The Application of Gamification in Attendance Information System at ITB STIKOM Bali Jimbaran Campus

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Abstract. Data collection and attendance information in a company is crucial, and the use of information systems in all organizations or companies is unavoidable. It is necessary to create a web-based attendance information system at ITB STIKOM Bali Jimbaran Campus to support the work of the Human Resource Department (HRD) division and make it easier for employees to view their attendance. This process was previously done manually through recording process using Microsoft excel and checking employee delays one by one. Employees did not have a system to see their daily attendance. In this study, the researchers applied the use of information technology called gamification to the attendance information system that has been built. This gamification concept can be combined with various fields to produce an interesting information system and increase the motivation of user performance, in this case, the employees at ITB STIKOM Bali Jimbaran Campus. This research developed a system that has been posted on the www.stikom-jimbaran.com page, tested, and used for approximately seven months. From the observations and HRD recap, the rate of employee tardiness decreased by 50%. Thus, this research was aimed to build a system to make work easier and prove that gamification can improve performance.

Keywords: Gamification, Attendance, System, Information.

1 Introduction

The attendance information system resulting from development in Information/Communication Technology has been widely applied in various fields, including education. Every company inevitably requires innovation to promote the productivity and the development of its employees. However, ITB STIKOM Bali Jimbaran Campus, one of the IT Campuses in Bali, has not implemented an attendance information system and still maintains manual work processes. The most frequent obstacle is that employees forget the rest of the annual leave provided by the company, and it is difficult to monitor employee absenteeism regularly. The HRD also often has difficulty giving rewards to employees who have never

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been late for work every month and have never had alpha or permission for that month. Based on this, this research was aimed to build an attendance information system at ITB STIKOM Bali Jimbaran Campus to simplify and improve the efficiency of HRD at work and add the application of gamification in the system built. Gamification is a game component approach for solving non-game problems [1]. In this case, the attendance information system was built using game elements to produce a system that can facilitate the HRD department and increase employee motivation to work and compete healthily and transparently. Implementing gamification also makes it easier for HRD to provide monthly rewards. The leaderboard feature can be used as a basis for employee evaluation and determining employee of the month. With the application of gamification in the attendance information system, it is expected to facilitate HRD work related to attendance data and motivate all employees to continue to work professionally and improve discipline. In this study, gamification was combined with the attendance information system. Gamification applied the concept of a leaderboard that sorts employees from the most on time to those who are often late for work. There were badges and a point system for employees who often get the title of employee of the month and was also recapitulated every year to seek the title of employee of the year. There was an additional quest menu to find more points for employees, such as doing research, doing community service, campus promotions, taking external projects that can benefit the company. Thus, in the future, the data can be considered to get additional rewards for employee promotions. The finished system was tested for seven months to see how it developed and its impact on employee attendance who previously used conventional processes.

2.1 State of the art

Three previous research were reviewed as the research base. The first research was based on Marsudi, Ebed Kharistian (2019) entitled The Effect of Gamification on Tokopedia Applications on Customer Loyalty. This study revealed that gamification has a significant positive effect on motivation and customer loyalty. The second research was based on Alsawaier (2018) entitled The Effect of Gamification on Motivation and Engagement. It revealed that gamification was a solution for the decreased motivation of students in their school. The third research was based on Rahardja, Aini, Dewi Ariessanti, and Khoirunisa (2018) entitled The Effect of Gamification on IDU (ILEARNING EDUCATION) in Increasing Student Learning Motivation. The result of the study stated that gamification could encourage students to be more enthusiastic and, as an alternative regulating and conditioning learning situations to be more focused. Based on the previous research, the researchers aimed to develop an attendance information system to facilitate HRD work combining gamification. Thus it was expected that the employees could increase their productivity and motivation. This research also applied gamification in other sector besides learning or education.

2 Literature review

Gamification is a game concept to create a fun and beneficial process for users, thus providing optimal results. Four things must be considered in the application of gamification: the details of the objectivity to be achieved, the characteristics of the players, a high level of re-playability, and creating internal motivation [2]. Emotion manipulation is a way to make

players want to engage with the system. Here are the things that can affect players emotions with the implementation of gamification:

A. Hard fun: players try to be the winner in every competition.
B. Easy fun: players try system exploration.
C. Altered states: the game changes the players' emotions.
D. The people factor: players interact with other players [3].

In this study, gamification was combined with the attendance information system. This Gamification applied the concept of a leaderboard that sorts employees from the most on time to those who are often late for work. There were badges and point systems for employees who often got the title of employee of the month and were also recapitulated every year to seek the title of employee of the year. There was an additional quest menu to find more points for employees, such as doing research, doing community service, campus promotions, taking external projects that can benefit the company. Thus, in the future, the data can be considered to get additional rewards or employee promotions [4].

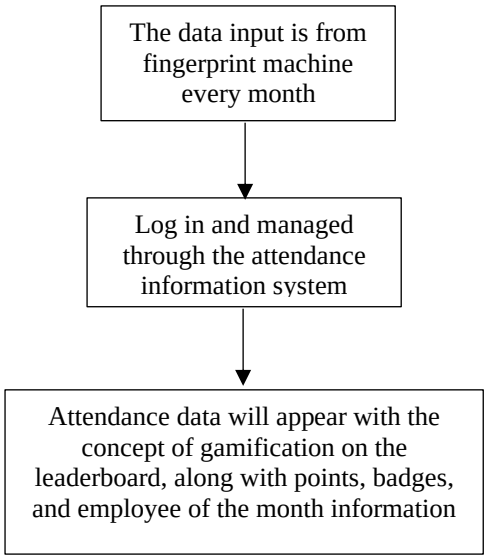

Fig. 1. System overview procedure.

Employees who were on time got 100 points, and late employees were deducted 100 points. Based on this point, the leaderboard ranked employees who are entitled to the title of employee of the month. Employees who got the title of employee of the month would get badges or trophies on the employee profile.

3 Research method

To make this system, the researchers applied the waterfall method. This method used a systematic and sequential approach to reduce the risk of errors in making the system used continuously [5]. The sequence of these methods can be seen in **Figure 2** below.

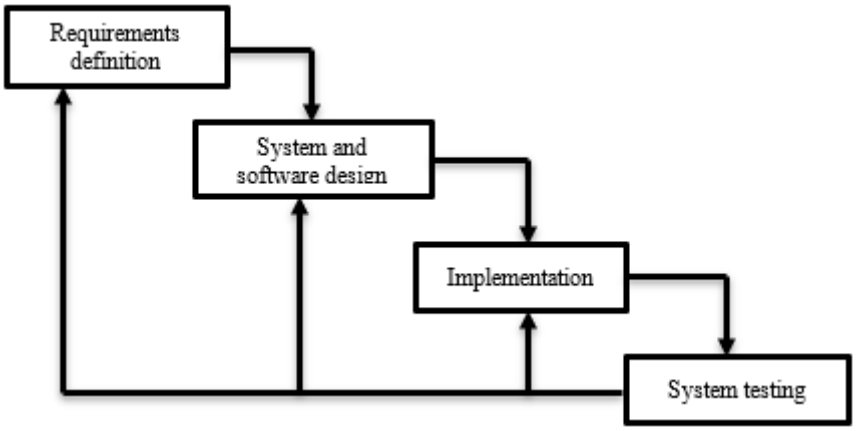

Fig. 2. Waterfall method.

3.1 Requirements definition

In this step, the researcher collected employee biodata, attendance data on fingerprint machines throughout 2021, and the attendance rules in ITB STIKOM Bali Jimbaran Campus through observation and interviews with HRD. After knowing how the rules apply, the researcher conducted a theoretical study. Thus the gamification concept created could be applied and adapted by the company.

3.2 System and software design

The researchers created a DFD (Data Flow Diagram) and Conceptual Database design. According to Afyenni (2014), DFD and Conceptual Database can broadly describe how the system flows and show that the system consists of related subsystems [6].

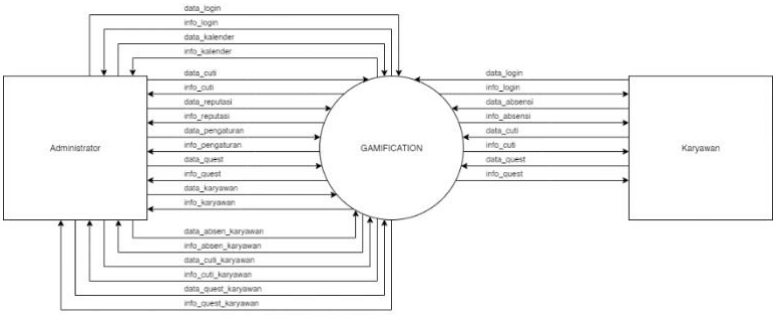

Fig. 3. Context diagram.

Figure 3 shows the context diagram that has been created where 2 (two) users were involved in the system:

1. Administrator: HRD who has access rights to manage leave, manage employees, and recap employee rewards.
2. Employees: users who have access to view info absences, remaining leave, taking quests, and viewing the leaderboard.

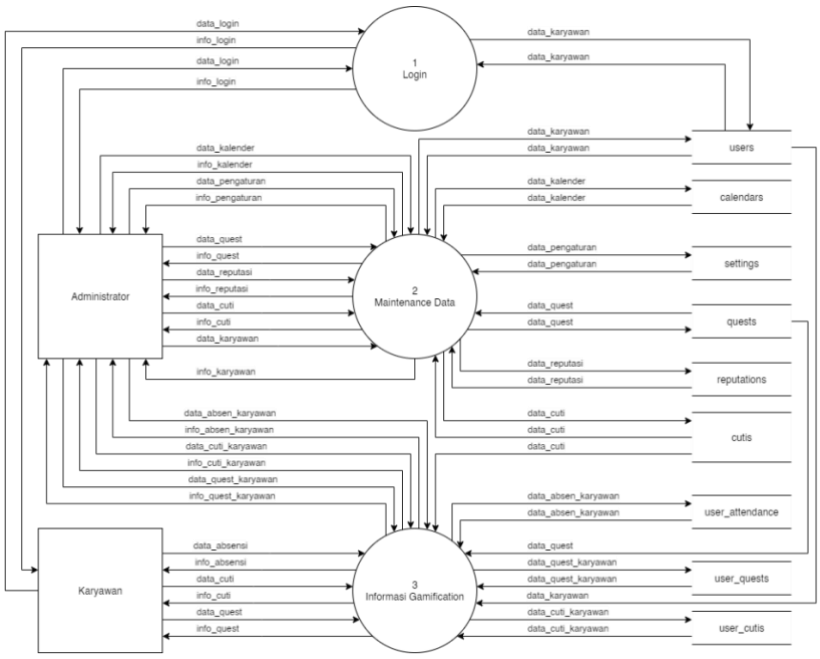

Fig. 4. DFD level 0.

Figure 4 describes the process at level 0 DFD as follows:

1. Login
   Login is the main process performed by the user when entering the system.
2. Data Maintenance

It is an access right owned by HRD regarding the overall system management.

3. Gamification Information
   It is a process where the processed data will be displayed through the leaderboard and seen by all ITB STIKOM Bali Jimbaran Campus employees.

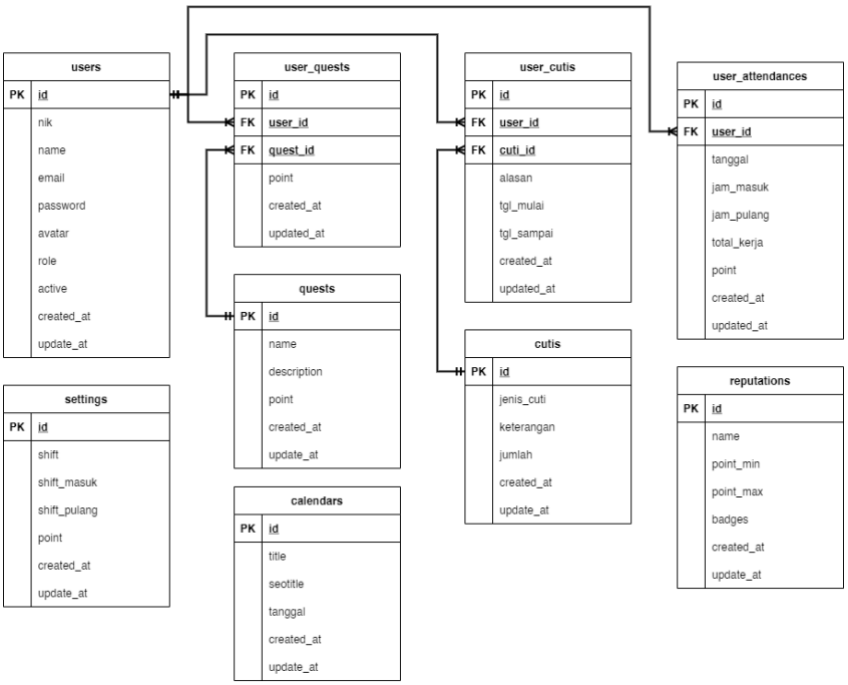

Fig. 5. Conceptual database.

3.3 Implementation

This stage includes writing program code or coding using PHP programming language and MySQL database. After the coding process was completed, the system was hosted and given a domain name www.stikom-jimbaran.com.

3.4 System testing

The system testing process applied the black box method to observe program execution results that focus on the requirements and functionalities of the system created.

4 Result and discussion

4.1 Main menu

When an employee login to the attendance system, the display that immediately appears is the employee who got the top of the month and top of the year predicate. There is a master data

menu for HRD and an attendance menu to view the leaderboard and attendance data. On the master data menu, HRD can manage employee data, leave, quest, and reputation data. The main menu that can be accessed from the employee side is viewing daily absences, the leaderboard, taking quests, and submitting employee leave.

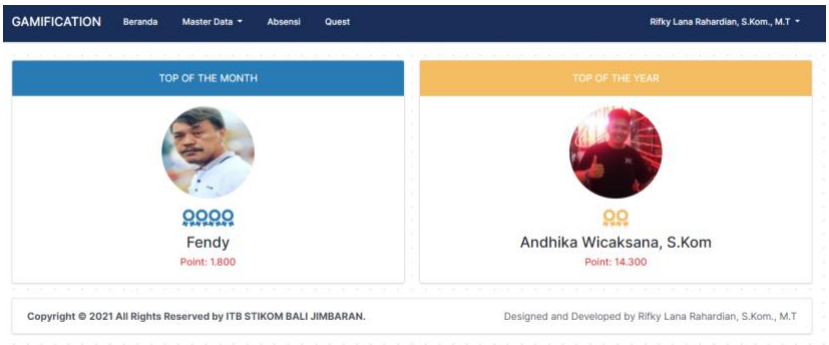

Fig. 6. Main menu.

Figure 6 shows the system's main page that immediately displays employees who have received the top of the month and top of the year. The gamification was aimed to motivate all employees.

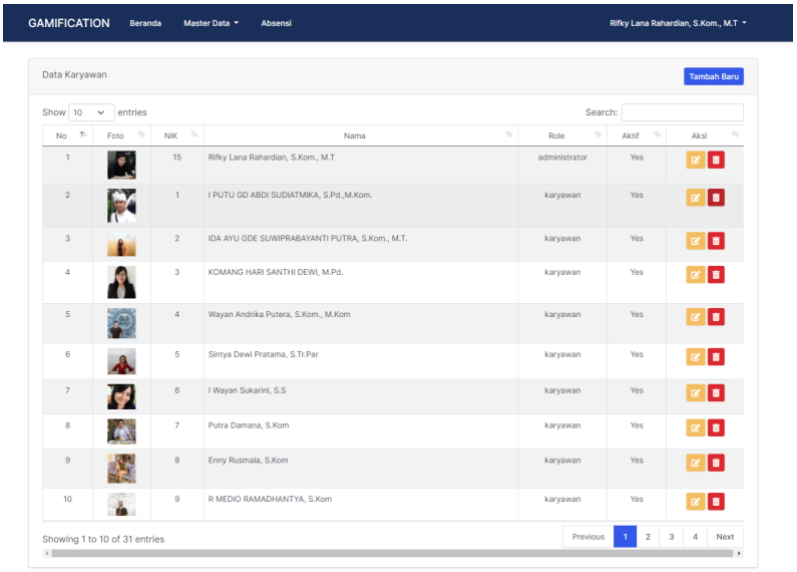

Fig. 7. Employee data menu.

Figure 7 displays the data on all employees managed by HRD. The HRD could delete and modify employee data. The management of the employee leave process could also be done on this menu.

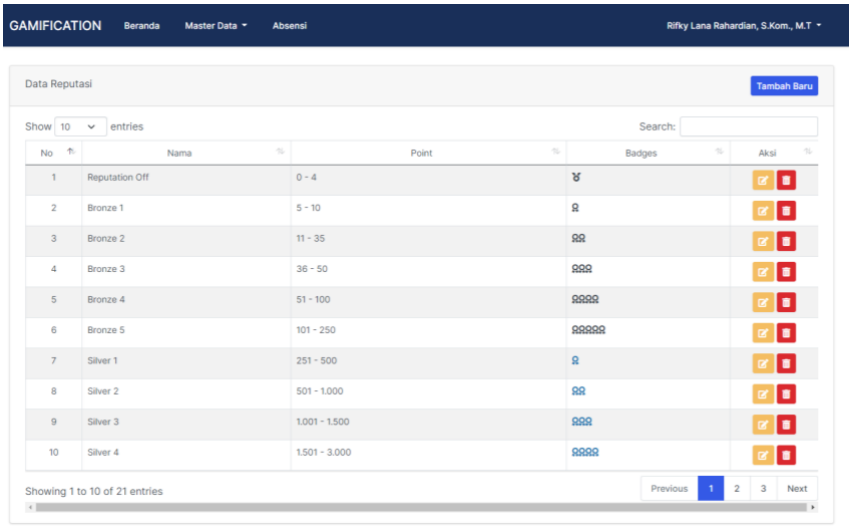

Fig. 8. Reputation data.

Figure 8 shows reputation data employees must collect to get the desired badges. The point ranged from five (5) points equal to bronze 1 to 500.001 points equal to diamond 5. An employee who wants more points or wants to catch up on points left behind can do the additional quest that HRD has opened on the quest data menu, such as doing international publications equal to 1000 points or making a website for a government office equal to 1000 points.

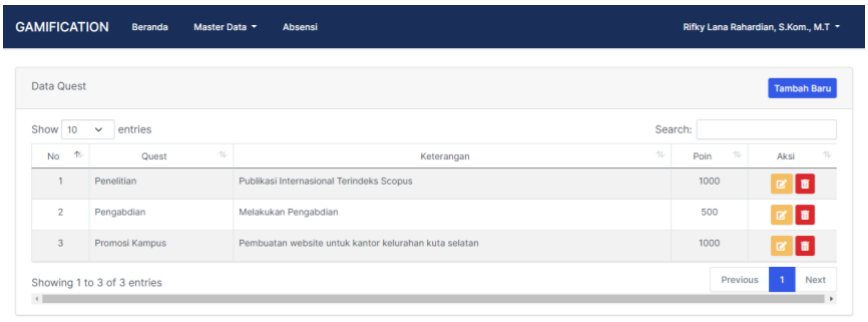

Fig. 9. Reputation data.

4.2 Black box testing

After the program was complete and hosted on the www.stikom-jimbaran.com page, the researchers tested the black box method. According to Nurudin (2019), the black box method is a suitable and easy test method to apply to the system. The documentation results can be said to be easy to observe; thus, to update the system functionality in the future, it will be more structured [7].

HRD user testing.

Table 1. Black box testing for HRD user.

No	Test	Scenario	Actual Results	Results
1	Login Page	Enter your email and password, then go to the home page	HRD can log in by entering email and password	Accepted
2	Homepage	Displays the employee highest points in the month and year active	HRD can see the highest points of the employee in the month and year they are active	Accepted
3	Calendar Data Processing Page	Processing data with the view data feature, add data, change data, delete calendar data	HRD can perform data processing such as viewing data, adding data, changing data, and deleting calendar data	Accepted
4	Reputation Data Processing Page	Processing data with the view data feature, add data, change data, delete data	HRD can perform data processing such as viewing data, adding data, and deleting setting data	Accepted
5	Quest Data Processing Page	Processing data with the view data feature, add data, change data, delete data	HRD can perform data processing such as viewing data, adding data, and deleting the data setting	Accepted
6	Employee Data Processing Page	Processing data with the view data feature, add data, change data, delete data	HRD can perform data processing such as viewing data, adding data, and deleting the data setting	Accepted
7	Employee Attendance Page	Processing data with the view data feature, add data, change data, delete data	HRD can perform data processing such as viewing data, adding data, and deleting the data	Accepted

No	Test	Scenario	Actual Results	Results
			setting	
8	Employee Paid Leave Page	Processing data with the view data feature, add data, change data, delete data	HRD can perform data processing such as viewing data, adding data, and deleting the data setting	Accepted
9	Employee Quest Page	Processing data with the view data feature, add data, change data, delete data	HRD can perform data processing such as viewing data, adding data, and deleting the data setting	Accepted

Employee user testing.

Table 2. Black box testing for employee user.

No	Test	Scenario	Actual Results	Results
1	Login Page	Enter your email and password then go to the home page	Employee can log in by entering their email and password	Accepted
2	Homepage	Display the highest employee points in the month and year active	Employee can see the highest point of employee in the month and year active	Accepted
3	Employee Attendance Page	Displays the attendance data of the employe	Employee can see the attendance of the employee	Accepted
4	Employee Paid Leave Page	Display employee paid leave data and can apply for paid leave	Employee can view leave data and can apply for employee paid leave	Accepted
5	Employee Quest Page	Display quest data and can submit quests	Employee can view a list of quests and can make requests for quests	Accepted

4.3 HRD observations

After the system was tested and used for seven months starting from January 2021 to July 2021 and compared with data along 2020 before the system was introduced, the results showed a decreasing number of employees who apply for paid leave permits and come late. Meanwhile, the number of employees who get rewarded was increased. From these results, it can be concluded that the presence of gamification in the attendance information system could

increase employee performance by 50%. The reason for using paid leave, permission, late, and reward as the parameters is because these parameters became the material for employee evaluation every year and affected the income earned.

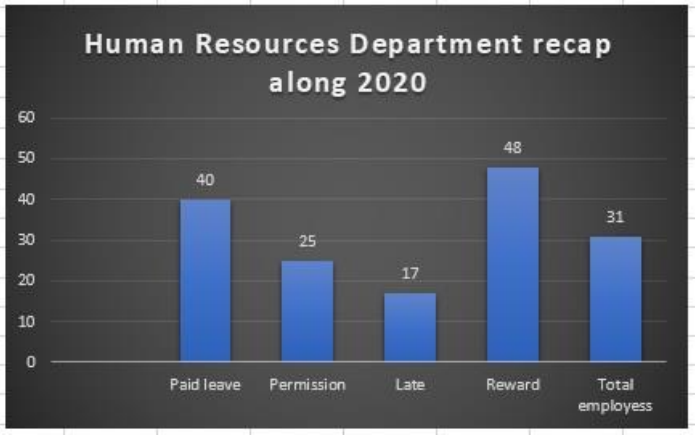

Fig. 10. HRD Recap Along 2020.

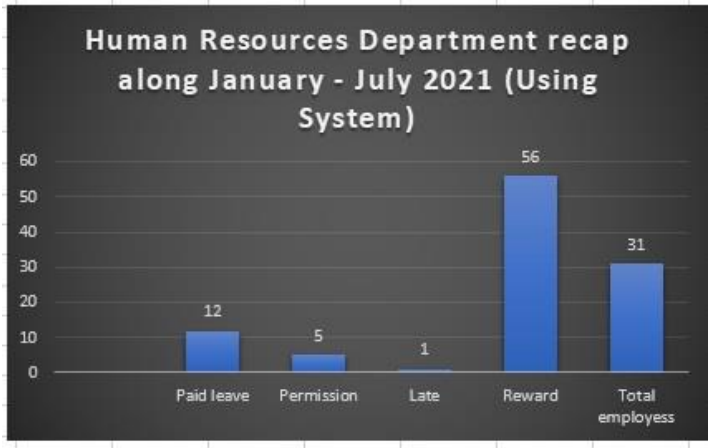

Fig. 11. HRD Recap Along 2021.

5 Conclusion

An attendance information system by applying the concept of gamification at ITB STIKOM Bali Jimbaran Campus has been successfully built using the waterfall method, black-box system testing method, and system testing hosted on www.stikom-jimbaran.com for seven months from January 2021 to July 2021. Compared to the employee attendance data in 2020, it can be concluded that applying this gamification concept could increase employee discipline

and performance by 50%. This study also argues that gamification could increase users' interest and motivation in a system. Gamification could be applied in almost all sectors, in this case, the employment and education sectors. The researchers will continue to implement and develop gamification in other sectors in the future. Thus, the activities that may seem boring can become more interesting if many sectors apply this gamification concept. There are also many deficiencies in this study, especially in user satisfaction about the experience and the interface when using the system.

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