APPLYING GAMIFICATION METHOD IN TASK MANAGEMENT IN CV.BIMS COMPANY

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ABSTRACT

In IT companies, there is one activity called task management. Task management is the activity of a manager to monitor and control a task for each employee. One of the responsibilities of the manager is to ensure that a task is completed on time. In addition the manager has the duty to motivate and appreciate employees so that the performance of each employee's work can be managed properly. However, not all managers can do that. There is one way to deal with the problem by applying the gamification concept. Gamification is the application of the way the game works in non-game activities. The application of gamification is done by adopting game mechanics to the non-game application. Game mechanics is used as a form of appreciation to users who have completed a particular task or job. In addition, the application of game mechanics can be used as a means of recognition in organizations or agencies for members who appear to be inactive while working with the same performance as other employees or even more than other employees. For ranking order used Simple Additive Weight method where the employee will be calculated based on the length of time worked, work performance, and the number of tasks that have been done. This information is used by company leaders as additional information in making decisions in determining promotion.

Keyword : *Task Management, Gamification , Game Mechanics, Simple Additive Weight , Manager.*

1. *INTRODUCTION*

Task Management is an activity where a task assigner (Manager) tracks a task throughout its life cycle and makes decisions based on progress or progress of the task. Task life cycle or task life cycle consists of nine states or states, namely Ready, Assigned, Terminated, Expired, Forwarded, Failed, Finished. A task is also distinguished by complexity, from low to high. In this case the task assigner is responsible for creating, assigning, prioritizing and monitoring tasks to ensure the task or task is completed on time. Therefore, one of the goals of task management is to be able to help managers or task assigners in managing tasks or tasks and monitoring each task. The basis for managing and managing tasks is by using functions such as task making, planning, assignment, tracking and reporting.

In addition to the task management issues above, other problems that are currently being faced are lack of employee loyalty to the company. Most resigned employees are fresh graduates. After tracing it turns out the problem is in giving appreciation or reward to employees. Currently employees who complete tasks quickly or employees who complete tasks slowly are still considered the same. Therefore, it is necessary to give an appropriate appreciation or reward to employees in accordance with their ability to complete a task.

But there are important factors in the success of a task that is often ignored by the manager or task assigner. these factors are the performance and performance of employees who receive the task,

At present the employees who work in the BIMS company have started to increase a lot, therefore the management for the assessment of work performance is needed for the need for salary increases and promotion. Work performance appraisal is still done in a subjective manner, that is, those who are seen to be most active in speaking and known are considered to have high values even though many employees have high technical performance and knowledge but have less active personalities. Of course this is a problem for the leadership to determine salary increases and promotion for the right person. Besides that subjective assessment is certainly not fair and will have a negative impact on other employees and the end will affect the performance and performance of employees.

One method for dealing with these problems is Gamification on Each Task. Gamification is the application of how the game works to non-game activities. Gamification is usually used in the user engagement and training section. The application of gamification to non-game applications is carried out by adopting game mechanics (components that are commonly found in the game) to the application. Some examples of Game mechanics include reward

points, experience points, levels, rewards, badges, and leaderboard. The mechanics game is used as a form of appreciation to users who have completed a certain activity or work and as a trigger for an atmosphere of competition among users as an example, a ranking that causes users to compete or improve their position. In addition, the application of game mechanics can also be a means of recognition in organizations or agencies for members who appear to be inactive while working with the same performance as other employees or even more than other employees.

Based on the description above, then in this study the authors raised the topic with the title "Application of Gamification Method on Task Management in CV.Bims Companies".

2. LITERATURE REVIEW

2.1. Gamification Theory

In the book Gamification By Design by Gabe Zichermann, said that gamification is a process of thinking like games and components that are in the game to involve users and solve certain problems [1]. The components in the game are also called game mechanics.

2.1.1. *Game Mechanics*

Game mechanics is a component taken from the game concept in the application of gamification. Game mechanics include:

1. Point

Point is a medium of exchange owned by the user that applies in the application that is gamified. Point is an effective motivator that can be used as a reward or reward to the user, as an indicator of status, and as a means of exchanging the purchase of goods or services regulated by organizations or agencies [4].

2. Experience points

Experience points are points that continue to grow with the completion of an activity or work in the system. Experience points are the most important points of various types of points. This type of point is used to view the user order. Experience points are generally unlimited, cannot be exchanged, and cannot expire. But in some cases, experience points can expire with the aim of equalizing the position of users [1].

Experience points are usually used for role-play games where users are not experienced at first. With each task completed, the user gets experience in the form of experience points and is ready to face more difficult or complicated tasks [3]. Here is an example of getting experience points:



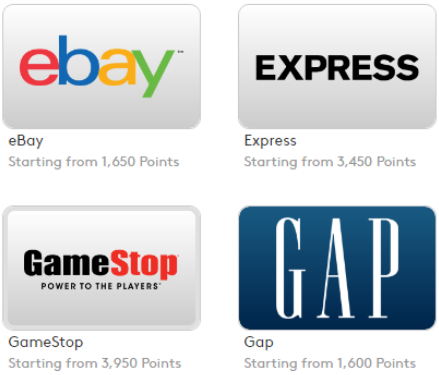
***PICTURE 1.** Example of getting experience points*

3. *Reward point*

Reward points are points that can be exchanged into something offered by organizations or agencies. Reward points are volatile or their value can be reduced or increased. Generally it forms a foundation like a virtual economy and is often named coins, bucks, cash, and others. As with other types of economics, reward points must be monitored and managed in the value cycle to ensure everything works well and to avoid inflation or deflation [1].

An easy way to determine the value of goods for transactions in dollars is 1% of the total reward points. This has become the standard for loyalty programs and has been proven effective [3].

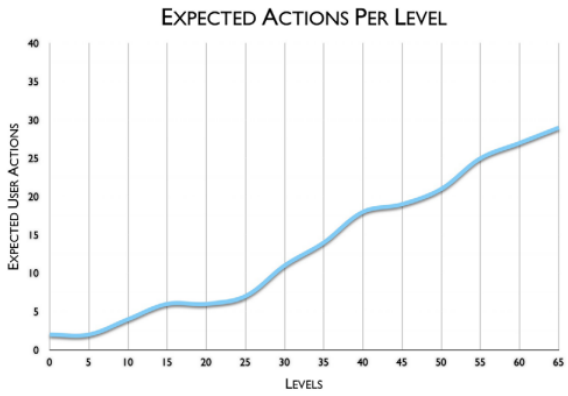
The following are examples of the application of redeemable points with rewards:



***PICTURE 2.** Examples of the application of redeemable points related to rewards*

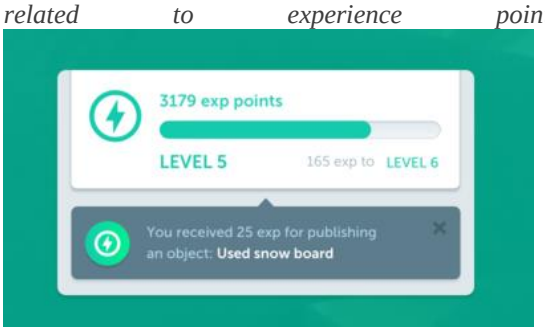
4. *Level*

Level shows the progress that has been reached by the user. The level serves as a sign that users know where they are at all times in the game environment. In game design, the level of difficulty of each level is not linear, in the sense that the large difference in points needed to level up is the same value. However, the level of difficulty level is curvilinear as shown below [1] :



PICTURE 3. *Relationship between the level of action that must be carried out by users with a large level*

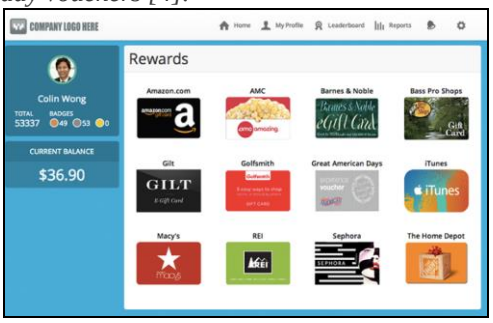
The following are examples of applying levels related to experience points:



PICURE 4. *Examples of applying levels related to experience points*

5. *Reward*

Reward is a gift that is obtained when the user exchanges the points they have. Reward is not in the form of money. So that users still want to spend their points or keep working on their activities or jobs, rewards must be kept up to date as needed. Examples of rewards applied to the work environment are dinner, shopping vouchers, or holiday vouchers [4].

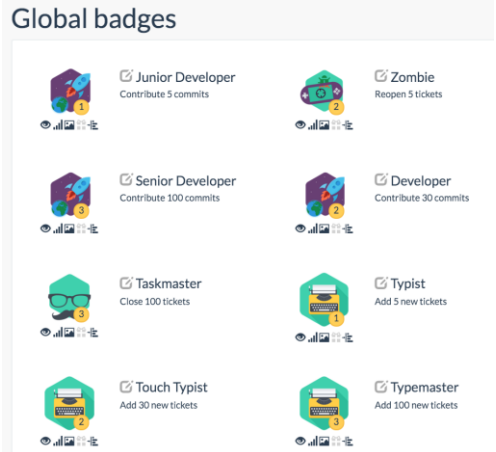


PICTURE 5. *Reward system implementation on wooboard.com*

6. *Badge*

The badge is intended to show the competence of a user so that other users can realize the user's ability. The badge functions the same as the badge applied to the army, where the badge reflects the training that has been passed. Users in the gamified application can get a badge and can be shown to other users.

Badge describes a person's ability and is attached to a user's profile as a record of achievement that can be seen by all users. The badge is used to view the user's achievements [4].



PICTURE 6. *Examples of badges and how to get them*

6. *Leaderboard*

Recognition of performance between users based on the acquisition of points and badges is important. One way to bring about this recognition is through the leaderboard feature. Leaderboard contains user ranking information based on the accumulated points that each user has that can be seen by other users. Users who occupy the top leaderboard get the benefits of recognition, social status and self-esteem. As for users who are in the order below, there is a desire to improve their position. This element of competition is the driving force of people, to meet their needs for challenges and rewards, and motivate work towards the target.

For some members of the team, elements of social recognition can be more important than physical rewards. Individuals who seek career development can be more profitable with recognition achieved through gamification. His colleagues can also see each other's progress and realize the tasks that have been done perfectly, while the manager has the opportunity to see the team's performance [4]. Following are examples of leaderboard:



PICTURE 7. *A leaderboard example that displays the user order according to the number of points*

2.1.2 *Benefits of Gamification*

The following are the main benefits that can be generated by gamification [4]:

1. *Increase user involvement or participation.*
2. *Increase the level of motivation of users.*
3. *Increase interaction with users (clients or employees).*
4. *Increase user loyalty.*

2.1.2 *Man Month*

In the business dictionary man month is the work time of one person for one month, or a work unit that represents the productive effort of one person within 4 weeks. Also called work months.

In FP5, the European Union stipulates that there are 1,680 hours of productive time per year or 140 hours of productive time per month for those who work 5 days 8 hours per week. In FP7 institutions their actual numbers must be used and therefore must make their own calculations (which may include productive hours other than 1,680 hours per year). Therefore there is a formula for calculating productive time as follows

$$PT = (A - LW - NH - l) * WH$$

Where:
PT = Productive Time (Productive Time)
A = Annual (annual or monthly)
LW = Less Weekends (Holidays)
NH = National Holidays
L = Leave (sick / sick)
WH = Work Hour (work time in a day)

Here is an example of a man month calculation

Man Month Calculation Example

	Days		Hours (based on 8 hour day)
Annual	365		
Less Weekends	104		
Net	261	=	2,088
National/statuary holidays, etc.	- 15		
Annual vacation	- 21		
Annual sick days	- 15		
	51	=	408
Annual net productive time	**210**		**1,680**

From the calculation it can be concluded that in 1 year with 104 days of work break, 15 days of national holidays, 21 days of leave, and 15 days of illness and per day working for 8 hours. Then the person's productive time is 1680 hours for 1 year.

2.1.3 Simple Additive Weight (SAW) Method

Simple additive weight method is a weighted addition method with the basic concept is to find the weighted sum of performance ratings on each alternative on all attributes. [10]

Assessment criteria can be determined according to the needs of a company. [10]

$$R_{ij} = \begin{cases} \frac{X_{ij}}{\text{Max } X_{ij}} & \text{Jika j adalah atribut keuntungan (benefit)} \\ \frac{\text{Min } X_{ij}}{X_{ij}} & \text{Jika j adalah atribut biaya (cost)} \end{cases} \quad \text{..... (1)}$$

Where :
Rij = normalized performance rating
Maxij = The maximum value of each row and column
Minij = The minimum value of each row and column
Xij = Rows and columns of the matrix
With Rij the rating of the normalized performance of the Ai alternative in the Cj attribute;

$$V_i = \sum_{j=1}^{n} W_j R_{ij} \quad \text{..... (2)}$$

A larger Vi value indicates that Ai's alternative is preferred. Where :
Vi = The final value of the alternative
Wi = Weight specified
Rij = Normalization of the matrix
There are several steps in completing the Simple Additive Weight (SAW) method as follows:

1. *Determine the criteria used as a reference in supporting decisions symbolized by Ci.*
2. *Determine the suitability rating of each alternative on each criterion.*
3. *Make a decision matrix based on criteria (Ci).*
4. *Conducting matrix normalization based on the equation adjusted to the type of attribute so that the normalized matrix R.*
5. *The final result is obtained from the ranking process, which is the sum of normalized matrix multiplication R with the weight vector so that the greatest value is chosen as the best alternative (Ai) as the solution.*

3. *Research Result*

3.1. *Simple Additive Weight Analysis*

The following is a description of the results of the study containing the results of the analysis of promotional decisions using the Simple Additive Weight (SAW) method

First is the determination of the criteria for the simple additive weight method. For determining criteria and weights determined by the company. The following are the criteria needed to measure and assess who will be selected to get promotion promotion, including:

1. Working Period

Indicators that are used in determining promotion promotion based on the criteria of the working

period where it is assessed or seen from how long an employee has worked in the company

Table 1. Working Period Criteria

Criteria	*Range*	*Value*
Years of service	*0.5 Year*	*0.2*
	1 Year	*0.4*
	1.5 Year	*0.6*
	2 Year	*0.8*
	>2 YEAR	*1*

1. *Work Performance*

Indicator used in determining promotion promotion based on assessment of work performance in completing the work for one month.

Table 2 Job Performance Criteria

Criteria	*Range*	*Value*
Work Performance	*<160 Hours*	*0.2*
	160-180 Hours	*0.5*
	181-200 Hours	*0.7*
	201-225 Hours	*0.8*
	>225 Hours	*1*

2. Total Task

Indicators used in determining promotion promotion based on the number of tasks completed in one month

Table 3 Total Task Criteria

Criteria	*Range*	*Value*
Total Task	*<10*	*0.2*
	11-20	*0.5*
	21-25	*0.6*
	26-30	*0.8*
	>30	*1*

Determined based on the main requirements or criteria above, then the preference weight (W) is as follows:

W1 = Working Period (25%) = 0.25
W2 = Work performance (50%) = 0.50
W3 = Number of Tasks (25%) = 0.25

In determining promotion promotion using the Simple Additive Weight (SAW) method based on the above criteria, the following data is obtained:

Table 4 employee data that wants to be ranked along with the criteria

NO	*NAME*	*CRITERIA*		
		YEARS OF SERVICE	*WORK PERFORMANCE*	*TOTAL TASK*
1	Helmi	1,5 *Years*	184	21
2	Hanafi	1 *Years*	168	15
3	Happrilia	1,5 *Years*	192	20
4	Leksa	1,5 *Years*	176	17

In determining the suitability rating, the value of each criterion is included in the match rating table that has been adjusted to the value from the criteria table. Then the compatibility rating table can be seen as follows

Table 5 determination of suitability rating with criteria

NO	*NAME*	*CRITERIA*		
		YEARS OF SERVICE	*WORK PERFORMANCE*	*TOTAL TASK*
1	Helmi	0.6	0.7	0.6
2	Hanafi	0.4	0.5	0.5
3	Happrilia	0.6	0.7	0.5
4	Leksa	0.6	0.5	0.5

The value of the results of the match table is then made into a matrix form as follows:

$$X \begin{bmatrix} 0.6 & 0.7 & 0.6 \\ 0.4 & 0.5 & 0.5 \\ 0.6 & 0.7 & 0.5 \\ 0.6 & 0.5 & 0.5 \end{bmatrix}$$

Making Matrix Normalization based on equations that are adjusted to the type of attributes (profit attributes and cost attributes) so that the normalized matrix R.

Determine the R value with the following formula:

$$R_{ij} = \frac{X_{ij}}{Max\ (X_{i1}, X_{i2}, \dots, X_{ij})}$$

From the calculation of the formula above, the matrix R is obtained as follows

$$\begin{bmatrix} 1 & 1 & 1 \\ 0.66 & 0.71 & 0.83 \\ 1 & 1 & 0.83 \\ 1 & 0.71 & 0.83 \end{bmatrix}$$

To find the value of each employee who will get a promotion, the following is the process of determining the ranking:

Determining the value of each variable or Vn is used the following formula:

$$Vn = (W1 * R_{1n}) + (W2 * R_{2n}) + (W3 * R_{3n})$$

So that the following values are obtained

$$V1 = (0.25 * 1) + (0.50 * 1) + (0.25 * 1) = 1$$
$$V2 = (0.25 * 0.66) + (0.50 * 0.71) + (0.25 * 0.83) = 0.7275$$
$$V3 = (0.25 * 1) + (0.50 * 1) + (0.25 * 0.83) = 0.9575$$
$$V4 = (0.25 * 1) + (0.50 * 0.71) + (0.25 * 0.83) = 0.8125$$

From the results of the calculation of the value of Vi from each employee who will get promotion promotion, the ranking table can be made as follows

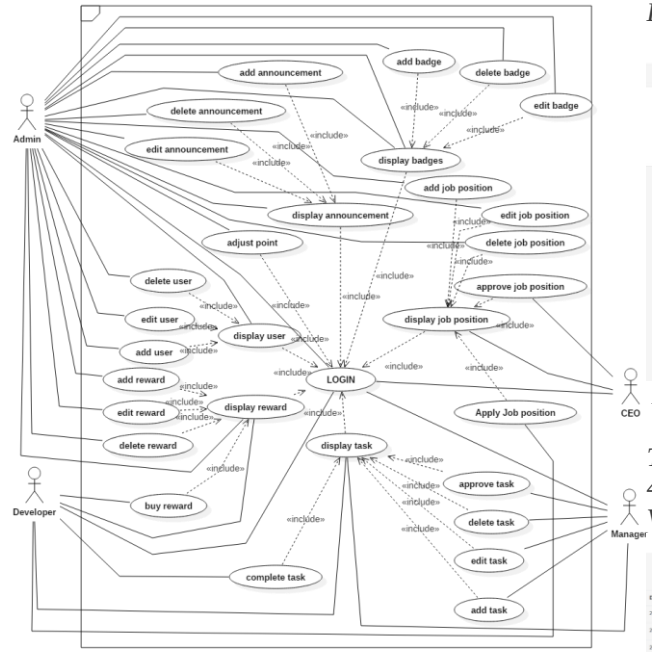
Table 6 Ranking Table

NO	NAME	VALUE	PERSEN TAGE (%)	RANK
1	Helmi	1	100%	1
2	Happrilia	0.9575	96%	2
3	Leksa	0.8125	81%	3
4	Hanafi	0.7275	73%	4

From prioritizing proposals for promotion promotion using the Simple Additive Weight method, those eligible for promotion promotion are employees named Helmi who have a value of 1.

3.2. *System Modeling*

Use Case Diagram can be referenced as a diagram describing an action in the system that can be done by the user, here is a Use Case Diagram of Elesys (Entertaining Workplace System)

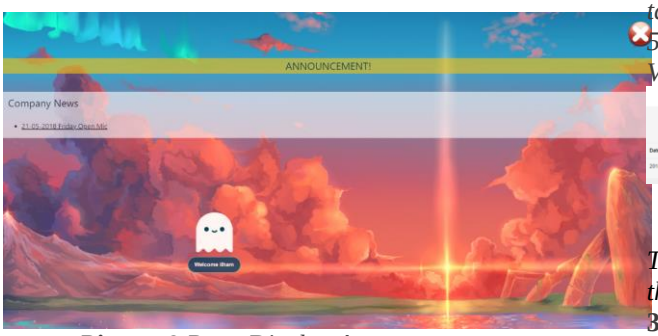


Picture 8 Use Case Diagram

3.3. *Interface Implementation*

The results of the implementation of the system interface can be seen below.

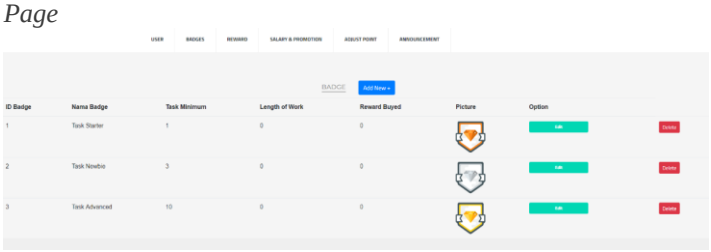
1. Implementation of Page Announcement



***Picture 9** Page Display Announcement Implementation*

This page is used to display news about the company.

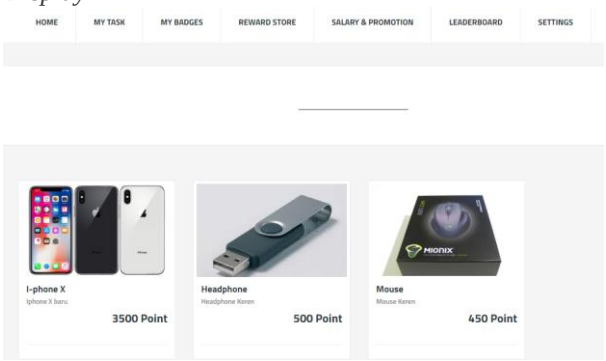
2. Implementation of Display Badge Display Page



***Picture 10** Implementation of Display Badge Display Page*

This page is used by the admin to display all badge data.

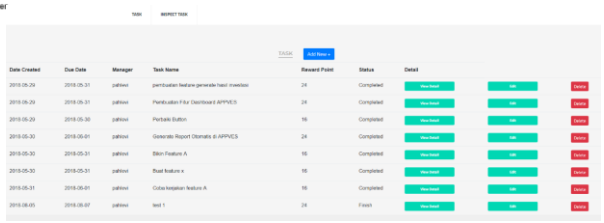
3. Implementation of Reward Display Page Display



***Picture 11** Implementation of Reward Store Display Page Display*

This page is used by developers to buy gifts offered.

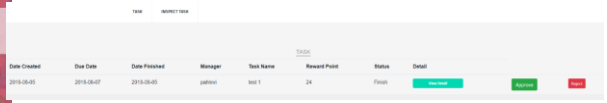
4. Implementation of Task Display Page Views



***Picture 12** Implementation of Task Display Page Views*

This page is used by the manager to display a list of tasks that have been created.

5. Implementation of Inspect Task Page Views



***Picture 12** Implementation of Task Display Page Views*

This page is used by the manager to approve a task that the task has been completed.

3.3. *Alpha Testing*

The testing process focuses on the software's internal logic, ensuring that all functions have been tested. This test is intended to find errors and ensure

that all functional needs are in accordance with the desired results.

3.3. *Beta Testing*

Beta testing is a test that is carried out objectively where testing is carried out directly to the company CV.BIMS by interviewing the CEO and Manager. In addition, questionnaires were made regarding employee satisfaction with the applications that have been made for further questioning directly to 8 respondents who are users of this application, but this research will be given only a few examples, using the following Likert scale formula:

Index Formula (%) = Total Score / Y * 100

The conclusion of beta testing is that this application can be used by employees to stay motivated and facilitate employees in reporting a task. Users can easily understand in operating this application.

4. *Conclusions And Suggestion*

4.1. Conclusions

Based on the results of testing the Application and interviews with application users. Then it can be concluded that

1. The application can be used as a tool or tool to motivate employees in the form of giving points when finished working on tasks or tasks and can buy reward rewards with the points obtained.

2. This application also makes it easy for managers to control a task, and makes it easier for the CEO to see the performance of each employee that will be used for consideration of salary increases or employee positions.

4.2. *Suggestion*

As for some suggestions provided by the application user is

1. Adding bonus points to certain points on a certain date or month.

2. Add a notification feature in the form of a notification via the user's email when a task or task is successfully created so that the user does not need to open the application to find out the information.

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