO-REYES, José Miguel†*, ALEJOS, Dylan Javier, SIEFKER, David and MARTÍNEZ-MEZA, Rebeca

Universidad Politécnica de Juventino Rosas, Plastics Engineering Department. Hidalgo 102, Community of Valencia Santa Cruz de Juventino Rosas, Guanajuato, Mexico.

ID 1st Author: *José Miguel, Moreno-Reyes* / **ORC ID:** 0000-0003-1913-1230, **CVU CONACYT ID**: 209863

ID 1st Co-author: *Dylan Javier, Alejos* / **ORC ID:** 0000-0003-0312-5848

ID 2nd Co-author: *David, Siefker* / **ORC ID:** 0000-0002-0643-2635

ID 3rd Co-author: *Rebeca, Martínez-Meza* / **ORC ID:** 0000-0002-2392-3524

Abstract

Nowadays we know it, in these last times the return to the classroom wasn´t the return to the classroom. Some students when was studying the last year, they were waiting for the time to finish class and go out to the university, now because the pandemic they and much more students didn´t return to the classroom in a normal way. The Universidad Politécnica de Juventino Rosas and the University of Guelph closed its installation in the same way that any school, college or university in the world, and nowadays we have new students that for first time in the history they started class by online mode, and they didn't know their scholar environment. In this project we proposed a 360 virtual tour of the UPJR and we decided make more immersive and educational the experience through the escape room design as a video game-based learning process to diagnosis the English language in the first stage. The novelty of the project is to include the new TIC´s showed too in the manufacture 4.0 as the VR technology to replay in virtual way the main scholar buildings, classrooms, laboratories, library, soccer field and the cafe of the University.

Resumen

Hoy en día lo sabemos, en estas últimas veces el regreso a las aulas no fue el regreso a las aulas. Algunos estudiantes cuando cursaban el último año, estaban esperando el momento de terminar la clase y salir a la universidad, ahora debido a la pandemia ellos y muchos más estudiantes no regresaron a las aulas de manera normal. La Universidad Politécnica de Juventino Rosas y la Universidad de Guelph cerraron sus instalaciones de la misma manera que cualquier escuela, colegio o universidad del mundo, y hoy en día tenemos nuevos alumnos que por primera vez en la historia iniciaron clases en modalidad online y no conocen su ambiente escolar. En este proyecto se propone un recorrido virtual 360 de la UPJR, y se decidió hacer más inmersiva y educativa la experiencia a través de un diseño de "escape room" como un proceso de aprendizaje basado en videojuegos para diagnosticar el idioma inglés en la primera etapa. La novedad del proyecto es incluir las nuevas TIC´s mostradas también en la manufactura 4.0 como la tecnología VR para reproducir de forma virtual los edificios escolares principales, aulas, laboratorios, biblioteca, cancha de fútbol y la cafetería de la universidad.

VR technology, Pandemic, Escape room, Immersive

Tecnología VR, Pandemia, Sala de escape, Inmersivo

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* Correspondence to the author (E-mail: jmoreno_ptc@upjr.edu.mx).
† Researcher contributing as first author.

Introduction

In this project we proposed to use the Teaching English for general purpose to teach English trying to remember the scholar environment, increasing the vocabulary of the students using words of their near context in your university, working topics as the classroom objects, prepositions of place, directions, daily routines etc.) with the order to go beyond the traditional digital material.

Digital materials have recently provided considerable audio-visual stimulation to students, causing them to focus less attention on traditional lectures. Learning motivation is closely related to outcomes; thus, many people believe digital games to be essential future teaching tools. Digital games develop high-level thinking skills such as problem-solving, strategic thinking, resource management, planning and execution, and adaption to changing work scenarios. Therefore, developing useful digital learning games is worthy of examination. Mounting evidence has shown that educational games effectively achieve educational goals. However, Gunter et al. indicated that certain learning games are unable to enhance learning motivation effectively because their learning content and game situations are incompatible [1]. Although abundant resources have been invested in game-based learning (GBL) studies worldwide, how to design a game to promote effective learning remains unclear. The figure one show and example of GBL model with five stage.
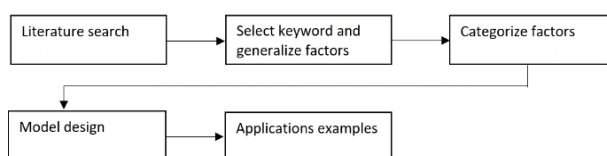

Figure 1 Example of GBL model
Source: [1]

Game designers are able to create interesting games but do not know how to maintain the quality of teaching materials in a game, whereas educators focused on effective educational materials but do not know how to create interesting games. Rather than being ineffective, the problem of educational games is that although they are more fun than traditional classroom activities, they are still considered boring.

More and more computer-assisted instruction (CAI) systems added game elements into their system, and that causes the boundaries between boring educational games and CAI are unclear. If a player does not feel that he was playing a game, then the educational game is boring and not interesting. [1] To make games fun is necessary to include challenge, sociality, and mystery. The figure two show some game factors.

Factors	Description
Game goals	Game designer provides what type of experience for players Players pursue game goals
Game mechanism	Refers to the methods prompting players to achieve the designers goals and enables Smooth functioning of the virtual word
Interaction	Player operations that trigger the computer to generate related responses, including the interactions and conflicts between players and computers
Freedom	An open game system that allows for player autonomy, including individual services such as the avatar
Game Fantasy	Refers to environmental contexts that provide virtual world imagery
Narrative	Describes what occurs in the virtual world
Sensation	Multimedia presentation of the virtual world
Game value	Promotes players to increase their game motivation
Challenges	Refers to player efforts toward the game or personal goals
Sociality	The interaction between people through the game system including communication, cooperation, competition, and conflict
Mystery	Refers to providing a novel experience for players, including curiosity and exploration

Figure 2 Game factors
Source: [1]

The novelty of the project is to include the new TIC´s showed too in the manufacture 4.0 as the augmented reality to replay in virtual way the scholar buildings, classroom, laboratories, library, soccer field, the cafe of one university (Universidad Politécnica de Juventino Rosas or the University of Guelp) to design a 360 virtual tour and escape room as a video games-based learning process for diagnosis and strengthening of the English language applying the deep learning model.

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Language learning based on deep learning

Language learning based on deep learning is language learning aided by artificial intelligence devices and can intelligently help people to complete communicative tasks and achieve the social function of interacting with people, their knowledge, and their environment. There are many intelligent devices that are closely linked to language learning, and they can be divided into three main categories: robots, specialist software, and integrated platforms. The main types of intelligent language devices are Xunfei translators, lip recognition robots, chariots (Chatterbot), Dasai intelligent educational robots, and Xiaobu English educational companion robots. Professional software includes Google Translator, Kingsoft, and Lingoes Translator, e-learning platforms include Library Genesis and Goodreads, Moodle, Blackboard, Sakai, and SuperStar Pan-Asia [2].

These three types of intelligent devices are collectively known as artificial intelligent language learning (AILL), and the difference lies in their different levels of intelligence. "Virtual reality" (VR) refers to "seeing something as reality," that is, seeing virtual reality visually, generating general assembly drawings, patterns, and then converting into part entities, and inputting CNC machine tools to parts in automatic processing. The real reality (body) is then automatically machined into the CNC machine. VR technology uses computing devices to render and simulate visual and auditory scenes, and these rendering techniques stimulate people's visual and auditory senses, providing the user with the best possible simulation of visual and auditory organs to make them impressive. The most immediate and stimulating effects are "immersion" and "participation in immersion". In short, these simulations are generated through computational simulation and are false effects and scenarios [2]

Virtual reality technology

Virtual reality technology has a long history, and with the development of the times, the connotation of virtual reality technology has been enriched in the new process. With the new generation of information and communication technologies such as network transmission, near-eye display, rendering processing, and artificial intelligence, it builds a virtual environment that combines virtual and real senses such as vision, hearing, touch, smell, and other perceptions as one. With the help of head-up display and other related equipment, the audience interacts with the objects in the virtual space in a certain way to obtain immersive perception and experience. From virtual reality classrooms to virtual reallity labs and from virtual reality immersive theaters to virtual reality house viewing, virtual reality technology has entered the lives of ordinary people. Everyone is inevitably in contact with the new technology, constantly learning to use it through learning and thus forming physical habits [3]. In the interaction with virtual reality technology objects, the technology objects make the body believe that it is in the real space; the immersive character of virtual reality technology, coupled with the interactive and multisensory character, makes the audience mobilize the body perception to interact with the technology objects and then create the illusion of being in the real space. The advancement of human history is inextricably linked to the development of technology [3].

Problem to be solved.

Unfortunately, due to the effects of the contingency that occurs worldwide we can´t be in person studying inside of the educative institution, an example is in the State of Guanajuato that was the last year on red alert, especially in the municipality of Juventino Rosas, a city that despite being small have been reported many cases of contagion.

For this reason, the Universidad Politécnica de Juventino Rosas has closed its installation in the same way that any school, college or university in the world, and nowadays we have new students that for first time in the History they have started class by online mode and they don't know their scholar environment.

Because the Universidad Politécnica de Juventino Rosas does not allow access to visit the facilities, one advanced option to know the scholar environment is to design a full interactive virtual tour 360 is in order to implement educational innovation in addition to promoting the use of the English language as it is a fundamental basis to have more possibilities to work, to improve the study, the professional preparation and even learn new cultures around the world.

The English language is becoming increasingly vital in modern society, considering English is a universal language. As a consequence, it is visible how universities and institutions attempt to improve their performance in this area. Even modern primary students, who have a responsibility to develop in a worldwide world, are required to learn the language, particularly English. Personal characteristics, learning circumstances, and learning settings are among the variables on which scholars focus to infer and illustrate the difficulty of learning a foreign language. Speaking English is an ability that is heavily influenced by personal psychology. [4]

According to self-determination theory (SDT), people have three basic needs, which are natural psychological requirements that allow a person to grow and are necessary for good performance and well-being. Autonomy, competence, and relatedness are the three things. SDT has had a significant impact on motivational theories in the context of English language acquisition, as well as in the field of psychology. For many students, acquiring a second or foreign language can be a difficult process as stated by many researchers. [4]

Researching the main problems that arising regarding the pandemic, with this project we intend to reduce some of them, how to know the scholar environment without leaving home in combination with a new material as a video games-based learning creating a computer game of scape room genre.

With the rise of the digital game industry, many games software have been developed and available on the market. There was "a mad rush" to integrate educational content into games "in an ad hoc manner" and video games were used for educational purposes. [5]

Educators have studied how to combine school education and games to relax students and make it possible to acquire the required knowledge and academic skills. thus, freeing students from traditional computer games makes computer games play a positive role in their growth and positively impact them. Computer games could be applied to the teaching and learning processes. At the same time, learning elements could contain the outstanding magic elements of computer games. [5]

Gamification as an option

Gamification is one of the different teaching techniques that seeks to improve user engagement and motivation in carrying out or learning tasks. Gamification involves using the elements, mechanics, and dynamics of games outside the context of traditional games. In addition, this author outlines three reasons why gamification can serve companies; these reasons can be easily adapted to different situations—so much so that they will be outlined in the teaching context. The reasons for the success of gamification are based on three cornerstones: engagement, experimentation, and results. With regard to engagement, as Koster maintains: "With games, learning is the drug." Gamification acts as a form of extrinsic motivation, as well as a reinforcing mechanism. It responds to one of the intrinsic needs of humans, that is, to seek the chemical rewards released by the brain as a motivating "engine" for the execution of tasks. Thus, the stimulus created by this feedback strengthens engagement with the class and the learning process and keeps the students motivated and hence eager to be engaged. With regard to experimentation, games do not usually have permanent punishments for those who fail them. As a result, they create a safe and often competitive or cooperative environment, which tends to stimulate participation by trial and error. This safe environment can be characterized as one of the most valuable contributions of serious games. In addition, according to Werbach and Hunter, serious games can be seen as a special type of gamification, as they make use of nonfocused games for entertainment. Finally, results, as depicted in the studies carried out by Hamari et al. and Pedreira et al., show that the adoption of gamification in organizations has had positive effects, depending on their application in a given context. [6]

In addition, large software organizations have employed gamification to encourage users to carry out ordinary tasks, since they know it achieves results. [6]

Aims

To design and develop an interactive virtual tour of the Universidad Politécnica de Juventino Rosas for diagnosis and strengthening of the English Language

To obtain first the 360 espherics photos to make a virtual tour including the mains buildings of the university as a first stage of the project using the 3D Vista software.

To analyze the interactions to create a puzzles to development a computer video game focus in escape room style using Unity.

Related work about escape room in education

Some of the research that has been carried out till now and that involves escape rooms in education are:

- The educational escape room of Universidad Politécnica de Madrid that was conducted in December 2018 and 124 students participated, in order to solve computer-based and physical puzzles in two hours. Hints were given to them if they answered quiz questions correctly. The course staff organized it to increase the low pass rate. The results provide evidence that appropriate use of escape rooms can impact positively on student's engagement and learning in programming courses, that students prefer this method over traditional computer lab sessions and that an escape room that allows large number groups to participate at the same time can be a reality (Lopez-Pernas et al., 2019).

- Marinou (2018) implemented "THESEUS'S TOUR TO CRETE" for elementary school children, as an educational tool. In 5 rooms playfully and interactively students understood and consolidated History lessons, using at the same time knowledge they have gained from the Robotics Seminar STEM4KIDS to solve puzzles, spells and drive their robotic vehicle. She used VR to let them travel in the past, LEGOS to construct their robot and Programming in Scratch. She concludes that the use of the escape room in an experiential and playful way helped students exploit the knowledge gained during the robotics seminar, broadened their skills and fostered motivation for learning and further deepening in the field of robotics and STEM. Marino's project was based on Experience Pyramid Model.

- Fotiou Sotiris (2018), a Computer Science teacher in Vocational School of Corfu, implemented with his adult students a Tech Escape Room based on the principles of gamification. This project resulted in a unique collaboration of his students with teachers, inventors, scientists and researchers from other countries, the improvement of creation spirit and the gain of valuable knowledge and experience through fun. The room has a unique international character and it was designed using quiz, algorithms, programming problems, mathematics, literary poems, and physics, chemistry and electromagnetism experiments. Fotiou provided his material with the riddles to many schools in Greece and abroad in order to create the same successful educational game.

- "The Gate School Escape Room" was designed and implemented in a secondary educational center in Valladolid. It offers clear evidence that educational escape rooms, can support and enhance teaching and learning processes and improve students' academic, personal, and social attainments (Macias & Rocio, 2017). The innovative educational tool known as eduesc@peroom (Lookingatlearning, n.d.) was used, providing a toolkit with examples of different escape rooms developed, considering their strongest points.

- Kuriakidou (2019) teaches French and English lessons in a small Greek High School and started using escape room games as learning environments 3 years ago. Last year she joined forces with Fotara E., a French language teacher, and this year they cooperated with 5 European schools via e-twinning project, where 10 students of each school created the same scenario game in order their classmates to learn French in 30 minutes and manage to escape. She declares the great success of the project and that she will continue to implement it by expanding her cooperation with other schools.

- MathEscape is an Escape room game with tasks connected to mathematical content of a certain teaching unit. It was conducted for 24 second grade students of Croatian Grammar school program and 4th year students of Department of Mathematics majoring in Education of mathematics and Computer science participated in the study. Survey results showed that MathEscape was amusing, fun and enjoyable to be involved in and could be the method to make interesting any mathematical content revision lesson. Finally, it can help boost positive attitude towards mathematics (Glavas & Stascik, 2017).

- Mills & King (2019) created an escape room in order to help new academics in higher education enhance their learning about pedagogic theories. Game master communicated with the players through Skype and puzzles were both digital (some used Augmented Reality (AR)) and analog. The game ran for three different groups. None of them completed their mission successfully and some players were disappointed. The writers concluded that escape room isn't suitable for teaching higher level concepts, since its implementation is time consuming and it can run simultaneously only for small numbers of individuals. Finally, they recommend that escape elements should be integrated into broader learning experiences or as small-scale learning activities within a workshop/class.

- CrashEd is an interactive learning experience using characteristics of an escape room, since it includes a "crime scene", participants that work together (applying STEM-based skills and knowledge) in order to solve a crime and a ticking clock. A timely animation is placed at the end of the educational experience to enhance the learning. CrashEd has proven especially effective as a way to enhance the learning cycle, empower and motivate pupils identified as detached from education and engage talented STEM students (Bassford et al., 2016).

- Scott Nicholson – Professor of Game Design and Development at Wilfrid Laurier University in Brantford, Ontario and the director of the Brantford Game Network game lab (BGNlab) – has written research papers on escape rooms, meaningful gamification, games in libraries, online education, and data mining. In his latest article "Creating engaging escape rooms for the classroom" (Nicholson, 2018) he explains the key design concept behind creating an engaging escape game and the importance of using such type of live-action gamesin school. [7]

The computer game genre

Computer game genres, such as role-playing games (RPGs) and first-person shooters (FPSs), imply particular sets of design features supporting expectations that prospective players have about the nature of the play experience that games support, based upon past experiences with other games in the same genres. When a player first encounters a computer game within an unfamiliar genre, they will, if sufficiently motivated, interact with the game and eventually learn sufficient patterns of interaction to make progress within the game, perhaps eventually completing it. Game play is therefore fundamentally a process of players learning, adapting and improving play skills. Since computer games are predominantly played by the use of very generic interaction technologies (e.g., a keyboard and mouse), learning and adaptation in play are, for the most part, processes of developing cognitive skills focused upon the mechanics of a game and its media realization, based upon an existing general skill set for computer use. Keyboard and mouse operations are mapped onto in-game actions in a game world synthesized by the game software. Learning how to play can therefore be divided into three phases: (1) learning interaction mechanics, that is, the basic motor operations required to operate, for example, a keyboard and mouse in a largely unconscious way; (2) learning interaction semantics, that is, the simple associative mappings from keyboard and mouse operations to ingame actions (and meta-game actions, such as setting play options, or loading and saving game states); and (3) learning game play competence, that is, how to select and perform in-game actions in the context of a current game state in a way that supports progress within a game. Interaction semantics represent a basic level of competence in playing a particular game; these mappings are often carried across different games within a genre and even across genres (e.g., using "w," "a," "s," and "d" keys to move a player character forwards, left, backwards and right, resp.). [8].

Development methodology proposed

Therefore, in the initial stage different software were proposed to analyze and compare (Table 1) which had more options to join the 360 photos in addition to us designing and proposing the layout of each shot helping to have a better view generating a video where you can access through any device and with a single click move to the place that interests you most to know about the university.

In the first MY360 software you can create a lively virtual tour step by step, adding moving images, text and descriptions, and even click on links to other websites. In the second Software Eye spy 360 provides us with a tour where you can see how many people and from what place they have viewed the tour in addition to taking photography of the smaller objects so that you can view it in detail.

In the third VR software you can add animated live stickers, filters and background music with volume adjustment, you can edit multiple clips at the same time, rearrange clips and preview in VR mode. The latest software is 3D virtual tour (demo version) which we use to make our tour, you can take photos to the smallest objects so that you can view it carefully, in addition to allowing us to create 3D transition effects, panorama, background music, descriptions and colors.

Then with the supervision of our authorities, a visit was made to the university to make the shots with an app where you can generate your photograph by focusing with the camera the point of interest proceeding to make several shots rotating 360 degrees, approximately to generate a spherical photo 360 had to take 46 normal photos.

About the elaboration, several issues were implemented in the video that can be solved as you travel through the university, questions of Basic English to get acquainted with what colors are, objects sign, etc. (Figure three)

Figure 3 Screenshot of the virtual tour route
Source: Own elaboration

You can visualize and answer by increasing vocabulary and grammar as when you go on the tour and throw a question where you learn how it is structured in English language just as when you answer you make use of the subject, verb, some helper to be able to answer the question. In addition, objects such as a table, chair and even the material they occupy in the career. In order to achieve this, a series of designs were made where it was convenient to generate the question helping those who follow the path to remember easily, this with the software that provides us with unreleased ways to create, imagine inserting shapes and designs to achieve an original work.

It is important to note that we organize with our colleagues in Canada through some meetings in Meet to be able to talk about the development and implementation of the project by raising the structuring of the questions and answers of the tour from a grammatical perspective.

Project viability

Evaluating the alternatives, this project is of great relevance if we promote it on the official website of the university since we have many visits to it where you have reports and different interests of students, in addition to publishing it on different sites, social networks like Facebook where many of the students share our publications and thus be able to reach people who are interested in studying in the university since in addition to everything gives us possibilities to innovate and innovate promote different design techniques and promote English language learning.

Originality and technical or scientific merit

This academic project has originality since it is recently created and has not been published in any forum or congress and has the requirements of innovation because it has the modality of contributing interests to students with a certain process implemented and that there is no other similar project in the region, they are considered observations during information search activities and will have the scientific merit of being able to be registered later in the department of Research.

Risks associated with the project

Risks include applying for permits to enter college through the pandemic, because it is closed and does not give access to more than one person to take each shot in the indicated areas. Others are related to the taking of 360 spherical photographs, the choice and acquisition of the software, processing time, sending and grouping, and compatibility with the virtual tour program etc. In general, everyone who was visualized and happened before assembling the tour in the software. According to the observations during the activities to be developed from the design, to address the problem from a preventive perspective, with existing resources the necessary logistical support for the realization of the activities required to achieve the objectives and expected results.

Elements of social and / or economic impact of the project

Virtual tours focus on meeting one of the needs of those who make up the university community. The solution will allow both students and teachers to be able to access a location remotely and provide those who are not aware of the current university infrastructure a series of photographs that will allow them to know the spaces of the university with this virtual tour from the comfort and security of the home. With a different and creative design with technological resources, then the different traditional advertising means, tools and techniques or the most commonly used strategies today for the promotion of universities.

Adding to the above, economically speaking these virtual tours will be free and public for college students and new entry students. In this way you will not have to make transport and / or gasoline expenses for the visit to the facilities and when disclosed will increase the staff and income in the registrations.

Project requirements

In order to carry out this project we required various tools that helped us throughout the process of this, first started with the capture of 360 photos on available phones and then took spherical photos, we looked for the option of a professional camera but did not have the option of spherical photos, once selected the software with facilities where we discussed choosing the indicated one.

Innovation

Elements of innovation of the project with respect to the existing one.

The innovative thing within this Project is the combination that we made of introducing a foreign language such as English to the virtual tour of the Universidad Politécnica de Juventino Rosas creating within this a series of questions that promote the use of this language. We know that English is a fundamental language for many countries to communicate and is somehow being adopted by people in order to establish a good interaction with people who do not speak our home language. The virtual tour is improved by involving several aspects where we can design various routes where we include colors, figures and images, to be able to make a unique design to attract the student community.

Expected impact level (economic, social, environmental, scientific, technological, etc.) of the innovation

In the economic field, an important impact arises since the transfer to the university is avoided in order to know the facilities and in this way no monetary resources are invested to attend it. Due to the current contingency it does not allow us to participate in person in certain activities as it is to go to the university premises this is an innovative way to approach digitally.

In the experimental aspect we implemented the 360 camera method since previously it had not been used in the university as well we both experimented with the development of the project and with the use of new material and tools to carry it out, this relates to the scientific since it solves a complex context that in this case would be not being able to attend and know the facilities and this is a tool that helps to complement that part gaining greater knowledge of the foreign language that is in the end didactic.

In technological matters we use certain instruments such as the accommodations of the photographs that we create with the cell phone capacity 360 spherical in the software.

Technical feasibility and the first solution

The technical solution of the problem is generated from the implementation of visualization software through a web interface where 360 spherical photographs are represented, using in this way, new techniques that present high precision and a high level of detail in the high resolution images to obtain the modeling of the school environment of the university. 360-degree spherical photography, without being a conventional means of advertising, as a competent electronic tool in the face of new digital marketing methods, hoping to provide effective conclusions about the technological reality to which it integrates as part of society. [9] Spherical photography is most commonly used as digital marketing for the rental sale of apartments, houses or to show public places for people who want to make a visit, but it is not like a tour or a spherical image. However, it does not have student use.

Research shows the assessment of impacts and preferences of consumers, proposing as an alternative the present photographic technique for the promotion, dissemination and development of university scenarios, with a different and creative design with structured technological resources, such as the conglomerate of spherical photographs in 360. [9]

Preparation stage

At this stage we carried out the research of a software that was the most suitable for the elaboration with the ability to obtain a series of photos of a rotated or rotated environment in a full circle, for the generation of 360 spherical photographs of university structures.

Data processing stage

This stage we seek to obtain the 360 panoramic photographs taken at the university applying the corresponding image correlation processes so that we can execute them on the virtual tour. Grouping stage in the virtual tour program. To use the 3DVista Virtual Tour program correctly it is necessary to import all the images that were used, in the form "Standard Panorama". (Figure 4)
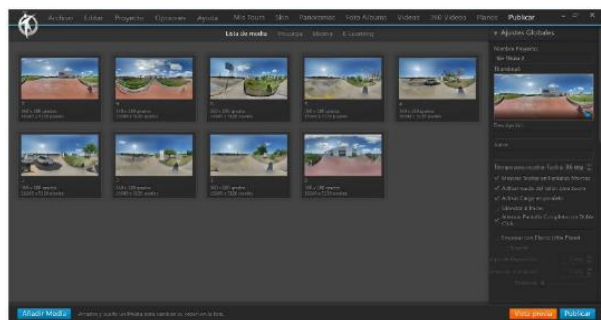
Figure 4 Imported image in the "standard panorama"
Source: Own elaboration

Editing is then activated by selecting any exported image to continue editing hotspots. Once this option is activated, the images begin to be dragged in such a way that there are at least 2 options in each place to be able to move forward and backward in the tour, this option is carried out in each image to which you want to add movement.

Escape room design as a game-based learning process

According with Zoi Karageorgiou & Eirini Mavrommati & Panagiotis Fotaris an Escape Room Design as a Game-Based Learning Process for STEAM Education (2019) can include the parts showed in the figure five.

Number	Part
1	The idea – Brainstorming – Working groups
2	Market research
3	Timetable – Budget
4	Pre-evaluation (online survey about students' opinions)
5	Space study and room selection – room design
6	Visit to escape room – Riddle recording
7	Theme selection – Artifacts from scenes of the serial
8	Scenario – New riddle recording
9	Theatrical games – Painting – Cooking – Experiments
10	Robotics – Programming – 360o Video capture, editing
11	Equipment – Decoration –Electrical installation
12	Storyboard – Riddle connection
13	Roles and Game master – Script
14	Implementation – Integration of riddles in escape room
15	Testing – Post-Evaluations
16	Marketing

Figure 5 Summary of the parts of the procedure
Source: [7]

Results

The gamification of the 360 virtual tour

Then of conclude the virtual tour based on 360 topographies was necessary to pass at the next level. According with the suggestions of the team of Canada was moment to apply the complete gamification of the project. The main idea was to create a video game that can to include the virtual tour of the university and the escape room design to increase the English level in a near future but in this case to help in the learning and diagnosis process.

Without delving too far, applications like "Duolingo", "Memrise" or "Drops" will sound familiar to you, these are some examples of gamification applied to language learning, which encourages its users to use them to practice while they get rewards and stimulate concepts and information in a playful way.

However, our project intends to go a little further, generating an entire virtual environment, where students can be immersed in the entire visual context of their university from the comfort of their home. because of course, nothing students like more than going to their university, right?

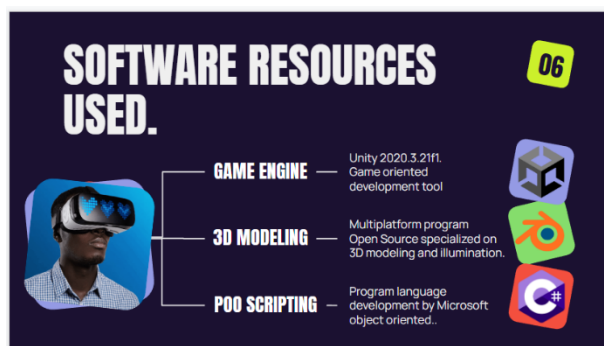The software resources used are showed in the figure six.

Figure 6 Software resources used
Source: Own elaboration

Very well, now that we are clear about the concepts that we intend to mix, how are we going to carry out this idea to a real prototype? For this we will use several software tools, among them we can highlight 3 main ones, a "graphics engine" or "Game engine", a 3d modeling tool, and a programming language capable of being object-oriented that is strongly typed.

Let's start with the graphics engine, Unity. Unity is the cornerstone of our project, a development tool focused on video games that offers us the necessary tools to create highly interactive environments.

know, many times video games are usually classified as a form of merely playful procrastination. But its development is not so different from that of any other application focused on users. We simply have to change the goal, from an entertainment medium to a learning tool.

The Unity3D engine was developed as a C#- and Mono-based code. The run-time part of the engine was developed with C++ and Microsoft NET API, and the editor program was developed with C#. As for the script, it cannot be modified directly in Unity, and it can be modified in script editors, such as Mono Develop, etc., that support Unity. Although Visual Studio also supports through plug-ins, it lacks overall debugging functionality and, in the Express version, debugging is not supported. In the case of Unity3, not only simple physics engines or shaders, but also realistically, all conditions, including network or terrain manipulation, audio, video, animations, etc., are supported [10].

For all those reasons and more the better option to develop the project is Unity as a graphics engine showed in the figure seven.

Figure 7 Unity as a graphics engine
Source: Own elaboration

Ok, so we already have an environment that will allow us to assemble our application, but now we need a tool that allows us to model both the environment and the objects and characters with which the user interacts. For that, we have designated Blender as our design tool, since Unity does not have its own 3d modeling tool.

And although Blender is aimed at artists and multimedia creation professionals, it should be remembered that for this type of development it is essential to have a multidisciplinary development team. Able to take advantage of the capabilities of this type of software so that the final product is both functional and attractive.

For these reasons, that Blender is Open Source, that it has an internal texture creation system or that its export format is compatible with Unity, makes it the best candidate for our project.

And speaking of compatibility, having a flashy or well-animated scenario won't do much good if it has zero functionality, since for the assignment of behaviors and other systems that require user interaction with the environment, it is necessary to generate behavior scripts, using the above mentioned C# in object-oriented programming.

Honestly, there is not much to object at this point, visual studio is one of the most used integrated development environments in terms of .NET applications, it has support for multiple languages and direct connection with the Unity 3d engine, so it was logical attach it to the tools to use.

Very well, with clear objectives and ready tools, all that was left was to get to work, for this we have implemented "Scrum" as an agile methodology for the development of our project. (Figure 8)

Scrum is a framework designed for teams that build and iterate quickly, helping us work together to solve problems in complex environments. Even if someone wasn't part of the development team, they could also take advantage of Scrum.

Within this framework and in the context of our project, we find 2 roles, the "Scrum Master" and the "Team Members" The "scrum master" has the role of moderator, we could say that he is the leader of the project, however he is not the person in charge of giving orders but rather helping the "team members" to understand the needs that the final product must meet.

Figure 8 Scrum Methodology
Source: Own elaboration

The "team developer" is obviously the development team, they are all the people trained to provide solutions or cover the needs that the project requests, regardless of their roles.

The "product backlog" is the definition of characteristics and requirements with which the project must comply, in this stage the tasks to be developed and their production order are ordered and organized.

The "Sprint backlog" is the list of functionalities or tasks that have to be developed in the defined time, and these are taken directly from the "product backlog" All of the above is defined in a period of time between 1 and 4 weeks, and this is what we know as "Sprint"

The "Sprint" can be accompanied by weekly or even daily "Meetings". And at the end of the entire Sprint, the progress of the development and the completed tasks are evaluated, making it an incremental development line. Defining a new Sprint, until the project ends in its entirety. Thus, facilitating the follow-up of the project.

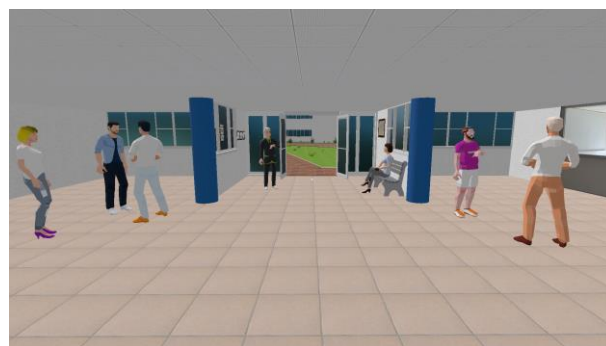The results of the 360 virtual tour and escape room are showed in the figure 9, to 12.

Figure 9 Screenshot of the virtual 360 virtual tour and escape room when you start the game
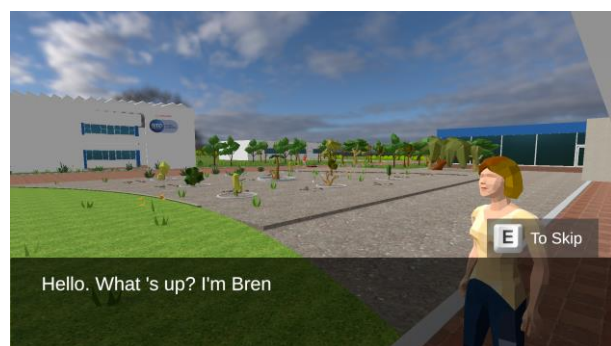*Source: Own elaboration*

Figure 10 Screenshot when you start a basic conversation with a NPC about the presentations topic
Source: Own elaboration

Figure 11 Screenshot of a conversation about the presentations topic and then solve a puzzle
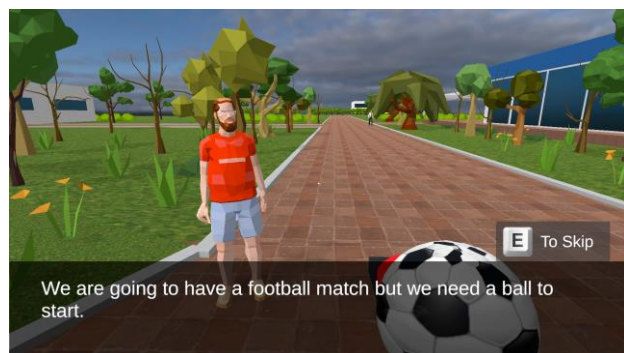*Source: Own elaboration*

Figure 12 Screenshot solving puzzles in the escape room dynamic
Source: Own elaboration

As we have been able to observe throughout the images, the methodologies where mechanics and elements related to playful reinforcement are introduced, can not only be implemented in video games, but also in the areas of education. And these can be implemented both in semi-professional education and higher education as our university. (Figure 13)

Whit this we are demonstrating that the gamification helps to encourage and motivate the attention that students pay to the content. With this learning model, it is about overcoming the barriers imposed by the global situations that we have had to go through, in addition to traditional methods, which are mainly characterized by the passive reception of the information provided or dictated by the teacher. In this sense, gamification is an alternative to these passive methodologies, installing the student as the protagonist of their own learning.

Figure 13 Screenshot of the virtual tour route of the UPJR University
Source: Own elaboration

Conclusions and escalation plan

The main aim was accomplished because we designed and develop an interactive virtual tour of the Universidad Politécnica de Juventino Rosas for diagnosis and strengthening of the English Language

The two specific aims were accomplished too because we obtained first the 360 spherical photos to make a virtual tour including the mains buildings of the university as a first stage of the project using the 3D Vista software and we analyzed the interactions to create a puzzles to development a computer video game focus in escape room style using Unity.

Within this project is possible to adapt news routes to the virtual tour and modify it or to change the dialogue and whit this to obtain different puzzles of level intermediate as a B1 or B2, in the future the plan to the improvement possibilities is to create new areas that can be added in the same way, that is, with new facilities, as well as to include the smaller but no less relevant spaces and the equipment used by students in the different careers , for example in manufacture engineering we use the 3D printer or the Fanuc arm robot, showing another spaces such as cubicles, offices, laboratories, bathrooms and machines, to continue with our project and make it grow, we also intend to introduce other languages such as French or Japanese maybe to show all the people what we have in the polytechnic university of Juventino Rosas

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