

DEVELOPMENT OF LEARNING ACHIEVEMENTS IN ECONOMIC UNIT AND ECONOMIC SYSTEM FOR GRADE 11 STUDENTS OF DEMONSTRATION SCHOOL OF SUAN SUNANDHA RAJABHAT UNIVERSITY BY USING GAME-BASED LEARNING (GBL)

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ABSTRACT

This research study aimed to 1) compare the learning achievements in Economic Unit and Economic System before and after using Game-Based Learning (GBL) and 2) evaluate students' overall satisfaction with the game. The tools for research consisted of 1) the simulation game named "Who pays whom?", 2) Achievement test used for evaluating the score before and after using Game-Based Learning (GBL) and 3) Student satisfaction survey form. The sample group was 30 students selected from the population which are all Grade 11 students in the Gifted English Program at Demonstration School of Suan Sunandha Rajabhat University numbered 124. This research was conducted in the first semester of the academic year 2023. Statistics used for data analysis included mean, standard deviation, and percentage.

From the result, students' learning achievements after using Game-Based Learning (GBL) are higher than before. The overall students' satisfaction is at a very satisfactory level.

Keywords: Learning Achievement, Game-Based Learning (GBL), Economic Unit, Economic System

INTRODUCTION

Economics is the science of allocating limited resources to satisfy unlimited wants in the most efficient way (Nilbai, T. et al, 2018). This concept could be applied to several levels of society. At the country level, the "Economic System" is a tool to solve economic problems by allocating limited resources in the country to reach the highest efficiency according to the authority's consideration. (Pinto, S., & Premsilp, J. et al, 2020). To understand the definition of the "Economic System", learners must know that there are several economic actors in each country called the "Economic Units." The units can be classified into three types: households, firms, and government (Pinto, S., & Premsilp, J. et al, 2020). The relationship between economic units is called the "Economic System." The type of economic system in each country is different. This relies on tradition, laws, and the political regime. (Sukkorn, K., & Chaichuchot, K., n.d.).

The above-mentioned is the content that the researcher has taught in Demonstration School of Suan Sunandha Rajabhat University, Bangkok, Thailand. In this school, there are two programs for students, the English Program and the Gifted English Program. Two programs follow the same curriculum. The Differentiating point is the language used for teaching. The contents for students in the English Program are taught in English Language, while the contents for students in the Gifted English Program are taught in both Thai and English Language. The researcher has worked in the Gifted English Program.

In both programs, Economics for high school students is arranged to study in the first semester of Grade 11 in the course named and coded "Social Studies 3 (SOC 32101)." The first

chapter of this course follows the Standard So3.1 Key stage indicators Grade 10-12/1 in The Basic Education Core Curriculum B.E. 2551 (A.D. 2008), which is to “discuss about fixing of prices and wages in the economic system” (Povotong, S., Translator, n.d.). As can be seen from this key stage indicator, understanding the technical term “Economic system” is the first step to achieve. As explained in the meaning of “Economic system” which is the relationship among “Economic Units”, recognizing the word “Economic Unit” is required before studying the “Economic system.”

From taking the basic economics quiz for Grade 11 students in the Gifted English Program at Demonstration School of Suan Sunandha Rajabhat University, the result showed that the average score was lower than 50 percent. The cause found by interviewing the students was the viewpoint that the technical terms “Economic Unit” and “Economic System” in Thai Language as well as complex descriptions were difficult to understand. Academic Language made them feel that the technical terms were difficult and not related to their daily life. This was a major obstacle to understanding “Economic Unit” and “Economic System” which are basic parts of Economics. If this problem had been not solved timely, it could have had a severe effect on studying Economics at the high school level in the next step as the collection of several economic units with interaction in the markets are closely linked to microeconomics and macroeconomics (Mankiw, N. Gregory, 2015). Both fields are required to study at the high school level. Moreover, the feeling that this content is far from daily life could stifle students’ attitudes toward learning economics which is one important knowledge for surviving in society inevitably because everybody is the part of Economic system and relationships with other economic units exist in daily life.

Game-Based Learning (GBL) has been popularly used for developing students. Using the game for teaching lets learners realize knowledge by themselves. This leads to durable memories creation. Simulation games could help students understand complex relationships as they can directly experience the situation and role given and recognize the result of each action from participation. This can also be used for student practice to apply the principle and concept of the lesson learned. In addition, “Game” is a good word to use for attraction. Games can also help students enjoy learning activities and create a good attitude toward study (Kaemane, T., 2023; Pornkul, C., 2014; Suttirat, C., 2018).

From several researches, it was found that Game-Based Learning (GBL) has been proven to be the way to develop students’ knowledge, processes, and attitudes. In Economics class for high school students, it was found that the problem skills on money policy and fiscal policy shown in the test after using the game were above the average score evaluated before the game was used (Chuayprakong, C., 2022). From the result of economics instruction after using a simulation game, students had a higher score post-test on financial literacy than pre-test. The game also changed financial attitudes and financial behavior (Thongphauk, P., 2018).

Owing to these, the researcher expected that the students’ learning achievement as well as their overall satisfaction with studying “Economic Unit” and “Economic System” could be developed if Game-Based Learning (GBL) was used in the classroom since students could realize and understand 1) the role of each “Economic Unit” and 2) the relationships of several units, which is the meaning of “Economic System” from playing on the role of each “Economic Unit” and finding other units to make relationships leading to the formation of the “Economic System” by themselves.

OBJECTIVES

- 1) Compare the learning achievements in Economic Unit and Economic System before and after using Game-Based Learning (GBL)
- 2) Evaluate students' overall satisfaction with the game

METHODS

Population and Sample Group

The sample group was 30 students selected from the population which are all Grade 11 students in the Gifted English Program at Demonstration School of Suan Sunandha Rajabhat University numbered 124. This group of students enrolled in the course Social Studies 3 (SOC 32101) in the first semester of the academic year 2023, all of the content in this course is Economics.

The tools for research

- 1) The simulation game which is named "Who pays whom?" created and developed from the Model of Game-Based Learning by Garris et al (2002) as follows.

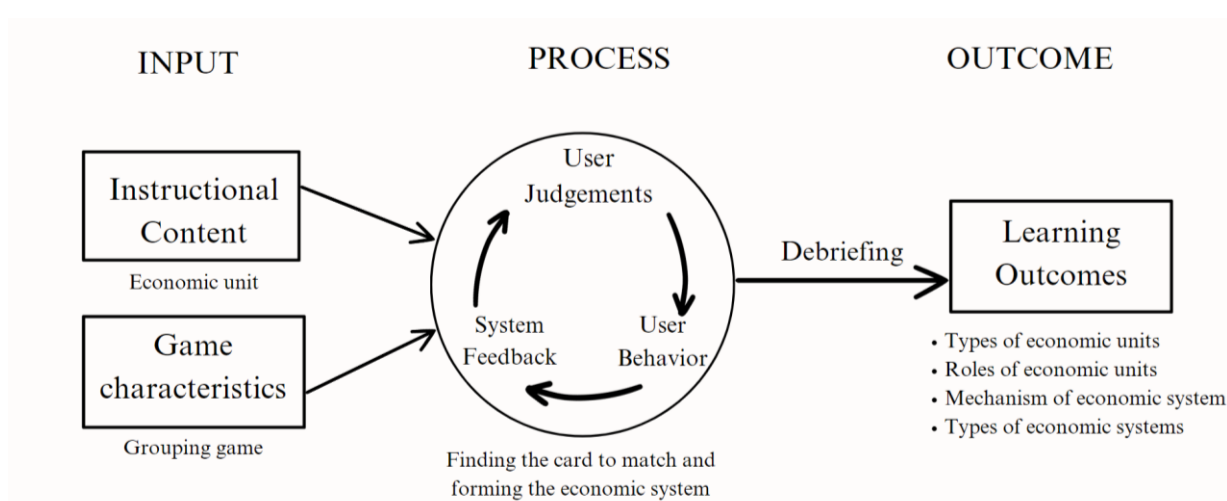


Figure 1 Procedure of the simulation game named "Who pays whom?" created and developed from the Model of Game-Based Learning by Garris et al (2002)

Input

- The instructional content: The content inputted to this game is "Economic Unit." The 30 game cards are given to the 30 students. The name of an economic unit is present on each card. The researcher chose the simple example of economic units experienced in daily life to input to the cards for easiness of understanding such as a person looking for a job, a person demanding some goods and services, a Seven-Eleven convenience store, and an Electricity Authority. In addition, the researcher also selected some examples related to the behavior of economic units in contemporary society to teach students to be aware of behavior change. Seeing that the LINE Application is used by the private and public sectors of Thailand to facilitate their value creation (Taweethong, N., 2019), the situation that Waterworks Authority pays money to LINE Corporation for creating LINE official account is included in this game. This can help students learn that Information and Technology Communication plays an important role in various fields including economy (Kaewkhongkha, P., 2023). Both text and logo are shown on 10 cards. For the other 20 cards, there is only text presence. After the

students get the cards, they are assigned to write the type of economic unit (Households, Firms, or Government) they gain on the cards.

- Game characteristics: This is a grouping game. If the grouping process is correct, 30 students can form 10 groups of 3 people per group.

To gather in the grouping process, students are required to know which kind of cards they get. There are 3 kinds of cards: “First payer”, “Connector”, and “Last payee.” “Connector”, which is the card with the logo, has two roles, payee of “First payer” and payer of “Last payee.” The connector is the important card that helps the group be formed. If the group is formed correctly, the cards can be arranged in the “First payer”, “Connector”, and “Last payee” sequence. Examples of grouping are in Figure 2.

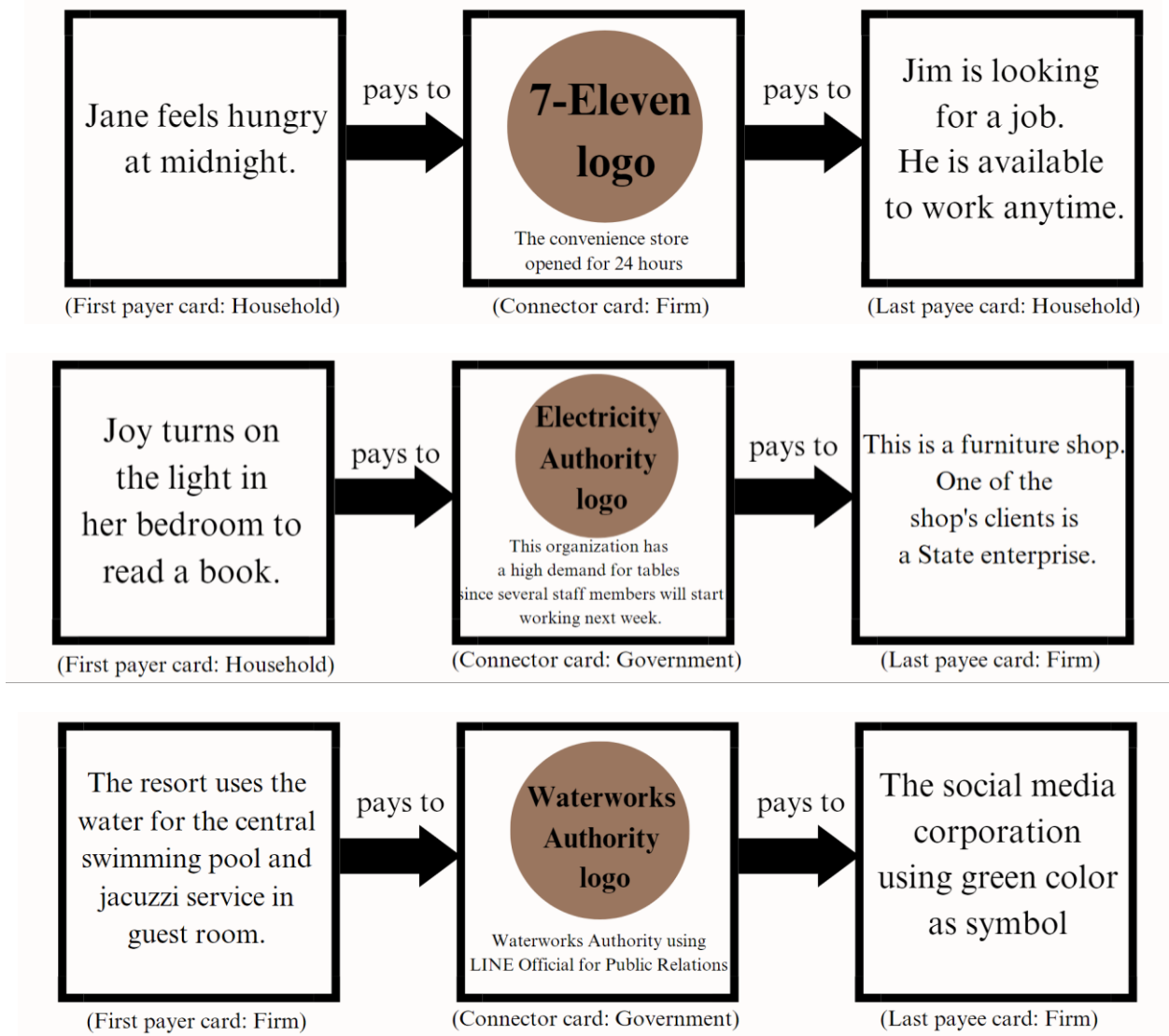


Figure 2 Example of game cards with key answers for correct grouping

Process

User judgments

To achieve the goal, students could judge the type of card that has the possibility to be in their group. 20 cards without the logo must find 10 connector cards with the logo. The 10

connectors must find both “First payer” and “Last payee” to help the group of 3 cards be formed.

User behavior

Student behavior expected in this game is classification skills. Students should separate the kind of card and realize the role of each economic unit. This skill can help them cut off the impossible choice and find the card they must be in a relationship with.

System feedback

The word “System” in this model means “Economic System” in the lesson since the economic system is composed of the relationships of economic units represented by game cards.

Debriefing and Outcome

After the game is finished, the question about the relation between the game and the lesson will be discussed as follows.

- “The game card” represents “Economic Unit”. The collection of “The game card” with interaction represents the collection of “Economic units” with interactions. This is the mechanism of the “Economic System.”

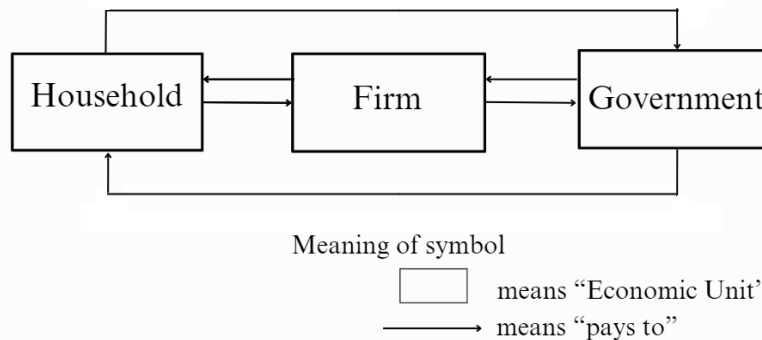


Figure 3 Mechanism of economic system: Relationships of economic units

There are several types of interaction of economic units as shown in Figure 3. Knowing the role of each unit in the game is the purpose of the simulation game (Pornkul, C., 2014). Students can see from the game that one type of economic unit has more than one role. For example, the Government can be both a manufacturer and a consumer (Pinto, S., Premsilp, J. et al, 2020). This is shown in the group having the card “Electricity Authority” as the connector card in Figure 2.

- In this simulation game, both the government and private sector are allowed to play roles in the economic system. This is the mixed economic system used in Thailand. After explaining this, ask students “What happens if all economic units including the Electricity Authority are under the control of the private sector?” and “What happens if all activities of economic units are planned by the central government?” After these questions are answered, the teacher explains these questions are the situation of the “Capitalist economic system” and “Socialist economic system” respectively. Subsequently, the researcher and students compare and contrast the characteristics, benefits, and disadvantages of each type of economic system.

2) Achievement test used for evaluating the score before and after using Game-Based Learning (GBL). There are 10 items in the test. Each item has 5 multiple choices. The content of the test covered the type of economic unit, the role of each type of economic unit, and the characteristics of the economic unit relationship forming the different types of economic systems.

After all students took the test, the researcher compared the result before and after using a Paired sample t-test by finding the average score for the pre-test and post-test to compare the score since this research uses one group pretest - posttest design as follows (Ritcharoon, P., 2023).

(R) O1 X O2

- (R) means the sample group
- O1 means score before using Game-Based Learning (GBL)
- X means treatment by using Game-Based Learning (GBL)
- O2 means score after using Game-Based Learning (GBL)

Realizing the average score of the pre-test and post-test leads to finding the percentage of learning progression, which is equal to the post-test minus the pre-test score divided by the full score and multiplied by 100 (Ritcharoon, P., 2023). In this research, Standard deviation was also calculated to measure the dispersion of students' scores (Chuacharoen, O., 2015).

3) Student satisfaction survey form. From reviewing that game can help students enjoy learning, get experience from participation, and recognize the content, which is easier to understand since games reduce complexity, by themselves (Kaemane, T., 2023; Pornkul, C., 2014; Suttirat, C., 2018). This survey form is the tool to prove students' satisfaction after using Game-Based Learning (GBL) in this case. There are 4 items in the survey form. The rating scale as below used for evaluation.

- | | |
|----------------------|--|
| 5 means Excellent | 4 means Very Satisfactory |
| 3 means Satisfactory | 2 means Fair 1 means Unsatisfactory |

After all students fill in the form, the researcher found the average score and standard deviation in each item.

Lesson plan

The essence of the lesson plan used for the research is explained as follows.

This lesson plan is one part of developing students to achieve Standard So3.1 Key stage indicators Grade 10-12/1, which is to “discuss about fixing of prices and wages in the economic system” (Povamong, S., Translator, n.d.).

The teaching procedure starts with assessing students' knowledge before studying by using a pre-test. After the pre-test is finished, the researcher distributes 30 cards to 30 students, explains instructions, and lets students play the game as described in the part of input and process of the game “Who pays Whom?” When the process of the game is finished, the lesson is discussed and summarized as described in the part of debriefing and outcomes. Before the class is over, students take the post-test and fill in the student satisfaction survey form. The purpose of the teaching procedure consists of

- 1) Knowledge: Students are able to explain the definition and type of economic unit and economic system.
- 2) Process: Students are able to create the economic system in a simulation game and separate the kind of economic unit and economic system.
- 3) Attitude: Students are enthusiastic when studying and realize the importance of lessons as they are one of economic units and one part of the economic system.

RESULTS

Learning achievement

From evaluating students' learning achievement before and after using Game-Based Learning (GBL) by achievement test, the result of learning achievement was found as follows.

Table 1 Average score and Standard Deviation of the learning achievement assessment

Assessment	Average score	Standard Deviation
Before using GBL	4.03	1.35
After using GBL	8.17	0.95

From this table, the average score after using the game is higher than before. From calculating by using data in this table, the percentage of learning progression is 41.33%.

Student satisfaction

After using Game-Based Learning (GBL) and collecting the data by student satisfaction survey form, the result of student satisfaction on each side was found as follows.

Table 2 Average score and Standard Deviation of student satisfaction

Questionnaire	Average score	Standard Deviation
Students feel entertained while playing the game.	4.57	0.62
This game reduces the complexity of the content.	4.73	0.45
Experience in this game helps students recognize the content.	4.67	0.47
The content inputted to the game is suitable.	4.63	0.61

From this table, the score of every item in the student satisfaction survey form is more than 4, which is the representative number of a very satisfactory level.

DISCUSSIONS, CONCLUSIONS AND SUGGESTIONS

As can be seen from the higher average score on the achievement test after using the game. The result in this research corresponds to former research conducted by Chuayprakong, C. (2022) and Thongphuak, P. (2018), the teachers who used games to teach Economics for high school students.

The result that students are very satisfied with every question. Student satisfaction shows that this game achieves the advantage of using games as Suttirat, C. (2018) explained that the game can be used for attraction and to help students feel entertained. This can also be realized from some students in the sample group's verbal feedback that they would like to learn by game again in the next class since the knowledge they got was caused by entertainment. This corresponds to the characteristic of game Jaradlertwong, K. (2023) concluded that game is one form that makes students have fun together with gaining knowledge. The result of the survey form also shows that this research reaches the purpose of simulation games, which Pornkul, C. (2014) said that it is for reducing complexity. It was found that this made the lesson easier for students to understand.

From reviewing the content in the last class, the researcher found that students remembered several parts of the content "Economic Unit" and "Economic System." Students were able to explain this more thoroughly than other units they learned from listening to a

lecture. This result corresponds to an explanation by Kaemane, T. (2023) that using games in teaching leads learners to durable memory creation.

However, one disadvantage of Game-Based Learning (GBL) found in this research is a long time use. This corresponds to the limitation explained by Kaemane, T. (2023) that this teaching method takes a lot of time. In this research, it was found that learning activities are operated almost not in time since taking the pre-test and playing the game consumed more than half of class time. Consequently, discussing, concluding, and taking post-tests were done in a hurry.

Seeing that the Game-Based Learning (GBL) causes this disadvantage, the researcher's opinion to cope with this is to contain lessons in the game as much as possible so that the knowledge gained is worth the time spent. As explained in the game instructions, the content in the game contains only the mixed economic system. Studying capitalism and socialism in this class was caused by students' experimental thoughts and listening to lectures after playing games. The efficiency, which means the capability to utilize resources worthy or to get output from inputting fewer resources such as time resources (Chompukum, P., 2009), could be higher if the content added to the game includes the case of more types of economic systems so that the time inputted for playing this game is worth the better output, which is understanding all types of economic systems clearly from undergoing simulation of other economic systems in the game by themselves. This also reduces the time to explain capitalism and socialism after the game is played

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