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# Development of "Trade War" Business Simulation Educational Game Using Unity

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#### **Abstrak**

Penelitian ini bertujuan untuk mengetahui pengaruh media pembelajaran game edukasi simulasi bisnis "Trade War" terhadap minat dan pemahaman bisnis siswa di SD Kristen Rehoboth. Sekolah umumnya hanya menggunakan media pembelajaran yang berupa buku dan penjelasan guru yang hanya bertujuan untuk memastikan siswa lulus tes tertulis sehingga motivasi dan hasil belajar siswa menjadi rendah karena hanya sekedar menghafal tanpa memahami materi, sedangkan subjek bisnis sendiri sulit untuk dipahami hanya melalui buku saja. Game edukasi simulasi bisnis memungkinkan siswa untuk berinteraksi langsung dengan lingkungan bisnis dan memahami materi subjek tersebut hingga mampu menerapkannya di dunia nyata. Penelitian ini menggunakan metode penelitian dan pengembangan dengan model ADDIE yang terdiri dari lima tahap, yaitu analisis, perancangan, pengembangan, implementasi, dan evaluasi. Data penelitian dikumpulkan dengan cara menyebarkan lembar angket validasi kepada empat orang validator untuk memberi nilai validasi pada aspek materi dan aspek media serta menyebarkan angket respon kepada 30 orang siswa untuk menilai validitas aspek manfaat media pembelajaran terhadap minat dan pemahaman bisnis siswa. Hasil penelitian menunjukkan bahwa media pembelajaran game edukasi simulasi bisnis "Trade Wars" untuk siswa kelas IV SD sudah cukup valid dari aspek materi, media, dan manfaat bagi siswa.

Kata Kunci: Game Edukasi Simulasi Bisnis, Unity, Trade War

#### Abstract

This study aims to determine the effect of learning media business simulation educational game "Trade War" on students' interest and understanding of business at SD Kristen Rehoboth Elementary School. Schools generally only use learning media in the form of books and teacher explanations which only aim to ensure students pass the written test so that student motivation and learning outcomes are low because they are just memorizing without understanding the material, while the business subject itself is difficult to understand only through books. Business simulation educational games allow students to interact directly with the business environment and understand the subject matter to be able to apply it in the real world. This study uses research and development methods with the ADDIE model which consists of five stages, namely analysis, design, development, implementation, and evaluation. Research data was collected by distributing validation questionnaire sheets to four validators to give validation values on material aspects and media aspects and distributing response questionnaires to 30 students to assess the validity of aspects of the benefits of learning media on students' business interests and understanding. The results of the study show that the learning media for the business simulation educational game "Trade Wars" for fourth grade elementary school students is quite valid from the aspects of material, media, and benefits for students.

Keywords: Business Simulation Education Game, Unity, Trade War

## Introduction

The era of globalization is an era in which the development of science is very rapid, causing constant changes in all fields, including information technology and business (Sasahara, 2022). This continuous change has opened up opportunities for everyone to work and innovate, but on the other hand, this has also created endless competition and demands everyone to adapt to keep up with existing technological developments (Karakostas, 2022). An example is that every expert in a field must have the motivation to continue learning and developing their skills so that they can stay abreast of the times and can be useful for their company, or an entrepreneur who must continue to innovate in creating and marketing products to remain competitive with other companies (Khan et al., 2022).

However, in Indonesia itself, unemployment and poverty are still significant problems, because the number of job seekers is not proportional to the demand for labor (Wang & Gu, 2022). This is caused by the community's low interest in entrepreneurship and the longevity of companies that do not last

long due to bankruptcy due to a lack of experience (Jeon & Lee, 2022). Both of these problems can be reduced by cultivating an interest in entrepreneurship, namely the willingness of individuals to create new businesses as entrepreneurs or create new business concepts and values in existing companies (Song, 2022)

However, a complex subject such as entrepreneurship education cannot be taught just like regular school lessons. (Aba, 2021) states that student learning outcomes have always been a very serious problem in Indonesia even though there are already many schools or educational institutions that are spread out. This is caused by differences in behavior and character possessed by each student, but the learning media used is inappropriate for students who are unmotivated and have low learning outcomes (Ramakrishna et al., 2023).

Learning media are physical and technical tools used in the learning process to make it easier for teachers to convey material to students to expedite the process and achieve learning goals (Dinopoulos et al., 2023). Learning media has an important role in supporting the quality of the teaching and learning process. The

use of instructional media in the teaching and learning process is not only used to convey messages from senders to recipients, but can also stimulate students' thoughts and skills, as well as students' feelings, concerns, and interests in learning (Zharikov, 2023).

(Mehling et al., 2019) made observations in several schools and stated that the learning process in schools was still teacher-centered, where learning outcomes were only seen from the results of written test scores made by the teacher. As a result, the teacher only conveys material only with the aim that students pass written tests and use limited learning media, namely books, and explanations of material verbally and orally on the blackboard. This causes many students to have no motivation to learn, get bad test results, and just memorize without being able to understand and apply it to real-world problems. The development of technology, communication, and information (Albers, 2020).

One of the learning media that has been used lately to teach many things from various fields to students and has a high level of success is educational games. Educational games use visuals and/or audio to create simulations of the problems and solutions of a subject and the description that the teacher wants to convey so that students are not only motivated and more easily understand the subject matter, but also interact directly with the business environment in finding solutions and implementing strategies. so that the experience of students in the game can be a reference for solving problems related to real life (Sasahara, 2022).

Games Business simulation emphasizes the player's ability to utilize limited resources in various ways. One of them is to build or improve the business of the player's choice, both in the field of goods and services to make a profit. The profits obtained can also be used again as a resource to improve growing businesses. Meanwhile, strategy games emphasize the player's ability to make strong plans and make the right decisions to get the desired results, one example of this game is chess (Karakostas, 2022).

In this study, students can explore cities in Java and learn about typical goods that can be bought cheaply and goods that are in high demand so that they can be sold at a high price in the area. The business skills of students who will be trained in this research include the ability to analyze the environment and use limited financial and time resources to travel to other cities, buy cheap typical local goods to sell them to other cities or invest in certain cities. Students also learn to adapt to a changing business environment such as the season of demand for an item,

Unity allows for the coding and facilitates further modifications in the game, such as setting the buying and selling prices. Unity also has easy transitions from 2D to 3D or vice versa by simply adjusting the camera angle so that it can give the visual effect the author wants. Unity also has a wide community and asset store that can be used to make the process of making games easier.

Games Chocolatier and Tradewinds both have a mechanic where a player can buy an item that is only available in a region and travel to different places to resell the item at a higher price. Players can travel between regions regardless of time and money to get the desired buy and sell prices as there is no competition (Jeon & Lee, 2022).

The main advantage of this game is the multiplayer feature where a player can compete with other players. Players can also see a range of information about cities on Java Island and their products, and invest in cities visited to reduce the price of goods and increase the amount of inventory. Players need to consider the time and gas money used according to the distance between cities. Through these features, players can compete in analyzing information and making decisions based on their time, money, and goods to get the maximum advantage over other competitors. So based on the background above, the purpose of this research is to design a Trade War Business Management Game for Windows Using Unity.

#### Method

This research uses research and development methods or also called Research and Development (R&D). This game development research uses the ADDIE model which consists of 5 stages Analyze, Design, Development, Implementation, and Evaluation. Game development research will be tested on fourth-grade students at SD Kristen Rehoboth who is located at Jl. Dewi Sartika No. 36-38, Balonggede, Kec. Regol, City of Bandung.

The instruments used in this study were game validation questionnaires and student response questionnaires. The first step is to give a game validation questionnaire to be filled out by three experts, namely 2 material experts and 2 media experts who are lecturers at the University of Muhammadiyah Malang to determine the feasibility of the game that has been designed by researchers. The second step is to give a response questionnaire to 20 students who have played the game to find out the effectiveness of the game on students. Each question in the two questionnaires can be filled in with a score which can be seen in Table 1.

Table 1. Rating Category

	-:
Score	Category
5	Strongly agree
4	Agree
3	Disagree
2	Don't agree
1	Strongly Disagree

Determining the validity value of the two questionnaires will be calculated using the formula. The maximum score for each material and media validation questionnaire is 2x5=10. While the maximum score of the student questionnaire is 30x5=150. The average of the results of calculating the validity value will be converted into assessment criteria as in Table 2. Validity Value =  $\frac{Score\ Total}{Maximum\ Score}$  \* 100%

**Table 2.**Expert and Student Rating Intervals and Categories

Average Value	Category
90% - 100%	Very Valid
80% - 89%	Valid
65% - 79%	Valid Enough
55% - 64%	Invalid
< 55%	Invalid

### **Results and Discussion**

This development research resulted in a business simulation game called "Trade War" which can be a learning medium for fourth-grade elementary school students regarding information about several major cities in Java Island and their typical products, as well as giving an overview of how business works in the real world. This research uses the R & D or Research and Development method with the ADDIE model

#### 1. Analysis Stage

#### a. Needs analysis

This stage was carried out by researchers by analyzing the curriculum taught for 6 days from Monday to Saturday. The curriculum consists of subjects in Indonesian, English, Citizenship Education, Mathematics, Natural Sciences, Cultural Arts, Sports, and Extracurriculars. From the list of subjects, the researcher concluded that students had not received lessons about Java and a general description of business related to supply and demand.

#### b. Material analysis

This stage is carried out by researchers by identifying, collecting, selecting, and compiling material to be used in this development research. The material taken is in the form of information about major cities on the island of Java along with the typical products produced as well as an overview of the business related to supply and demand which will be conveyed in the form of game mechanisms or rules.

#### 2. Design Stage

This stage is carried out by creating a game mechanism, interface design, and modeling the game to be made.

- a. Game mechanics
  - 1) All players start in a random city and have a certain

#### 4. Implementation Stage

After the development of the business simulation educational game learning media entitled "Trade War" in Unity is completed, the next step is to export the game project in Unity into an application that can be played outside of the Unity application. This is done by leveraging the build feature in Unity to compile for the purpose of accessing and inspecting the source code to ensure nothing is ambiguous and converting it into an application that can run and play on the Windows platform.

The implementation stage is very easy, because the build for the educational game "Trade War" is in the form of an .exe

- amount of money
- 2) Within the city, players can buy and sell goods in shops, make investments, and upgrade vehicles. Prices for goods in stores can go down and up depending on the season.
- 3) Shops in each city have their specialty goods and the selling price of the goods held in the shop depends on how far the goods come from
- 4) The player with the largest investment in the city will receive tax money from other visiting players
- 5) Players can upgrade vehicles to carry more goods
- 6) All players choose a destination city, the system will calculate the waiting time for each player according to the distance of the destination city from the city where the player is now
- 7) The player with the shortest waiting time takes the first turn, enters the town, performs the activity, and ends the turn. The system will also reduce each player's waiting time according to the previous player's smallest total waiting time.
- 8) The player who ends their turn needs to choose a city again and the system will calculate the waiting time for all players again
- 9) The player with the shortest waiting time will have their turn. This will continue to repeat until the number of days exceeds the daily limit set or only 1 player remains who hasn't gone bankrupt.

#### 3. Development Stage

The results of application development can be seen in Table 3.

and you only need to open it to run the game without the need to install again. The .exe file only needs to be copied to any computer or laptop that has specifications according to game needs, for example the Windows operating system.

#### 5. Evaluation Stage

After the business simulation game application "Trade War" has been successfully developed and implemented, a lecturer at the University of Muhammadiyah Malang as a validator will test the validity of the material and media and test the benefits of the game by the students of SD Kristen Rehoboth Elementary School.

**Table 4.** Validation Table of 2 Material Experts

No	Section Name	Total Score (Max 10)	Average Percentage	Category
1	The material is in accordance with the learning objectives	8	80%	Valid
2	The material regarding the geography of the city is accurate	9	90%	Very Valid
3	The material regarding the typical product of the city is accurate	6	60%	Invalid
4	The material is complete	6	60%	Invalid
5	The material presented is easy to understand	7	70%	Valid Enough
6	Give an overview of how the business works	7	70%	Valid Enough
7	Learning media provides an overview of business competition	8	80%	Valid

Average 72.86% Valid Enough

 Table 5. Validation Table 2 Media Experts

No	Section Name	Total Score	Average Percentage	Category
1	Learning media has visuals that attract attention	9	90%	Very Valid
2	Learning media increases interaction between students	8	80%	Valid
3	Students can exit the application at any time	7	70%	Valid Enough
4	Learning media functions properly without bugs	9	90%	Very Valid
5	Learning media is easy to play	7	70%	Valid Enough
6	Pictures don't interfere with writing	8	80%	Valid
7	Easy to read font size and type	8	80%	Valid
8	The language used is good and easy to understand	7	70%	Valid Enough
	Average		78.75%	Valid Enough

Table 6. Table of Response Questionnaire 30 Students

No	Section Name	Total Score	Percentage	Category
1	Obtaining geographic information and monuments in major cities on the island of Java	127	84.67%	Valid
2	Acquisition of information about typical products of cities in Java	119	79.33%	Valid Enough
3	The material is in the form of information that is easy to understand	124	82.67%	Valid
4	The material is in accordance with the learning theme	133	88.67%	Valid
5	The material is presented clearly	129	86%	Valid
6	Games give a business picture of supply and demand	122	81.33%	Valid
7	Game gives an idea about business competition	114	76%	Valid Enough
8	Games increase interaction between students	131	87.33%	Valid
9	Games are easy to play	117	78%	Valid Enough
10	Game works as it should without any bugs	146	97.33%	Very Valid
11	Easy game navigation	112	74.67%	EnoughValid
12	The game's visuals are eye-catching	142	94.67%	Very Valid
13	Pictures don't interfere with writing	144	96%	Very Valid
14	Easy to read font size and type	144	96%	Very Valid
15	The language used is easy to understand	133	88.67%	Valid
Aver	Average 86.09% Valid			

**Table 7.** Average Results of Material and Media Validity by Students

Section Name	Questionnaire Number	Average Percentage	Category
Material	1 - 7	82.67%	Valid
Media	8 - 15	89.08%	Valid

#### Conclusion

Based on the results of this study, it can be concluded that the business simulation educational game learning media "Trades War" for fourth-grade elementary school students was successfully developed using the Research and Development method using the ADDIE model. At the product evaluation stage, the percentage of material validation by material experts was 72.86%, which means quite valid and the percentage of media validation by material experts is 78.75%, which means it is quite

valid. The benefits of games for students can be seen from the overall average student response questionnaire, which is equal to 86.09%, which means it is valid. Learning media made in the form of a business simulation game can increase students' interest and ability in entrepreneurship.

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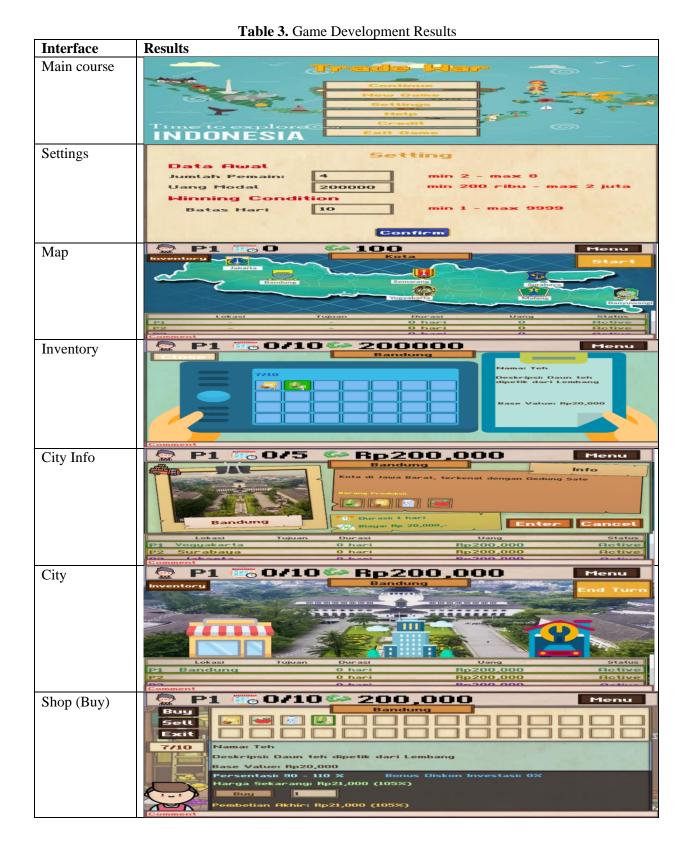
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# Appendix II

