

Aijuvi 1.0: A Didactic Model Proposal for Teaching Finance Using Video Games

Aijuvi 1.0: una propuesta de modelo didáctico para la enseñanza de finanzas con videojuegos

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ABSTRACT

A well-crafted didactic model is crucial to optimize learning outcomes by seamlessly integrating content with innovative pedagogical strategies. A cutting-edge didactic model that employs video games to teach personal finance in English is proposed. The Aijuvi 1.0 model, rooted in the theory of Design-Based Research, reinforced by Constructivism, was designed, and a tool was employed to measure student motivation. The findings, in this case, reveal that video games can be used effectively to teach Personal Finance in English. **KEYWORDS:** didactic model, video games, personal finance, college students, English as a foreign language.

RESUMEN

Un modelo didáctico bien elaborado es crucial para optimizar los resultados del aprendizaje integrando a la perfección los contenidos con estrategias pedagógicas innovadoras. De acuerdo con lo anterior, se propone un modelo didáctico de vanguardia que emplee videojuegos para enseñar finanzas personales en inglés. Se diseñó el modelo Aijuvi 1.0, enraizado en la teoría de la investigación basada en el diseño y reforzada por el constructivismo, y se empleó una herramienta para medir la motivación de los estudiantes. Los resultados, en este caso, revelan que los videojuegos pueden utilizarse eficazmente para enseñar finanzas personales en inglés. **PALABRAS CLAVE:** modelo didáctico, videojuegos, finanzas personales, estudiantes universitarios, inglés como lengua extranjera.

INTRODUCTION

Didactic models are tools used in education to facilitate student learning. These models can be digital teaching resources, or active teaching methodologies (Delgado Cobeña *et al.*, 2023; Ruiz Ortega *et al.*, 2015). Using digital didactic resources in education has managed to innovate teaching-learning models (Delgado Cobeña *et al.*, 2023).

These models are a fundamental tool for the construction of more significant understandings of the concepts addressed in the classroom. In addition, they can be used to improve the learning of various academic subjects, including mathematics, with eye-catching teaching materials (Abreu *et al.*, 2017). The use of didactic resources in higher education can be improved by identifying the pedagogical conceptions held by university professors (Valentín Centeno *et al.*, 2016).

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Didactic models are helpful tools to facilitate student learning in different areas of knowledge. They can be used with digital didactic resources and active teaching methodologies to improve teaching-learning.

In order to understand the didactic models, it is necessary to define the term didactics, a science that integrates concepts, definitions, categories, laws, and principles whose development is linked to research and practical experiences that occur in the classroom to achieve the comprehensive training of students (Abreu *et al.*, 2017).

According to Larriba Naranjo (2001), a didactic model is a set of educational principles that comes from the practical experience of teachers together with their academic knowledge, whose function is to define educational objectives and guide teaching-learning processes. Didactics refers to the art of teaching and is a pedagogical discipline of a practical and normative nature that has the specific objective of teaching technique. It is also a research discipline that analyzes the contents related to the teaching-learning of any school subject (Landazábal Cuervo *et al.*, 2010).

Didactic models are structured plans that can be used to form a curriculum and design materials that support teaching in the classroom (Koper *et al.*, 1995). Models are not static; they vary over the years and go hand in hand with societal changes. In recent years, these variations have been supported by what is now known as Information and Communication Technologies (ICT) (Thillainathan *et al.*, 2013).

The article is divided into five sections, the first of which briefly exposes the current status of the Teaching of English as a Foreign Language (TEFL onwards) in Mexico. The second section proposes an in-house design of a didactic model and the way it can be used by teachers. In the third section, the results derived from the motivation measurement by the didactic model users are exposed. Finally, the conclusions and a prospective analysis of this research are presented.

Teaching English as a Foreign Language at the undergraduate level is a common practice in almost all the universities of the Mexican Republic (Cruz-Ramos & Herrera-Díaz, 2022). Although each institution defines the number of hours students must dedicate to study; it is a fact that to graduate, students must prove that they have met the requirements established by their university (Tromp & Datzberger, 2019).

Despite the importance of English as a *lingua franca*, some learners may need help to learn it. *Lingua franca* refers to “any or various languages used as common or commercial tongues among peoples of diverse speech” (Merriam-Webster, 2023). For this reason, English teachers must develop teaching strategies that allow students to learn the language not only to pass the course but also to have better opportunities in life.

1. THE AIJUVI 1.0 MODEL

Figure 1 shows the proposal of a didactic model design for teaching TEFL to university students based on video games. The model, besides being a metaphorical figure, is an in-house design called Aijuvi 1.0, an acronym that means “Learn English by Playing Video Games” or “Aprende Inglés Jugando Videojuego” in Spanish. This model consists of four key stages, which are described below.

1.1. First Stage: Preparing the Ground

The first stage, represented by the buttons from 1 to 7, is the preparation of the teacher prior to the use of video games in the classroom. Button 1 corresponds to the consideration of the audience, be it young adults, teenagers, or children, in order to choose the appropriate type of language and context. Button 2 represents the choice of the device where the video game will be used, so it is important to ask students if they have the necessary technical requirements. Button 3 refers to the technical training of the teacher in case of doubts related to the use of the video game. Button 4 corresponds to the preparation of the didactic materials in digital or physical format, which will be used during the session. Button 5 introduces a limited number of new words, between 7 and 10, to avoid overwhelming students. Button 6 is used to check the clarity of the instructions to be given to the students, ensuring that they understand the objectives of the game before starting to play. Finally, button 7 determines if the time allocated to the activity with the video game is sufficient or if several sessions will be needed to achieve the objectives.

1. 2. Second Stage: Activating Students' Prior Knowledge

In the stage represented by the lever with the number 8 in Aijuvi 1.0, the teacher must use an activity that serves as a trigger to activate the students' previous knowledge and put them in context. In order to achieve this goal, a simple table of three blank columns called K-W-L can be used for the three related questions: "What do I Know?" "What do I want to know?" and "What did I learn?"

In the first column, with the title "What do I know about the subject?" students can freely describe their previous knowledge. Likewise, it is valid not to have any prior knowledge about the subject.

The second column is titled "What would I like to know about the topic?" and allows students to share their intentions regarding what they want to learn.

Finally, the third column, titled "What did I learn about the topic?" is left blank at the beginning of the activity for students to complete at the end of the class in a moment of introspection and reflection.

1. 3. Third Stage: It's Time To Play!

The button marked with the number 9 indicates that it is time to start the game stage once all the elements are prepared. To do this, the teacher must share the link to the video game or the access code with the students, and his/her role is only to monitor that the students have a trustworthy gaming experience.

1. 4. Fourth Stage: Reflecting to Improve

The button with the number 10 indicates that it is crucial to close the cycle through a reflection exercise on what they have learned after the students have finished playing. This exercise can be carried out individually or collectively. If the K-W-L table mentioned in point 2.2 is chosen, it is time for students to complete the third column with their reflection on what they have learned. Another option is translating it into an online forum so that other colleagues can compare what they have learned.

2. THEORETICAL BASES FOR THE DEVELOPMENT OF THE AIJUVI 1.0 MODEL

In order to create the Aijuvi 1.0 didactic model, Design-Based Research (DBR) was used, which is a type of research, according to De Benito Crosetti and Salinas Ibáñez (2016: 1), which focuses on:

[...] educational innovation, whose fundamental characteristic is introducing a new element to transform a situation. This type of research tries to respond to problems detected in the educational reality, resorting to scientific theories or available models to propose possible solutions to said problems. To this end, programs, didactic packages, materials, didactic strategies, etcetera are designed, which are tested, validated, and once improved, disseminated to the school reality. The research process generally has two stages: research until creating a new product and its successive improvements. On the other hand, it provides knowledge in the form of principles that contribute to new design processes. Understanding as a product not only material objects (textbooks, video programs, computer applications, simulation games) but also processes and procedures (teaching methods, school organization plans, didactic strategies, different programs).

Gibelli (2014) and Herrington (2007) argue that researchers who use the DBR seek to analyze learning problems in their natural contexts to create transformations that improve teaching processes. Likewise, Rinaudo & Donolo (2010), Easterday *et al.* (2014), and Valverde-Berrocoso (2016) affirm that DBR is an adequate tool to search for a didactic model that can innovate incrementally, in this case, using videogames as a tool to teach English.

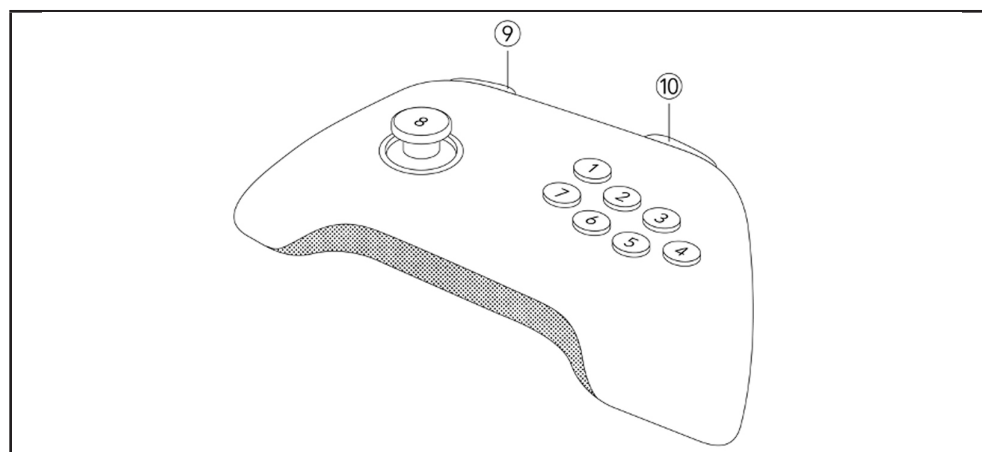


FIGURE 1

Aijuvi model 1.0

Source: elaborated by authors. Illustration made by David Flores J.

3. THE USE OF GAMIFICATION FOR L2 TEACHING

Gamification is a relatively new term in English, which refers to using game design elements in unrelated contexts, such as public or private companies, according to Contreras Espinosa and Eguia (2017). Due to the recent appearance of the term, a well-established definition has yet to be coined. However, gamification has been consolidated in recent years in different contexts, including education.

In the university environment, gamification is used to generate a playful learning atmosphere that encourage student motivation and participation, as well as interaction and collaboration between them, according to Ferreira Nunes *et al.* (2019). In addition, according to Pintor Díaz (2019), gamification can attract and enhance students' motivation through rewards, competition, and challenges that drive the desire to excel.

Gamification is based on game design and elements of psychology that motivate users, mainly through competition and reward, according to Aseriskis *et al.* (2017). In this way, gamification changes user behavior and supports innovation in teaching.

Additionally, gamification has been successful in the educational field due to its ability to generate immediate feedback and motivate students to improve their performance, unlike the traditional teaching model, where students are passive entities, according to Cornillie *et al.* (2012) and Carnero (2019). Furthermore, gamification was a handy tool in terms of encouraging students' participation in virtual education during the COVID-19 pandemic, according to Flores *et al.* (2021).

However, gamification is not limited to the educational field but is also used in other contexts, such as the environment, according to Torres-Toukoumidis *et al.* (2017). In general, gamification has become a natural and effective methodology to develop skills and competencies pleasantly, according to Gómez-Díaz and García-Rodríguez (2018). In short, gamification has established itself as an innovative and effective tool in teaching and other fields, thanks to its ability to generate motivation and immediate feedback.

4. DEVELOPING SKILLS IN L2

It is common to hear the expression: "You cannot give what you do not have," which acquires particular relevance in L2 teaching. During the L2 teaching-learning process, the teacher must ensure that students are exposed to various teaching materials that can enrich their learning in different ways. In recent years, it has become common to use technology to teach L2 language skills, such as listening, reading, writing, and speaking, without neglecting the teaching of grammar, vocabulary, and pronunciation.

In the case of the subjects of this research, participants study at least two subjects or Learning Units (*Unidades de Aprendizaje* in Spanish or UDAs) entirely in English: Organizational Communication and Business Communication. According to the curricular plan for Finance students, they must take one or both UDAs simultaneously after completing two years of their degree. Given the above, the teacher expects that students will understand and express themselves fluently, so they can teach the subject without facing language barriers.

For this to be possible, it was determined that students must have passed at least six semesters of English before taking these two UDAs. This idea implies that if the Finance degree lasts four years, students can complete three years of L2 study and take both UDAs without difficulty in their final year. However, this situation began to change over time: most students needed help to meet the six semesters of English requirement. This situation led the university authorities to reduce the requirement to enter the UDAs from six to four semesters of English.

Regarding the curricular plan for teaching L2, teachers cultivate the development of receptive or passive skills during the first three semesters. In the following three semesters, they focus on teaching productive or active skills. Both skills are described below in order to clarify the point.

4. 1. Teaching Receptive Skills

In the L2 teaching process, teachers focus on developing receptive skills such as *Reading* and *Listening*, recognizing them as critical pieces in the success of student learning. To do this, L2 teachers use their experience, creativity, and pedagogical skills to design learning activities that allow students to be receptive to oral content through YouTube videos, podcasts, radio shows, dictation exercises, and interviews, among other formats.

Students must receive adequate nutrition in the learning process; they can ingest and produce language. In the case of the development of reading skills, the teacher can use different pedagogical tools, such as fictional stories, text comparison, or the identification of the four existing types of reading: extensive, intensive, fast reading, and exploratory. In this way, the scaffolding construction that allows students to acquire the necessary language skills for their future professional performance is encouraged.

4. 2. Teaching Productive Skills

The development of productive or active language skills represents a more significant challenge for students since it is at this stage that they must practice what they have learned in the first three semesters. L2 teachers use various didactic activities to encourage the writing of biographies, short texts, fictional stories, dreams, myths, legends, and interactive stories to improve students' writing skills.

Speaking skills, teachers can implement multiple activities, such as describing images, reading aloud, and interesting, Socratic, or globally relevant discussions. The objective is for the student to effectively express their feelings and opinions so that their interlocutor understands them correctly.

4.3. Teaching Vocabulary in L2

Vocabulary learning, along with grammar and pronunciation, is considered an important activity in acquiring an L2. Despite not being a language skill in itself, it is essential to communicate effectively in another language. From the beginning of the learning path, students are exposed to activities such as word associations, crossword puzzles, word searches, and matching images with texts, among others, to improve their vocabulary.

In this sense, video games are essential as a didactic tool in teaching the four language skills and learning grammar, vocabulary, and pronunciation. By allowing students to experience and practice L2 without having to focus on grammar rules, video games can significantly enhance the learning experience and language proficiency.

5. RESEARCH METHOD

During the fourth week of online classes of the 2021 fall semester, a study was conducted to quantify student motivation. The study sought to measure the motivation experienced by students when using The Payoff video game. For this, the ARCS instrument by Keller (2010) was used, which measures Attention, Relevance, Confidence, and Satisfaction through the Instructional Materials Motivation Survey (IMMS) on the Microsoft Forms platform.

During a two-hour work session in the classroom, activities such as activating prior knowledge about personal finance, reflecting on the subject, and answering questions related to their knowledge and desires about personal finance were carried out. During a third session, the students worked individually with the video game The Payoff and concluded by writing a brief reflection on their learning.

Keller (2010) describes the four ARCS dimensions or categories his instrument seeks to measure. Attention includes human traits such as orientation, curiosity, and sensation-seeking. Regarding Relevance, it refers to the elements that a person perceives as elements that serve to satisfy their personal needs. Confidence is explained through the perceptions of personal control and the search for success, which leads to Satisfaction, that results from the sum of the three previous values and motivates the student to continue learning.

Keller's (2010) ARCS instrument consists of 36 items based on a Likert scale with seven response options ranging from "I strongly disagree" to "I strongly agree." Despite the fact that this instrument was developed some time ago, it has proven its usefulness in studies by researchers, such as Barroso Osuna (2016), Cárdenas Huérfano (2021), and Loorbach *et al.* (2015), among other, to assess the degree of motivation of students in the use of educational technologies.

6. RESULTS

An evaluation of the reliability of the results obtained using the ARCS instrument was carried out. In order to do this, a reliability coefficient was applied to a measurement scale using Microsoft Excel. The results corresponding to each dimension are presented in Table 1, in the column titled "Flores." This comparison was carried out to determine the consistency of the data acquired about the results obtained by three other researchers who also used this same instrument, except they were conducting different studies.

The comparison in Table 1 shows that the Attention and Confidence dimensions' reliability results are lower than the other three authors. In contrast, the areas of Relevance and Satisfaction present higher average values. Regarding the questionnaire applied in its entirety, the reliability index obtained coincides with that obtained by Barroso Osuna (2016). Both Barroso Osuna (2016) and Cárdenas Huérfano (2021) used this instrument to measure confidence in the use of augmented reality in the classroom, while Loorbach *et al.* (2015) applied it to evaluate its use in an instruction manual for older people who want to use a cell phone.

For this third iteration, 126 students from the Economic-Administrative Sciences degree program of the University of Guanajuato in central Mexico participated in the survey. Among them, 82 were women (65%), and 44 were men (35%). The students were studying the Business Communication learning unit, a compulsory subject for their academic training.

The results obtained after applying the Instructional Materials Motivation Survey (IMSS) instrument are presented in the following table.

Table 2 shows that the mean of the scores is above the central value of 3.5. This value indicates that the students found the experience of using a video game significant for learning finance. Specifically, the categories that stand out are those of Relevance and Satisfaction, while those of Attention and Confidence have a slight improvement. In addition, in the standard deviation column, it can be seen that the results obtained show remarkable uniformity.

The results obtained by applying the validity test are similar to those obtained with the original ARCS model proposed by Keller (2010).

TABLE 1
Comparison of reliability coefficient among authors' results

Dimension	Author	Loorbach <i>et al.</i> (2015)	Barroso Osuna (2016)	Cárdenas Huérfano (2021)	Flores (2021)
Attention		0.73	0.70	0.82	0.41
Relevance		0.68	0.58	0.75	0.86
Confidence		0.73	0.74	0.53	0.49
Satisfaction		0.82	0.77	0.86	0.88

Source: elaborated by authors.

TABLE 2
Means and standard deviations of the instrument. Instructional Materials Motivation Survey

Dimension	Half	Typical deviation
Attention	4.72	1.68
Relevance	5.43	1.64
Confidence	4.61	2.08
Satisfaction	5.53	1.47
Total of the instrument	4.99	1.83

Source: elaborated by authors.

PROSPECTIVE ANALYSIS

The results found in this study seem to indicate that students find using video games in class attractive, encouraging them to remain attentive. Therefore, its use is recommended to the teaching community as a didactic tool to explore in the classroom. Regarding the relevance of the material used, students find it interesting and relatable to their previous experiences. Furthermore, the results show that the students were confident in the organization of the material presented and could learn things that they considered surprising or unexpected. According to V. Plata (personal communication, November 15, 2021), “the information discovered through the experience stimulated his curiosity” and that “it was a pleasure to work on this lesson, which is well designed”.

Thanks to the use of the instrument developed by Keller, it can be observed that video games manage to awaken motivation, along with attention, relevance, confidence, and satisfaction among students who use them in the classroom, regardless of the exact title of the video game that a teacher wants to use. Based on the results found, the didactic model for teaching English using video games was developed since it was found that university students show an interest in them, that thanks to their use, they can expand or improve their knowledge of personal finance in English and who feel motivated and attracted by using a video game like The Payoff. Teachers interested in teaching a particular subject are encouraged to find a suitable video game title for use in the classroom.

The use of The Payoff video game as a technological tool works well for regular use in the classroom. Like the video game used in this research, because it is free of charge and designed for desktop and laptop computers, it allows students to access it without the need to install any additional software or application. Likewise, any teacher who wants to use this model may notice that it is relatively simple to implement the Aijuvi 1.0 model.

CONCLUSIONS

In the present study, it has been shown that using video games in classes can be attractive to the student body, increasing their attention level. Likewise, it is verified that the didactic material used is striking and transcendental for the students due to its relationship with their previous experiences.

In the same way, it has been verified that the use of video games awakens five critical learning elements in most students: confidence, motivation, relevance, attention, and satisfaction, regardless of the videogame title used.

One of the primary drawbacks of using video games for educational purposes is the requirement for specific technological resources. Not all students can access the necessary hardware or software to run the games effectively because of various reasons such as financial constraints, lack of internet service, limited proficiency in English, among other reasons. This situation creates a digital divide, limiting inclusivity and equitable access to educational opportunities. Therefore, schools and institutions can work towards providing adequate computers and a fast internet connection to ensure that all students have access to the necessary technology. Additionally, the constant need for technological updates and compatibility issues can further hinder the seamless integration of video games into the classroom environment.

While video games can offer engaging and interactive learning experiences, there is a concern regarding the transferability of knowledge and skills acquired within the virtual environment to real-world situations. Students may need help to apply what they have learned in a video game context to solve problems or make decisions in their everyday lives. The discrepancy between the virtual and real-world contexts can pose challenges when attempting to generalize the acquired knowledge and skills to practical scenarios.

Another limitation of using video games as a teaching tool lies in aligning game content with specific educational objectives. Finding or developing video games that target the desired learning outcomes can be challenging. While some games may cover certain subjects or skills effectively, they may require more depth for a comprehensive educational experience. The content of video games may also need to be aligned with the curriculum, so as not to compromise the intended learning outcomes.

Video games have the potential to captivate and engage learners, but this engagement needs to be carefully balanced with the overall instructional time and objectives. Excessive use of video games in the classroom or educational setting may lead to time mismanagement, with students spending more time on game-related activities than on actual learning. Striking the right balance between gameplay and focused learning activities is essential to ensure that video games are an effective teaching tool without sacrificing instructional time.

In conclusion, based on the theory of Constructivism, the Aijuvi 1.0 didactic model is functional for teaching L2 in Finance students at the university level. It might be helpful to teach almost any subject as well, and it is essential to note that the model must be continually reviewed and adjusted for its evolution. Educational innovation is not a destination but rather a path that the teacher must enjoy, along with everything he/she finds in his/her path.

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