

## “Defense of the Ancients”, Gamification in Learning: Improvement of Student's Social Skills

<https://doi.org/10.3991/ijet.v15i07.13221>

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**Abstract**—This article introduces a learning innovation called the Dota learning model. Dota (*Defense of the Ancients*) actually is a game or fortress defense game that is in great interest among various groups. This game inspires the researcher to adapt and adopt into a learning model. The Dota learning model provides an opportunity for students to train critical thinking, train cooperation, improve competitive spirit between teams, and be able to play the emotions of students. The research method used in this study is a research and development with an ADDIE (*Analyze-Design-Development-Implementation-Evaluation*) model. The feasibility of the Dota learning model is validated by learning design expert, educator, and students. The learning design validation score is 85%, the educator validation score is 95%, and the student's validation score is 80%. Based on the result, it can be concluded that the Dota learning model that developed has been valid and feasible to use.

**Keywords**—Learning innovation, game in learning, Dota learning model

### 1 Introduction

The progress of science and technology in the era of industrial revolution 4.0 has inspired many learning innovations [1]–[3]. The "what to learn" approach becomes obsolete and is replaced by "how to learn", and education experiences great pressure to change from teaching, technology, and quality standards [4]. The implication of learning as a process must continue to be designed and developed creatively, innovatively, adaptively to facilitate the learning process and create meaningful learning for students [5].

Game based learning is an alternative answer that has the potential for learning renewal. It's proven, everyone from young children to adults likes to play games, and many spend time on this activity. So, why not the mechanism of this game we apply to learning. Even Kapp [6] states that games are an important and urgent approach to current learning, the technique facilitates learning and enhancing motivation by using elements of play, mechanisms, and thinking in games.

Implementation of the use of games in learning can be manifested in the learning model. Because the learning model will provide an overview of the steps or syntax of learning in full starting from the beginning to the end of learning. One model of game-based learning is the Dota learning model. The Dota learning model leads to "game-

based learning", which is a form of learning model centered on students who use games/games for learning purposes.

Referring to some research on game based leaning [7]–[9], the results of the study indicate that games are able to provide an environment for problem solving skills, communication skills, social skills, and other skills needed for life and success in the modern world, or which are often referred to as 21st century skills. Therefore, researchers are interested in proving whether the learning model developed is also able to improve various social skills of students. Thus, the specific objectives of this study are 1) to develop the design of the Dota learning model to improve social skills and 2) to describe the strengths and weaknesses of the Dota learning model.

This research is important because in addition to being based on the background described above, the development of this Dota learning model is also an alternative learning innovation that has the potential to respond to the birth of students (millennia generations) who are gamers, tech savvy, and less have social skills. With this game-based learning model, users are expected to feel at home and feel an increase in their learning skills.

## 2 Method

This research produces a product in the form of a learning model. The research method used is research and development (research & development) with the ADDIE model (Analyze-Design-Development-Implementation-Evaluation). This model is one model of learning design that shows the stages of design that are simple and easy to learn. Sukenda, et al. [10] explained that this model uses 5 stages of development.

- **Analyze:** The analysis phase is a needs assessment process (needs analysis), identifying problems (needs) or analyzing the need for development. This analysis aims to establish the basic problems faced in learning [11]. The steps taken at this stage are analysis of problems in learning that occurs in the classroom through observation and interviews. The output produced at this stage is the characteristics of students, identification of needs (learning objectives and learning materials), and identification of the learning environment.
- **Design:** The second stage is the design of the learning model. Descriptions of the learning model are oriented towards active learning. This stage starts from setting learning objectives, designing teaching and learning scenarios, designing learning materials, and designing evaluation of learning outcomes. The output produced at this stage is product design (learning model) on paper.
- **Development:** This stage is the stage of realization of the product design learning model. After the learning model has been developed, the next step is the validation of learning design experts, validation by educators, validation by students. The output produced at this stage is a better, more effective learning model that is ready to be implemented on a broad scale.
- **Implementation:** This stage is the stage in an effort to strengthen its applicability, with a large-scale trial. Activities carried out at this stage are preparing and marketing it to the target students. After the application of the learning model, an initial

evaluation is carried out to provide feedback on the application of the next learning model.

- **Evaluation:** The last stage of this development is product revision. After the final learning model was widely used by the public and monitored continuously, the model developer received input from the public for model improvement.

### 3 Result and Discussion

#### 3.1 Results and analysis of classroom learning problems

Learning problems obtained based on the results of observations directly on the three subjects in the Social Sciences Study Program FIS UM and interviews with 12 students there are several problems inherent in students related to the spirit of learning. They claim to be bored and bored if the method of delivery in learning only uses lectures with power points and presentations. They feel bored because most courses are always presentations and presentations. Apart from this, when they were asked if there were questions, they tended to be passive. But when given questions, on average they were confused in answering. Even if they ask, they would rather ask a friend. Many students chat alone with friends when explained material. There are some students who are sleepy and lack concentration when explained material. Passive during discussion.

The analysis is used to identify solutions that can be used to overcome learning problems. One solution that can be offered is to create a game-based learning model. According to Prasetya, et al. [12] game-based learning is a form of learning centered on students who use games for learning purposes. The use of games in this learning has increased throughout the world [13]. By applying the game in learning, it is expected to be able to increase student enthusiasm in learning. Moreover, the learning model of this game is compiled with active learning oriented so that students' social skills and critical thinking also increase.

#### 3.2 Results and analysis of validation data

Validation is an attempt to gain academic recognition. Validation is done through testing the validity of content, constructs, and technical greed of the model. Validation is done by involving

- 1) Learning design experts
- 2) Educators
- 3) Students involved in developing learning models.

**First**, the validation of the learning model by learning design experts is carried out to determine the validity level of the Dota learning model, especially on the suitability of the learning steps and devices with their theoretical foundation. According to expert

validators, the Dota learning model substantially in this study is understood as an interactive learning model and stimulates students to think critically. This learning model is believed to be applicable in learning. However, there are still some things that need to be completed and explained in the process of implementing this model so that there is no misunderstanding in giving meaning and interpretation of the model's substance. The following is a critical assessment by experts for the development of the Dota learning model. First, the steps or syntax of the Dota learning model need to be clarified. Second, there needs to be a guidebook for implementing the Dota learning model intended as a guide in popularizing the Dota learning model for educators and students. The three tools and media to play Dota games must be applied and practically carried everywhere.

**Second**, the validation of the learning model by educators is intended to measure the level of application of the Dota learning model in the practice of classroom learning. This model is practiced at the college level. The educator who predicted this model was a Social Sciences Education FIS UM lecturer at three courses. Here are some opinions given by educators to the development of the Dota learning model: the role of educators in this model is very important, namely how to create a fun and challenging atmosphere, make all students active in solving problems, educators must play more roles as guides, guides, facilitators, and mediators. Kickmeier-Rust [14] states that "one of the most effective educational games is the ability to maintain individual learner's motivation and interest in the learning and gaming experience of each learner's needs, preferences, goals, and abilities". Another opinion expressed by the validator (educator) is that the instructions for using the Dota learning model need to be clarified, so that educators can use the Dota learning model precisely in accordance with the purpose.

**Third**, the validation of the learning model by students. Student responses to the Dota learning model, namely the Dota learning model, require more time. The Dota learning model is very interesting, because this model provides an opportunity to learn while playing. Hidayat [15] states that one of the main attractions of using games is the learning process that allows students to really learn by playing, not as usual when learning means the subject must sit and read a book. This means that whatever the point of view, learning through games requires an immersion process, namely direct and overall involvement of the learner in interacting with the system contained in the game design. In summary, the data from the validation results from the three validators are listed in Table 1.

**Table 1.** Results of Validation from Validator

Information	Achievement Rate (%)	Qualification	Test Decision
Validation of Learning Design Experts	85%	Decent	No Revision Needed
Validation by Educators	95%	Very Decent	No Revision Needed
Validation by Students	80%	Decent	No Revision Needed
<b>Percentage Average (%)</b>	<b>87%</b>	<b>Very Decent</b>	<b>No Revision Needed</b>

Based on the average results, the Dota Learning model is very feasible and does not need revision. Even though it is included in the very decent category and does not need

revision, the developer still revisions based on comments and suggestions from all validators. These actions are carried out for perfection in conducting trials.

In accordance with the suggestions from the validator, the instructions for using the Dota learning model need to be clarified, here are technical instructions on playing activities with the Dota Instructions learning model after revision.

- 1) At the beginning of the core learning activities, the class is divided into several heterogeneous groups, where each group consists of 4 students.
- 2) The teacher distributes teaching materials and cards to make questions and answers for each group.
- 3) Each group makes at least four questions and answers (according to the number of group members). The questions and answers that were made should not come out of the material being discussed.
- 4) Criteria for questions must be in the domain of higher order thinking skills.
- 5) After each group has finished making questions and answers, students are formed into 2 large groups (2 teams).
- 6) Each team is given the freedom to choose one team leader.
- 7) The team leader is tasked with guiding the course of the game and is assisted by the teacher as a facilitator / mediator.
- 8) Each team has 8 towers and 1 fort (the number of towers can be adjusted according to needs).
- 9) Each team is free to attack the opponent's tower, but before the tower in front runs out, they cannot attack the tower behind it, and so on until one of the teams can reach the fastest rear fort, meaning they are the winner.
- 10) The team leader suits. The team that wins the suit calls the team A and the team that loses the match, call the team B. Team A is given the opportunity first to choose the tower of Team B that will be attacked. Then team A asks a question to team B and team B must answer that question.
- 11) If team B succeeds in answering questions from team A, then tower team A will disappear (the part of the fort lost linearly with the tower selected when attacking).
- 12) If team B does not succeed in answering questions from team A, then tower team B will be lost (the missing tower part is the tower that was chosen at the beginning).
- 13) The time given to give a question is 30 seconds, while to answer the question is 60 seconds (when answering is allowed for discussion), if it exceeds the specified time (either asking or answering) then it is considered a failure.
- 14) Each team member only has the opportunity to ask one time and one-time answer and may not answer again, but can help give input or answer ideas to friends who have the opportunity to answer. For those who have answered, they will get a star-shaped red card, while those who have asked will receive a yellow card.
- 15) The game continues until one of the teams makes it to the house of the opponent's fortress. But in the midst of the game the facilitator can also give an opportunity to the two teams to change the game strategy, for example changing the team leader, asking for time to make repeated questions, and so on.

16) At the end of the game the facilitator attempts to reflect on the game that has been done.

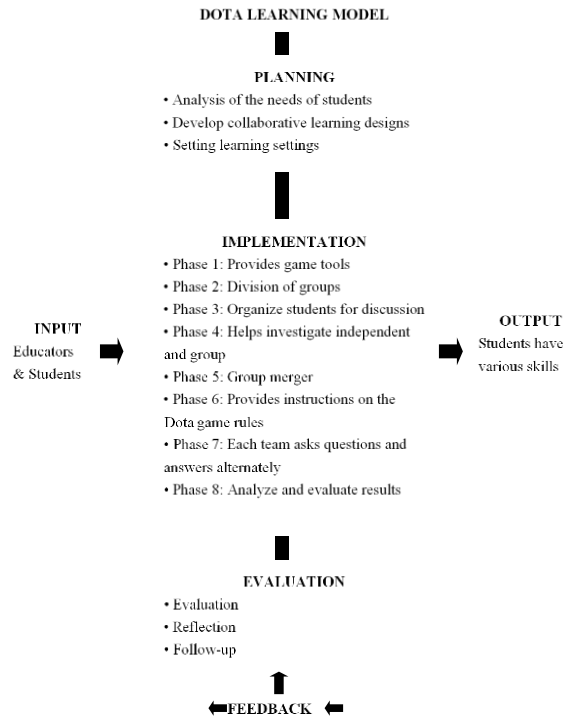
In addition to the revisions to the instructions for using the Dota learning model, revisions were also made to the syntax to be more operational and easier to implement (Table 2).

**Table 2.** Syntax of the Dota Learning Model

Phase		Teacher / Student's Behavior
Phase 1	Provides game tools	The teacher provides game tools: a) board, tower, and fort Dota, b) participant number, c) opportunity to speak (ask and answer), and d) question and answer cards.
Phase 2	Group division	Students are divided into several heterogeneous groups (4 students per group).
Phase 3	Organize students for discussion	The teacher provides discussion material in the form of teaching material and helps students to define and organize learning tasks, namely each student in the group at least makes 1 question along with the answer.
Phase 4	Helps investigate independent and group	The teacher encourages students to get the right questions and answers and look for explanations.
Phase 5	Group merger	The teacher combines small groups into 2 large groups in one class
Phase 6	Provides instructions for the Dota game rules	The teacher provides an explanation of the rules for playing Dota.
Phase 7	Each team asked questions and answers alternately	Learners do games and the teacher acts as a facilitator / mediator / referee in the Dota game.
Phase 8	Analyze and evaluate results	The teacher helps students to reflect on the learning processes that they have done with the Dota model.

### 3.3 Trial results implementation of Dota learning model

The results of the trials that have been conducted illustrate that students are interested in the applied learning model, there are dialogues and criticize each other's questions and answers as the game progresses, students are enthusiastic in learning, the learning process has succeeded in fishing and increasing students' ability to arrange critical questions, students have skills such as teamwork, solidarity, the ability to exchange information, opinions, problem solving, creativity, the ability to take responsibility, etc. So that information can be obtained that the game-based Dota learning model can increase the spirit of learning.



**Fig. 1.** Construction of the Dota Learning Model

The results of Perotta's research [16] also prove the same thing that game-based learning can increase student participation and motivation. In addition to increasing learning motivation the results of the model implementation can also improve students' various social skills. The results of these studies, in line with several research results [7]–[9] which states that games are able to provide an environment for learning problem solving skills, communication skills, and social skills, as well as other skills needed to live and succeed in the modern world. And these skills are needed by students when they live in society. Project Tomorrow [17] explains that educational games help today's students to be well prepared and to be tomorrow's innovators, leaders and engaged citizens of the world (Fig 1).

## 4 Conclusion

The syntax of the learning model consists of eight phases, namely providing a game tool, group division, organizing students for discussion, helping to investigate independent and group, group merging, giving instructions on Dota game rules, each team asking questions and answers alternately, and analyzing and evaluate the results. The advantages of the Dota learning model are that it is easy to implement, complemented

by instructions for using the Dota learning model, and improving the various social skills of students.

However, there are still a number of things that need to be followed up to obtain a higher level of feasibility and perfection of this learning model, namely: there has not been an equal distribution of learning because it is often dominated by students who have more learning achievements; the crowded atmosphere when the game takes place must be able to be controlled by educators as facilitators; and time management needs to be considered because this game requires a long time.

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Article submitted 2020-01-07. Resubmitted 2020-02-02. Final acceptance 2020-02-22. Final version published as submitted by the authors.