Gamification Design for Education in Learning Management System

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Abstract : The COVID-19 pandemic has made teaching and learning activities in schools abolished and schools have started learning activities from home. Therefore, the suitable technology is the application of E-Learning using a Learning Management System with an acceptable level of acceptance. The students still get material even though they do not come to school. Learning Management System has developed many advantages, such as announcements, assessments, assignments and so on in the use of Learning Management System. However, its long-running implementation makes students bored and of course the level of their focus in front of the screen is reduced and distracted by things like games, because for students, games make them not bored. can be seen by measuring the fact that students have the opportunity to increase the level of desire to learn by seeing how difficult the material will be. From here they can classify materials and related tasks and learn more interactively because they explore the LMS system itself. Because the level of focus of students in viewing computer screens is not very good, it is necessary to be developed so that students can stay focused on learning activities. This research found the development by combining Learning Management System with game mechanism which is usually called Gamification. The application of Gamification itself has been applied to startups such as Grab and Gojek in increasing user activity, so the application in terms of Education can also be done with a system, namely Gamification for Education in the Learning Management System. It is also hoped that the application of gamification in system management learning is expected to contribute to science, especially educational technology.

Keywords: Gamification, Education, Learning Management System

1. Introduction

School From Home (SFH) activities have become a daily activity in the era of the COVID-19 pandemic. So, the application of the Learning Management System (LMS) has become a daily student activity and accelerates digitization or the application of technology into the world of education. Technology always helps to improve human tasks, as the advance of traditional learning processes.

Technology which is located in the scope of e-learning has allowed students to continue the learning process during learning activities from home (Raza et al. 2021), so that students still get material even though they do not come to school. LMS has developed many advantages, such as announcements, assessments, assignments and so on in the use of LMS. As such, we believe it is worth to investigate the extent of utilization and development of these functions. The acceptance rate of Learning Management System [1] can be seen by measuring the fact that students have the opportunity to increase the level of desire to learn by seeing how difficult the material will be. From here they can classify materials and related tasks and learn more interactively because they explore the LMS system itself. Because the level of focus of students in viewing computer screens is not very good, it is necessary to be developed so that students can stay focused on learning activities.

The development of the LMS that we did was the addition of the Gamification method into the LMS. Gamification is the application of rules, elements, and mechanisms in the game into non-game elements [2]. Gamification has a positive effect, depending on the magnitude of the effectiveness based on how large the context of gamification is applied, and also used by its users [3]. The application of gamification itself has been implemented by startups around the world. The examples of this application can be seen from Grab and Gojek which apply the Gamification element to boost application usage by providing ratings, loyalty levels, and rewards to users. The results of this application can be stated that gamification can positively affect user engagement and further increase the company's brand equity [4]. Therefore, the application of these digital game attributes can be applied in daily needs even in the world of education, because many students also play games in their activities while they are staying at home. So, the application of game elements should be more quickly accepted by students in the future application.

Another element in gamification that is often applied to learning activities is Reward and Punishment. Rewards are given by teachers as a form of appreciation to students because students are able to complete the lessons and assignments that have been given (Rahmadi1 and Pancarania2 2020), while punishment is given for actions that are not good or interfere with the course of the educational process. It can also be said that punishment is a negative assessment for student learning activities [5].

2. Materials and Methods

2.1 Research Model

Conducting research on the learning model that underlies the application of Gamification including:

2.1.1 Attention, Relevance, Confidence, and Satisfaction (ARCS) Model

Attention, Relevance, Confidence, and Satisfaction (ARCS) is a learning model developed as an alternative that can be used by teachers to motivate student's learning by carrying out learning activities well. This learning model contains four components which are an integral part of learning activities, namely (1) generating and maintaining student's attention during learning process (Attention), (2) giving subject matter that is relevant to students (Relevance), (3) giving self-confidence to students (Confidence), growing the student's satisfaction with the learning process (Satisfaction) [6]. This ARCS model has been proven successful and is one of the references in the research model for the application of Gamification that we will develop.

2.1.2 Unified Theory of Acceptance and Use of Technology (UTAUT) Model

This model has been used extensively by researchers in their efforts to explain the acceptance and the use of Information Systems and Information Technology. The UTAUT model explains a large number of varieties in behavioral intention and usage behavior. This model has some theories that some relationships may not be applied to all contexts, eliminates some relationships that may be potentially important, and also excludes some constructs that may be important to explain the acceptance and the

use of Information Systems and Information Technology [7]. In this case, we realize that we need a theory regarding the level of acceptance and the use of gamification of the Learning Management System.

2.2 Game Mechanism Analysis

Game mechanism analysis is needed to find out what game elements are in the game, because we will take these mechanisms and apply them to the game. In discussing teaching method using games, according to [8] the use of games in learning process can increase student's curiosity by 10%. Meanwhile, according to [9] there are four factors that can change the emotions of players, namely:

1. Hard Fun: When the players try to win the competition.
2. Easy Fun: When the players try to explore the system.
3. Altered States: When the game changes the emotions of the players.
4. The People Factor: When the players interact with other players.

It can be concluded that the mechanisms that can be included are the four factors above. The design that we made includes the implementation of Leaderboard and Title as a motivator for students to try to win the competition which is divided into several lessons and students' abilities so that there are many titles that can be contested by the students. Figure 1 shows the design of the Leaderboard.

Figure 1: The Design of Leaderboard and Title

Next, students will explore the system because of their curiosity. After students' curiosity arises, we prepare Quiz, because with Quiz it can increase the sense of competition and interaction with other students. Figure 2 shows the design of the Quiz interface.

Figure 2 : The Design of the Quiz

2.3 Method

The method that we use in this research is the Research and Development method based on the references by [10], namely looking for problems, problem identification, research, literature review, and develop research. The discussion of the method that we are currently doing is the research on the Gamification and its development.

2.3.1 Gamification Method

Gamification is the application of rules, elements, and mechanisms in the game into the non-game elements [2]. One context in which gamification can be applied is in education (Seaborn and Fels 2015). In education, gamification is used to increase engagement and to motivate students to learn. From the knowledge that we receive from education, more knowledge can be expanded and discovered. Through education we will not only receive knowledge, but also other aspects of life such as skills, beliefs and habits. The purpose of this article is to explore the proposed gamification model to be related to the topic of education, and to analyze all of them to find a better and suitable gamification model for learning materials and can be used in future works.

Video games have become increasingly popular among all age groups and genders in recent years. In the year to date, $29.4 billion of video games have been sold in the US - a 23% increase from the same period last year [11]. Here it can be concluded that if there is an increase in the number of users in playing games, it means the gamification method does not surprise students because the trend of video games has already been known among them, especially with the E-Sport trend which makes many students interested in becoming professional gamers. Sports management academics must embrace the potential of E-Sports in order to study this evolution and provide guidance to the gaming industry through education and research [12]. Therefore, in this study we try to link games with LMS through the gamification method in education. Game thinking means solving problems with the concepts such as being in a game. We can see how students can be motivated to create an interesting learning environment, and support the students in their learning process. Additionally, game thinking is combining game design and design thinking to help build engaging experiences. Figures 3 shows the design of user's profile of the game.

2.3.2 Game Elements

1. *Leaderboards*. It is clear that the leaderboard is a measurement of student ability which in traditional learning is known as *Ranking*. The presence of the leaderboard has succeeded in motivating students to the level of their performance similar to the difficult level. With near-impossible goal setting, students implicitly set their goals to be at or near the top of the leaderboard without us needing to direct them [13]. Figure 4 shows the design of leaderboard.
2. *Points*. As in game, when each student successfully completes a task then they will be given points (Werbach and Hunter 2015). Different types of points can be distinguished, such as *experience points, redeemable points,* or *reputation points*. This is in line with the various purposes that the points represent [14].
3. *Badges* are defined as visual representation of achievement, which can be obtained and collected in a gamified environment. Badges affirm the achievements of the players and symbolize their achievements [15]
4. *Performance graphs* are often used in simulations or strategy games, that provide information about players performance compared to their previous performance during the game (Sailer et al. 2014).
5. *Exchange rewards*. It is necessary to exchange the points that have been earned by the students into the rewards that they can use. Usually students are given rewards if they can complete certain achievements [15]. However, in the present research that we are developing, we want the mechanism of points that are earned by the students become a system that can be exchanged, for example, with student learning tools. Figure 5 shows the designof exchange rewards.

6. ***Challenges***. In this research we design a Quiz feature that can make the students feel the learning experience, and this can be proven in the research [16]. The e-quizzes scheme with a touch of gamification can increase the competitive and interactive spirit of the students during the game. Therefore, the challenge that can be developed is a one-on-one-knowledge questions to test students' abilities based on the related questions in the game. Figure 6 shows the design of the challenges.
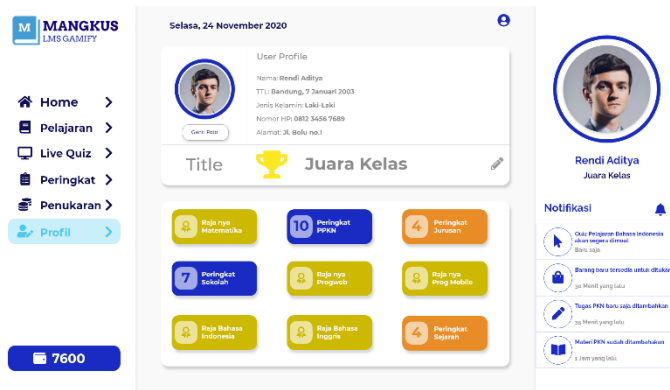

Figure 3. The Design of User's Profile

Figure 4. The Design of Leaderboard

Figure 5. The Design of Exchange Rewards

Figure 6. The Design of The Challenges

2.3.3 Psychological outcomes

In an empirical study, [17] proved the positive effect of gamification on behavioral motivation (e.g. participation and involvement) and also on psychological outcomes, by comparing behavioral perceptions of gamified application services between user and non-user gamified applications in virtual community platforms. Citing from the list of game design elements discussed above, we assume that competency needs can be addressed with points, performance charts, badges, or leaderboards [18]. While this research demonstrates the relevant effect of applying the concept of need satisfaction in the general context of games, it is not much different from the other game design elements that would be required for a gamification research perspective [19]

3. Results and Discussion

3.1 Result

Below are the ideas that we can apply in the learning applications:

1. For each class determine the rules if the user has accessed the points he should get, or if homework is collected according to the speed and accuracy determined by the teacher.
2. In every meeting, quizzes can be held with prizes, so that students will be more enthusiastic.
3. The material is classified according to the level of difficulty, so it is clear that different scores will be obtained in relation to the level of the difficulty of the material.
4. Rewards are given based on degrees, levels, and grades according to student's achievement, and each reward is given to the students in each subject, not as reward of a whole.
5. Punishments are given if students break the rules. The punishments are given titles such as *"late", "truant", "provocative", "asleep in class"* and other titles. This is done by making it difficult for students to delete the titles from their *normal activities* to pretend that they do not earn such title. However, allow the students to get prizes too if they are willing to share their knowledge with others as guides in a game.
6. Give a surprise gift when the student has completed the task.
7. Determine the time when the quiz starts so that students are challenged while working on it.
8. Create a role-playing that can be restarted to the beginning of the lesson. So that later on, if the challenge cannot be completed, students should complete the result.
9. Introduce the characters that facilitate or prevent the students from their achievements in their learning journey.
10. Offering the facilities to the students so that they can create or choose the characters to play with while learning.
11. Display the leaderboard showing the performance of all students to motivate the spirit of competition and cooperation among students.
12. Give points that can be redeemed for prizes in the exchange system.

Gamification learning has several advantages compared to other learning methods, namely:

1. Learning becomes more fun
2. Motivating students to complete their learning activities
3. Helping students to be more focused and understand the material being studied
4. Giving students the opportunity to compete, explore and get achievements in class.
5. Students get benefits from the points earned so that they can meet their needs.

By studying the weakness domains of the various existing systems, it is possible that this research can unify them all.

1. Systems that use gamification use bound points or values.
2. Points can be regenerated into various new forms such as different badges or prizes.
3. Most activities performed in the system are recorded and can earn points.
4. Combining the level or rank taken from the activities given by the user in the system.

Systems that use gamification will have several ways to encourage users to explore other things because of their need for games. Therefore, gamification should contain options like *Points, Badges, Levels, Leaderboard, Quiz, Rewards* and *Engagement Loops*.

3.2 Discussion

In our opinion, the application of Gamification is better applied at the Elementary Education level because at this level students are more active and they have great curiosity. With the character formation in the basic education, this also helps future implementation for students. If gamification is applied at the higher education level, of course, there are many factors of student's character that have been formed. Learning that starts with something new will be more difficult if the students already have their own beliefs about the lesson because they already have many complex tasks that cannot be applied directly. It is hoped that this research will be able to find various developments or design implementations of this research.

4. Conclusion

It is hoped that this Gamification method can make it easier for students to learn. Because this gamification method relies on learning concepts such as games and uses Learning Management System-based applications that students usually use. With this system, students are encouraged to study harder and can complete their assignments well, because students can learn more actively, creatively, innovatively, and confidently. Likewise, teachers can more easily assess their students because there are progress reports during the student learning process.

Besides, by providing *Points, Badges, Levels, Leaderboards, Quiz,* and *Rewards*, it can add to the student experience as if they were playing the games they often play before. This situation can create a new mindset and new behavior, which can be a new study of the world of education and digital transformation. Along with the development of technology from time to time, it is necessary to have an appropriate model in terms of the Learning Management System features which, when it is implemented in the learning system, can become a gamification learning model that can be applied even it is apart from School From Home activities. It is also hoped that the application of gamification in system management learning is expected to contribute to science, especially educational technology.

Acknowledgement

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