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# IMPLEMENTATION OF GAME-BASED LEARNING IN ENTREPRENEUR EDUCATION USING THE PROTOTYPE METHOD

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**Abstract**

The aim of this study was to analyse the impact of Game-based Learning on entrepreneur education using the prototype method. The prototype method was used in this study, consisting of five stages: data collection, system analysis, coding, implementation, and maintenance. Through Game-based learning, students were able to engage in a game related to entrepreneurship, comprising of puzzles and questions, in the form of a web application. Game-based learning was designed to help students understand common knowledge about entrepreneurship, and the researchers hope that it will encourage them to learn more about entrepreneurship and ultimately motivate them to become entrepreneurs.

Keywords: Entrepreneur education, Game-based learning, Prototype method.

## 1. Introduction

Digital Game-based Learning (DGBL) is an educational approach that combines learning principles with games to engage students [1]. Games are a popular form of entertainment in today's era and can provide students with social and cognitive engagement that can lead to increased satisfaction [2-8]. DGBL can attract students, particularly gamers, and make learning interesting for them [9]. The process of learning becomes more enjoyable in the world of ICT, as students start learning through their interests and entertainment [10-18]. Education is crucial to make the teaching and learning process between teachers and students more informative, creative, and innovative [19]. With the advent of ICT, online learning based on educational games that follow the curriculum can be provided, which allows students to learn independently without depending on their schools and can learn anytime and anywhere.

DGBL is mobile-based and adapted to the curriculum at the School of Saint Inacio de Loyola (CSIL) and is applied to entrepreneurial subjects that follow the curriculum of entrepreneurship. The game includes matching pictures, business models, and more. The satisfaction of students in the classroom while learning educational games will be measured and displayed on the scoreboard to stimulate their competitiveness to continue learning and become the best.

Previous studies have explained the implementation of GBL using prototypes to improve learning efficiency [20-22], but research on the implementation of DGBL in CSIL schools has not yet been conducted. Therefore, this research is interesting as it focuses on the implementation of DGBL in CSIL schools.

The purpose of implementing DGBL is to spark students' interest in entrepreneurship. Interactive and attractive media can inspire students to continue learning and develop their efficacy. This is expected to have a significant impact on students' learning, resulting in better learning outcomes.

## 2. Research Method

For this research, the data was collected through literature review, which involved studying journals and articles related to the research topic. The researchers also used the Prototype Method, which is an overview of the stages involved in conducting a study or designing software [23]. Figure 1 shows the stages involved in the Prototype Method that were utilized in this research.

The research on the prototype method consists of 6 stages, and each stage is interrelated and involves a rotating cycle. It starts with the stage of data collection/consultation between the customer and the developer, followed by system analysis, coding, implementation, and maintenance.

(i) Data Collection. This stage is an analysis of system needs aimed at obtaining as much information from the user so that a computer system will be created that can perform the tasks desired by its users [24].

(ii) System analysis. After the data collection stage, then system analysis, in this study the system analysis stage was carried out by designing comoponents that running include hardware, software, networks and people resource, user requirements must define system specific input, output, process, data source handled, and control [25].

(iii) Coding. The next stage of coding, at this stage is done writing code to make a game, to use mobile programming language as the display that will be displayed by the user.

(iv) Implementation. The Implementation Stage is the launch of the application maker that has been designed, at this stage the researcher will conduct a trial and assessment on the entrepreneurial educational game, whether the game is in accordance with the wishes and reality of the field (case study) namely the Colegio Santo Inacio de Loyola school.

Maintenance. The maintenance stage is not the last, there can be a rotation cycle back to the initial stage, namely data collection in case of errors in the software being developed.

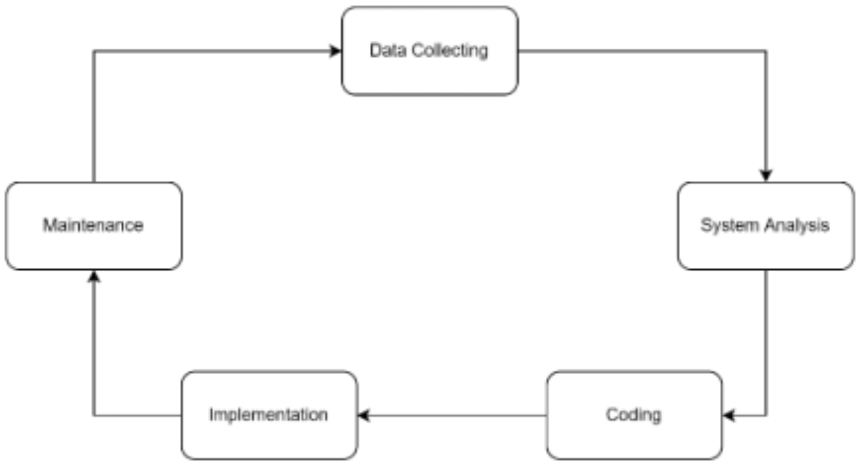


**Fig. 1. Prototype method.**

## 3. Results and Discussion

The purpose of creating this game is to enhance students' knowledge and interest in entrepreneurial subjects. The game is based on the curriculum at Colegio Santo Inacio de Loyola school and has been designed to have an attractive and user-friendly appearance.

The research system design utilizes Use Cases and Activity Diagrams. Use Case is a modeling tool used to represent user interactions with the system [26]. The Use Case diagram is a UML model used to identify the relationship between users and the system. This simplifies the application development process and enables an earlier understanding of its functionality and purpose (Fig. 2).

Figure 2 illustrates that users can perform various activities on the system, including logging in, accessing the theory, taking tests, viewing scores, and logging out once they have completed their activities on the system (Fig. 3).

Figure 3 explains that admins can perform activities on the system such as logging in, viewing, editing and deleting theories, viewing, editing and deleting tests, seeing scores and student’s logout when they have finished doing activities on the system (Fig. 4).

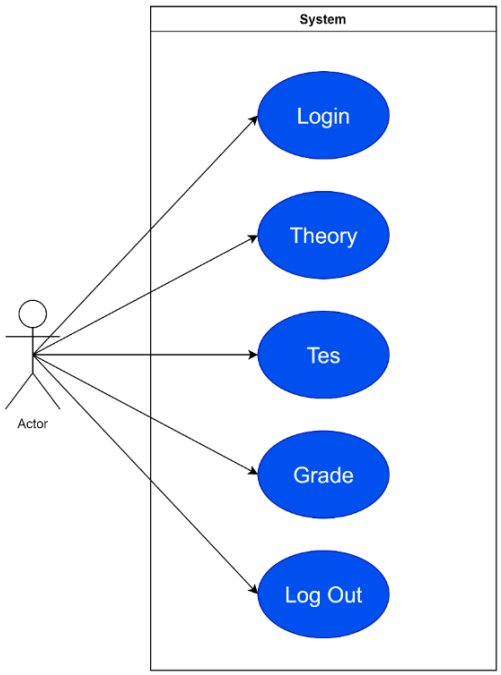


**Fig. 2. Use case diagram students.**

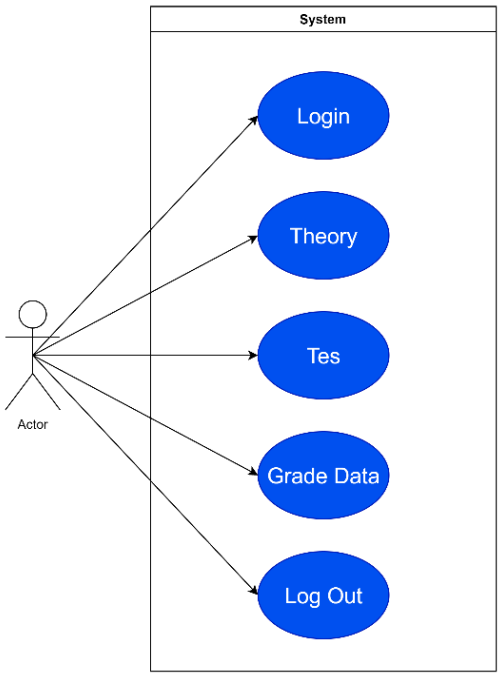


**Fig. 3. Use case admin diagram.**

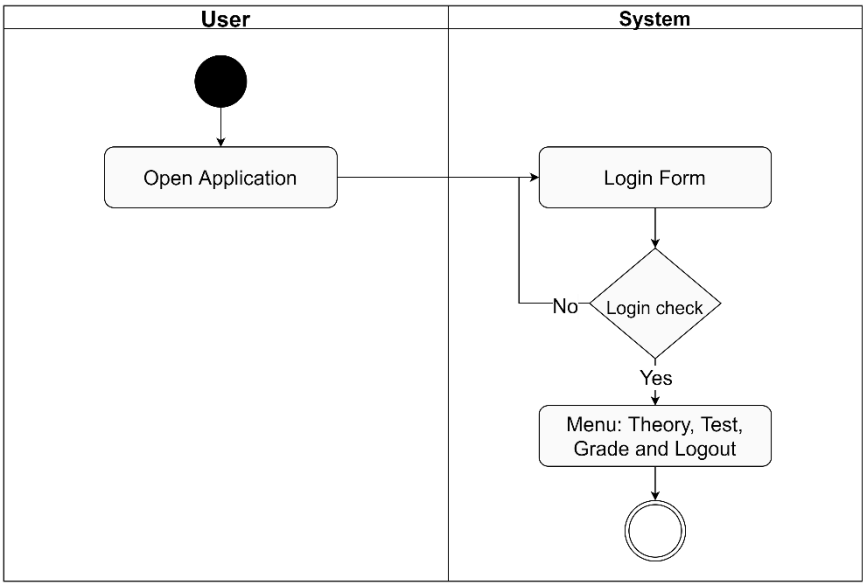


**Fig. 4. Activity diagram student grade menu.**

Figure 4 depicts the flow for users/students when logging into the game. The system will verify the username and password, and if they are correct, it will direct the user to the main menu (Fig. 5).

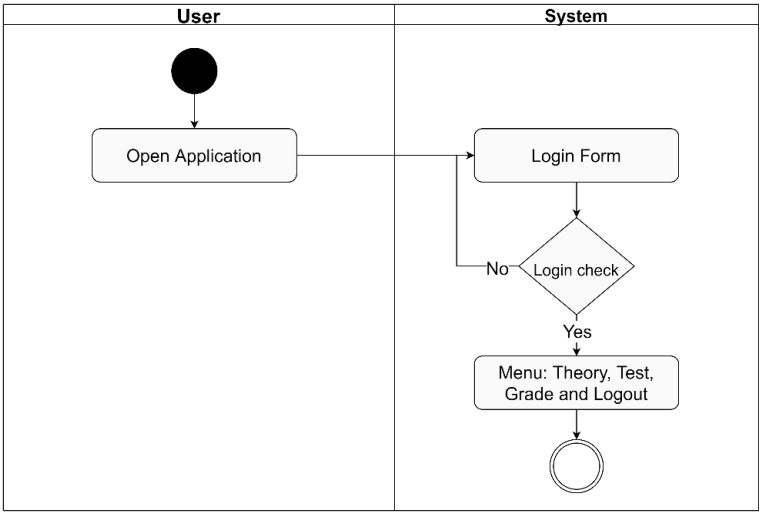


**Fig. 5. Activity diagram selecting the teacher's start menu.**

In addition to students, there are also teachers who serve as system admins, responsible for managing and processing data such as theory, test, and score data. Figure 5 illustrates the process of the admin/teacher logging into the system, where the system checks the username and password entered by the teacher and directs them to the main menu.

The implementation of the system involves two user types: teachers as admins and students as users. There are two different interfaces for the system implementation: a server implementation using the PHP programming language framework for admins to manage theoretical data and questions displayed to users, and a mobile application interface developed using the Android programming language for students to access the system.

**Implementation**

On the server side, users can process student user data, theory data, and test data. In this menu, the admin is the highest user who can add and edit theory data and test data (Fig. 6).

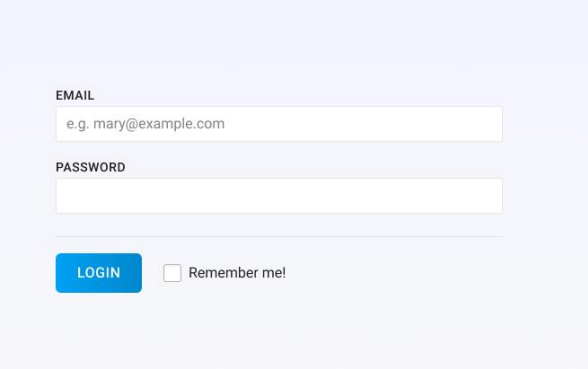


**Fig. 6. Login view.**

Figure 6 shows the login view of the application. To log in, the student or admin must enter a username and password. After that, the system will detect whether the login is from a student or an admin. If it is a student login, the system will direct them to the student menu. If it is an admin login, the system will direct them to the admin view (Fig. 7).

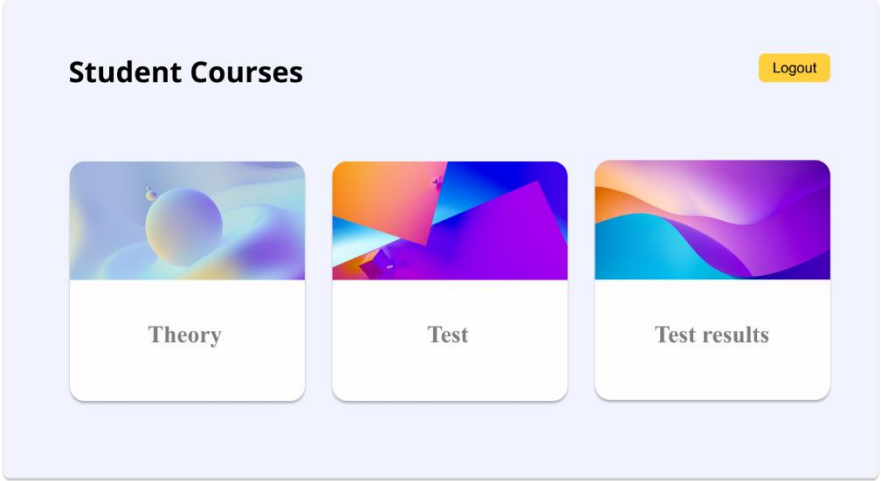


**Fig. 7. Student menu view.**

Figure 7 depicts the appearance of the student menu. When students choose a theory, the theory will be displayed. Students can choose a test after finishing reading the theory since the test will ask students about the theory. Students can also see the value of the test results by selecting the score menu. After completion, students can choose to log out to leave the application (Fig. 8).

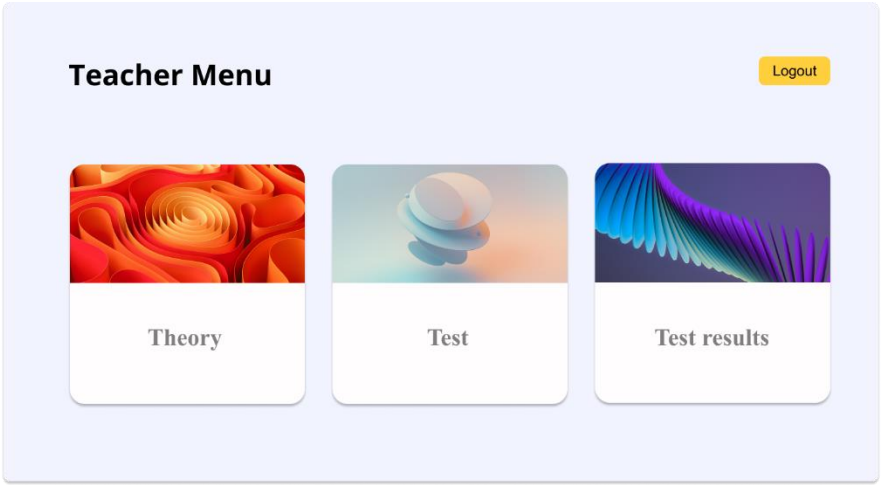


**Fig. 8. Admin/teacher menu view.**

Figure 8 illustrates the appearance of the admin menu. When on the theory page, the admin can add, edit, and delete data related to the theory. The admin can also manage test data, including adding, editing, and deleting it. Additionally, the admin can view the results of student scores on tests. Once finished, the admin can log out by selecting the "Log out" option (Fig. 9).

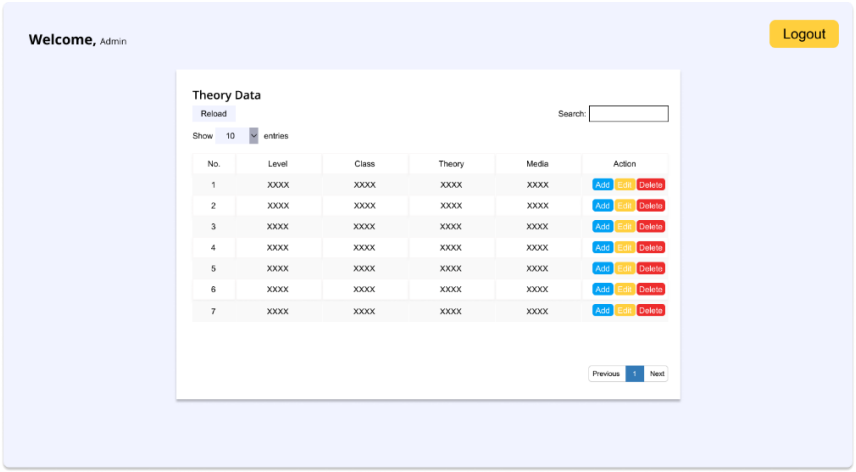


**Fig. 9. Theory data menu view.**

Figure 9 depicts the data related to the theory. Users can add, edit, and delete theoretical data as desired. The theoretical data is divided into levels, which include

easy, intermediate, and difficult levels. Additionally, there are classes for the students and the theories that will be studied (Fig. 10).

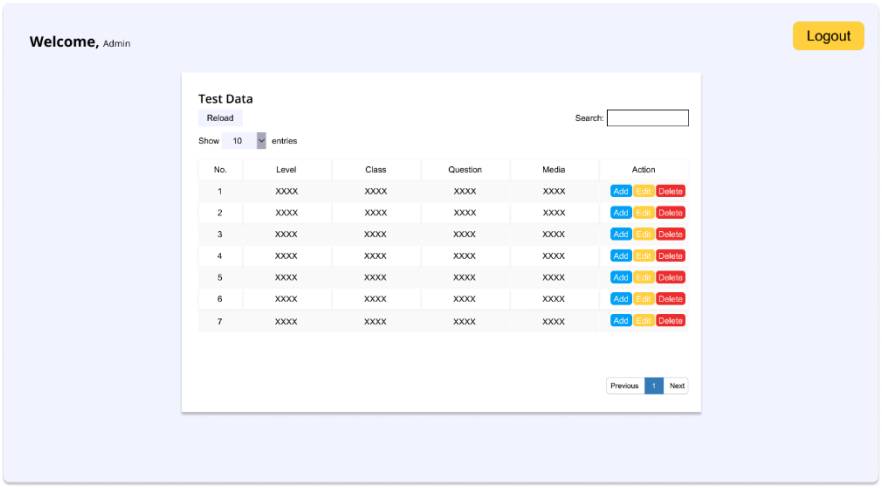


**Fig. 10. Test data view.**

The test data can be added, edited, and deleted by users similar to the theoretical data. The test data is in the form of levels, which include questions categorized as easy, intermediate, and difficult. Additionally, it includes questions for specific classes. These questions are the ones that will be asked to students (Fig. 11).

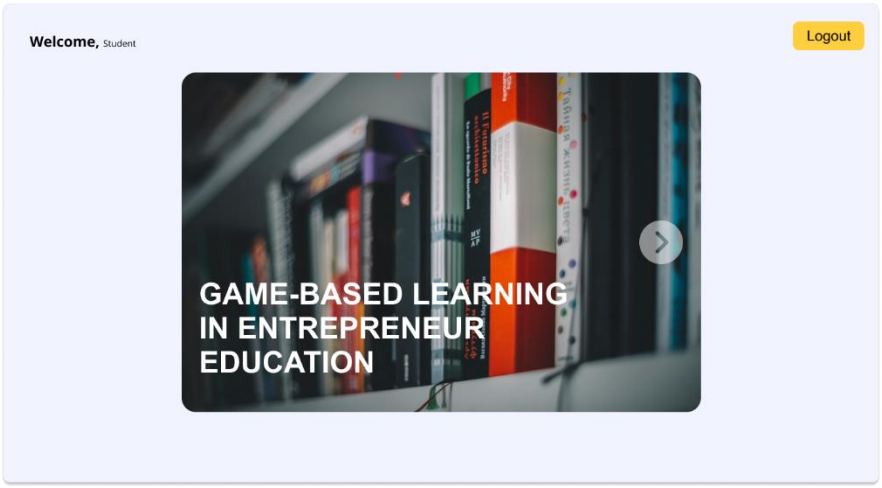


**Fig. 11. Theory view.**

In the theory display, students are able to read the theory. After understanding the theory, students can proceed by selecting 'next' or review the previous material by selecting 'prev' if they do not comprehend the theory (Fig. 12).

In the test menu, students can take a test. Before taking the test, students must first learn the theory. They can choose the correct answer between a, b, c, and d,

and then click next for the next question. Additionally, there is a time limit to answer all the questions (Fig. 13).

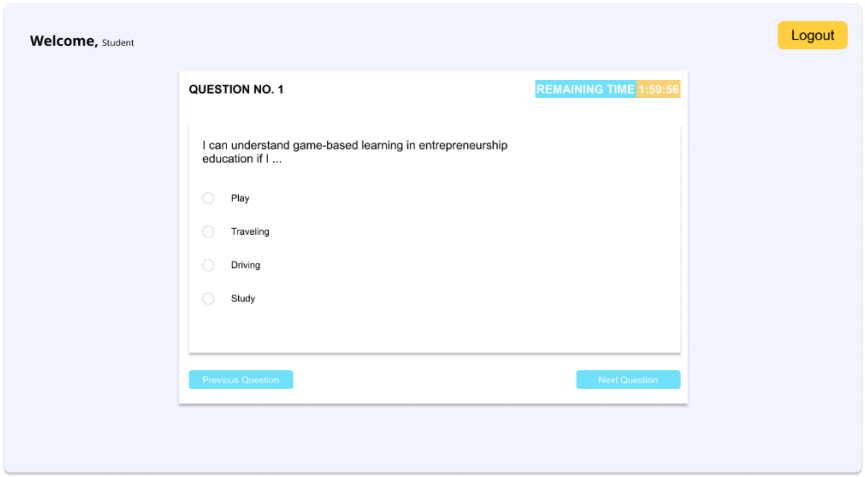


**Fig. 12. Menu test page.**

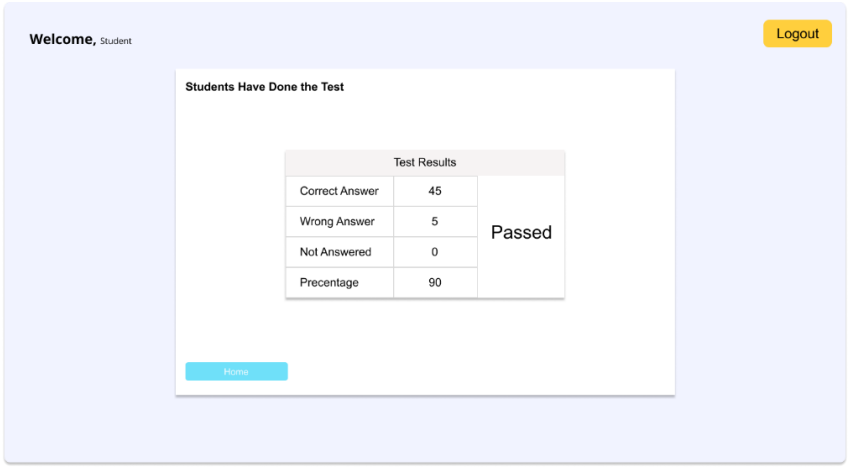


**Fig. 13. Student grade display.**

In Fig. 13, students will immediately see the indigo colour after answering all the questions, which will indicate whether their answers are correct or wrong. After that, they can directly go back to the starting menu.

## 4. Conclusion

Based on the results of the conducted research, it can be concluded that educational games have been developed which can present materials and questions as an evaluation of student learning. Thus, this can be an alternative means to support learning. The research and trial results demonstrate that the interactive English educational games created make the users feel that learning English is more enjoyable.

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