

ANALYSIS OF GAMIFICATION FOR TRAINER PERFORMANCE USING MDA FRAMEWORK AND ARCS MODEL

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ABSTRACT

In the current era of knowledge-based technology development, human resources are an essential and valuable asset for the company, so it is necessary to manage them properly and not cause a decrease in productivity. Gamification has been widely used to increase user motivation and performance in various fields, such as education and health. The latest trend is the application of “gamification of work,” which aims to incorporate game design elements into the workplace to increase employee productivity and work motivation. This study will analyze problems related to the absence of a standard trainer rating system, making it difficult for managers to find trainer profiles that match the training to be held. The gamification method combines the MDA framework and the ARCS motivation model to analyze relevant game elements to improve coach performance and assist administrators in assigning training to coaches according to the criteria. The analysis in this study mapping the Mechanics–Dynamics–Aesthetics of the MDA framework with twelve ARCS (Attention, Relevance, Confidence, Satisfaction) subcategories. The results obtained from the relevant mechanics game elements are Achievements (Badges, Rewards), Points (Score), Leaderboard, Level System, Progress Bar, Mission (Task), Tutorial, Feedback, and Chat.

Keywords: *Gamification, MDA Framework, ARCS Model, Trainer Performance, Knowledge Management*

1. INTRODUCTION

In the current era of knowledge-based technology development, human resources are an essential and valuable asset for companies in supporting business activities and achieving company goals. Human resources are seen as a resource and not a burden to the organization but become a valuable asset that needs to be managed and developed correctly. Proper management of human resources will provide more benefits for the organization. The ability to manage limited resources is a significant factor for the progress and success of the organization. One of the challenges faced by organizations is how to effectively motivate employees to contribute their knowledge, which is distributed throughout the organization [1].

The responsibilities of employees who have been assigned by the organization need to be evaluated by providing periodic performance appraisals so that decision-makers obtain information related to the productivity of each employee's performance. Employee performance productivity is not only

influenced by the amount of income received but can also be influenced by other factors. Other factors such as a non-conductive work environment, inconsistent co-workers, high pressure at work can cause a decrease in employee productivity due to decreased morale. Another problem that can reduce employee performance productivity is boredom at work due to monotonous or routine work that is done every day in the same and repeated form.

Therefore, it is necessary to have a method used as an alternative strategy in helping to provide periodic performance productivity evaluations to provide recommendations to decision-makers in making written rules and procedures, selecting the best employees, providing opportunities for employees to self-actualize, and providing promotion to employees of the results of the assessment that has been done.

In recent years, gamification has been widely used to increase user motivation and performance [2] in various fields, such as education [3], health [4], and virtual reality [5]. The latest trend in the application of gamification is in the workplace or

what is called "gamification of work", which aims to incorporate game design elements into the workplace to increase employee productivity and work motivation [1].

This study will discuss the problems that occur in the Learning & Development Department at a private university in Jakarta. One of the problems that will be discussed is related to the absence of a standard trainer performance rating system, making it difficult for managers to find trainer profiles that match the training to be held. The current process is manual, which can cause the assessment and assignment trainer to be subjective and not objective. The scope of this research is limited to evaluating trainers' performance using gamification with combining the ADM framework and the ARCS motivation model.

The purpose of this study is to analyze what elements in gamification can be applied to Learning & Development Department to be a solution to the problems that occur. Previous studies rarely examine the evaluation of trainer performance in universities using gamification and only use one method, either the ADM framework or the ARCS motivation model. The contribution of this research is to combine these two methods: the ADM framework and the ARCS motivation model in conducting gamification analysis related to ranking instructor performance in the university environment. The benefits that can be obtained are expected to be a guide for the design and development of a trainer management system that can facilitate administrators in finding criteria for trainers who are qualified to provide training.

Based on previous studies, several empirical studies have produced very good perceptions in the application of work gamification in increasing employee motivation and work performance [6], [7], [8], [9].

2. LITERATURE REVIEW

2.1 Gamification

The concept of "Play" and its application in the form of games have special advantages over other solutions used to improve employee performance. Technology-enabled role gaming (in non-gaming contexts), or gamification, has proven to be a powerful approach for simulating various aspects of an organization, including engagement, collaboration, and innovation. Three aspects need to be considered in the gamification approach,

namely: human behavior, game design, and personal psychology. The design and implementation of gamification in a company need to be analyzed by the company [10].

Gamification is an innovative approach to solving problems related to motivation and performance [2]. Gamification is the process of creating game-like activities in a non-game context. The gamification system provides immediate feedback on progress and can be turned into a control mechanism to create an enjoyable experience [11].

2.2 Mechanics–Dynamics–Aesthetics (MDA) Framework

One of the game design frameworks used in gamification is the MDA framework which consists of three parts related to games that apply to non-game contexts [10], [12], [13], [14], [15], [16]:

- **Mechanics:** describes the rules or components implemented in the game that support the dynamics in the gameplay, such as basic actions, algorithms, game engines, game elements, etc. Mechanics is at the level of data representation and algorithms and forms the functional components of games such as Leaderboard, Levels, Badges, and Points.

Some of the various elements of Mechanics can be seen in Table 1.

Table 1 Variety of Mechanics Elements

Type	Mechanics Description
Player progress	<ul style="list-style-type: none"> ▪ Points (score) ▪ Achievements (reward system, badges, trophies) ▪ Leaderboard ▪ Levels (level up system) ▪ Progress bar
Mission or Task	<ul style="list-style-type: none"> ▪ Mission (quest, mission election, optional assignment, collect object) ▪ Mini games (quiz, puzzle)
Game content	<ul style="list-style-type: none"> ▪ Role-Playing ▪ Unique controllers ▪ Simulations
Additional features	<ul style="list-style-type: none"> ▪ Feedback ▪ Map ▪ Background story ▪ Characters ▪ Tutorials ▪ Social media platform (chat feature or forum)

- Dynamics: based on mechanics and describes the behavior of players during the game. Dynamics is how a mechanic plays in a game based on player input and relationships with other mechanics in the context of the game, constraints, decisions, possibilities, outcomes, completion, continuation, competition, and cooperation. Dynamics can create aesthetics for everyone who plays the game, for example, through the challenges that can arise from competing with others in terms of time pressure.

Some of the various elements of Dynamics can be seen in Table 2.

Table 2 Variety of Dynamics Elements

Type	Mechanics Description
Get badges or other rewards	<ul style="list-style-type: none"> ▪ Players with the best scores get rewards in the form of badges or other rewards to spur motivation in the activities provided.
Role-Playing	<ul style="list-style-type: none"> ▪ Players can choose a character to play in the provided mission or task scenarios.
Non-linear progression	<ul style="list-style-type: none"> ▪ Missions/tasks can be completed separately so players can choose the mission/tasks they want to complete. ▪ There are tutorials in various forms that can be selected by the player (optional, can be selected or not) ▪ If there is a mission/task involving collectible objects, the player can collect these objects randomly.
Puzzle-solving	<ul style="list-style-type: none"> ▪ Players can use their own way to complete missions or tasks.
Hints	<ul style="list-style-type: none"> ▪ The game will provide hints or tutorials that will help players in completing missions/tasks.

- Aesthetics: represents the emotional reactions that players experience while playing, such as surprise, satisfaction, excitement, and jealousy. There are eight kinds of aspects derived from normal "fun" to explain in terms of how players feel about the game:
 - a. Sensation (Game as sense-pleasure): pleasure from trying something new. The sensation can be used to evoke emotions from the performer through visual, audio, and tactile manipulation.
 - b. Challenge (Game as obstacle course): challenges to complete a specific task.

Challenges are realized by adding different obstacles or challenges in each stage.

- c. Discovery (Game as uncharted territory): discovering new things through exploration or trying new strategies.
- d. Fellowship (Game as a social framework): engage in social networks.
- e. Expression (Game as self-discovery): the ability to express in-game player selection.
- f. Fantasy (Game as make-believe): plunge into the virtual world. Fantasy is realized by designing and creating characters played by players.
- g. Submission (Game as a pastime): devotion to the game.
- h. Narrative (Game as drama): a storyline that attracts the player's interest. The narrative is actualized by creating a game storyline.

The flow of the three elements in the MDA Framework, along with their functions, can be seen in Figure 1.

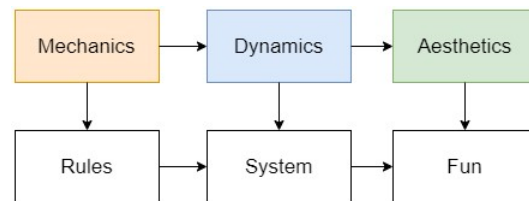


Figure 1 MDA Framework and Functions

Each component of the MDA framework can be viewed from two perspectives: the designer's perspective and the player's perspective. Both of these perspectives need to be considered to help observe that small changes in one layer can affect another layer. From the designer's perspective, mechanics give rise to dynamic system behavior that leads to certain aesthetic experiences. Whereas from the player's point of view, aesthetics sets the tone, born in observable dynamics and, finally, operable mechanics. Thus, when carrying out the design in this study, it will start from Aesthetics which is continued to Dynamics and ends with the underlying Mechanics [17], which is illustrated in Figure 2.

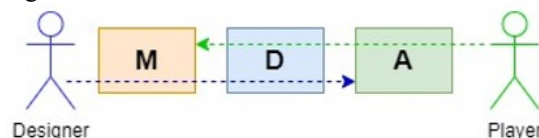


Figure 2 Perspectives in the MDA Framework

2.3 Motivational Design ARCS Model

The ARCS model has been widely applied to improve motivation, attitudes, retention rates, performance, and other psychological traits. The ARCS model uses a systematic design process from analyzing the motivation of the target group, designing a motivational strategy based on the analysis of motivation and other constraints, implementing the strategy, and assessing its impact [18].

The ARCS model not only emphasizes the stimulation of learning motivation but also maintains motivation to provide the fulfillment of learner needs that facilitate learner communication. The ARCS motivation model consists of four categories, namely: Attention, Relevance, Confidence, and Satisfaction. Each category has three subcategories that help diagnose and develop appropriate motivational tactics for the specific problem identified. The subcategories of each category can be seen in Table 3 [19]:

Table 3 ARCS Model subcategory

Category	Subcategory
Attention	<ul style="list-style-type: none"> ▪ A1: Perceptual Arousal ▪ A2: Inquiry Arousal ▪ A3: Variability
Relevance	<ul style="list-style-type: none"> ▪ R1: Goal Orientation ▪ R2: Motive Matching ▪ R3: Familiarity
Confidence	<ul style="list-style-type: none"> ▪ C1: Learning Requirements ▪ C2: Success Opportunities ▪ C3: Personal Control
Satisfaction	<ul style="list-style-type: none"> ▪ S1: Natural Consequences ▪ S2: Positive Consequences ▪ S3: Equity

2.4 Knowledge Management

Knowledge can be referred to as information held in people's minds or people's experiences and understandings, which contain information, skills, and expertise. The main purpose of knowledge management is to make organizations aware of the knowledge they have and shape knowledge, so that knowledge can be used effectively and efficiently. Knowledge can be divided and grouped into two forms, namely tacit and explicit [20] which is described in Table 4 below:

Table 4 Tacit and Explicit Knowledge

Tacit Knowledge	Explicit Knowledge
Can be documented, codified, shared	What do people think in their mind
Can be stored through technology and digital systems	Difficult to assess and evaluate
Transferable	Unable to transfer

Knowledge Management is a systemic and organizational-specific process for acquiring, organizing, and communicating both employees' tacit and explicit knowledge so that other employees can use it to be more effective and productive in their work. Knowledge management consists of four main elements and processes [20]:

1. Knowledge Creation/Knowledge Acquisition

This process involves applying new knowledge from the organization's explicit and tacit knowledge or replacing current content. In this case, the organization is required to seek new knowledge and information, both inside and outside the organization, that can be obtained through duplication, imitation, benchmarking, or outsourcing.

2. Knowledge Storage

The tacit and explicit knowledge held by individuals in the organization must be maintained by organizing and managing that knowledge to make it more accessible. Knowledge integration helps reduce redundancy and increase efficiency.

3. Knowledge Transfer or Knowledge Dissemination

This process involves the sharing and exchange of knowledge between individuals or networks of individuals, from groups of people to organizations, and from individuals to explicit sources. In the process, organizations must ensure that knowledge is converted from tacit knowledge to explicit knowledge to prevent the loss of tacit knowledge.

4. Knowledge Application

This process involves using knowledge to coordinate strategic direction, solve problems, make decisions, increase efficiency, and reduce costs. Individuals can use the knowledge of others without actually learning that knowledge.

2.5 Related Work

The adoption of the gamification process has the potential to motivate employees to be involved in the organization by selecting the right and appropriate lean games to align with the dynamics of a productive environment [7]. Points, Badges, Leaderboards, and Progress Bars are effective ways to promote quantity of performance and can be indicators of employee discipline rate [8].

Gamification in education using the MDA framework is a method to increase motivation, achievement, and involvement in learning activities [12]. Gamification can accommodate different learning styles and speeds and allows individuals to achieve mastery at their own pace. The results obtained are related to the characteristics of the game that are relevant to the workplace: learning, rewards, and individual and group performance, and what motivates employees to achieve them [9].

The use of the Attention, Relevance, Confidence, Satisfaction (ARCS) motivation design model, which is integrated into the MOOC, shows that the pattern of students selectively paying attention attracts relevance for self-determined reasons, has high self-confidence, and gets satisfaction from various sources [18].

This research combines the MDA framework and the ARCS Model on the object of research by trainers at universities in Indonesia who have received a 5-star rating on the QS World University Ratings, which has never been done before.

3. RESEARCH METHODOLOGY

The research method used in this study starts from the formulation of the problem, literature studies and preliminary surveys, data collection, analysis, and finally, conclusions which can be seen in Figure 3.

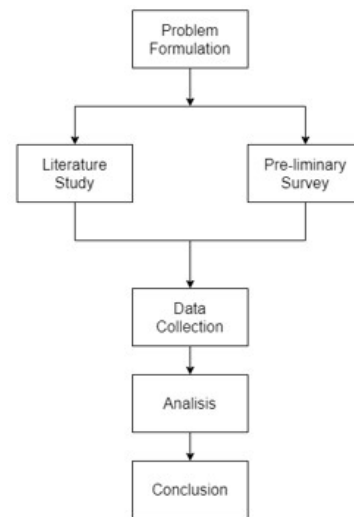


Figure 3 Research Methodology

3.1 Problem Formulation

The problem formulation stage is carried out by exploring the problems and challenges faced by the object of research, then formulated into problems that will be discussed and investigated in this study.

The problem in this study is related to ranking trainers' performance that did not previously exist, which developed using gamification. This problem was chosen because trainers' performance and capabilities became an important factor in the process of assigning a trainer into training, which ranking could assist administrators to assign the right trainer objectively.

3.2 Literature Study

The literature study stage is carried out by searching for and studying information or research materials related to this research, such as journals, books, eBooks, etc. The information or research explored is focused on topics related to gamification, the MDA framework, and the ARCS Model.

3.3 Preliminary Survey

A preliminary survey was conducted to explore the level of urgency of the problem topics to be discussed in this study. The selected respondents are departments that often hold activities involving trainers, which are distributed through Microsoft Forms.

3.4 Data Collection

Data collection is carried out by holding internal discussions with trainer managers to obtain information related to the trainer's performance appraisal criteria and the required rating system.

3.5 Analysis

At this stage, an analysis of the literature study and the criteria for the needs of the assessment and ranking of trainer performance is carried out by using the appropriate mechanic, dynamic and aesthetic elements in the MDA framework, which is combined with the elements of attention, relevance, confidence, and satisfaction in the ARCS model elements.

3.6 Conclusion

This stage is concluded related to what elements of the MDA framework and ARCS Model can be used as guidelines for the design and development of a trainer performance appraisal and rating system.

4. RESULTS

4.1 Company Profile

The object of research in this study is a trainer who has been actively providing training in the last two years in the Department of Learning & Development. The Department of Learning & Development is one of the units at the only university in Indonesia that is rated 5 Stars from QS World University Ratings. In developing people at the university, the Learning & Development Department tries to present training programs that can support the performance of lecturers and employees. One of them is by presenting qualified trainers who can provide useful best practices, knowledge, and skills.

In its development, the training programs held are growing and diverse, so a system is needed that can monitor the performance of lecturers and employees as trainers so that the performance of trainers can be managed and monitored properly. Thus, it is hoped that it can facilitate the management of the workload of lecturers and employees as trainers so that activities as trainers do not interfere with their main duties as lecturers and employees in their respective workplaces because they can be monitored through the

application. With managed data, it is planned that it can also be the basis for determining rewards and benefits to trainers for a program according to performance.

Before starting this research, a preliminary survey was conducted regarding:

Frequency of finding trainers

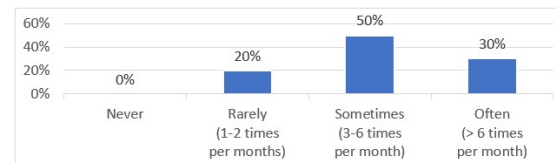


Figure 4 Frequency of finding trainers

The survey results show that the frequency of searching for trainers is the highest from the respondents' answers as much as 50% at the sometimes level (about 3-6 times per month).

The difficulty of finding trainers

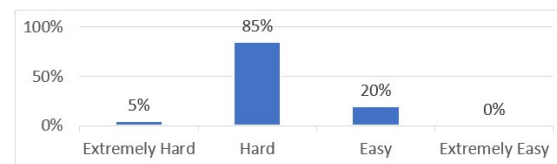


Figure 5 Difficulty of finding trainers

The survey results show that the difficulty level of disbursing trainers is at the hard level, which is 85%.

Level of importance for trainer management system development

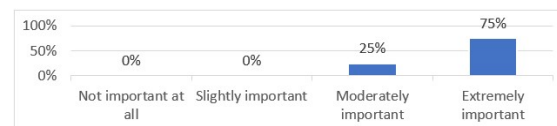


Figure 6 Level of importance for trainer management system development

The survey results show that the level of need for developing a trainer management system is at an extremely important level, which is 75%.

4.2 Mapping the ARCS Model Attention Category to the MDA Model

The Attention category in the ARCS model consists of three sub-categories: Perceptual Arousal, Inquiry Arousal, and Variability. The

results of mapping the Attention subcategory on the MDA model can be seen in Table 5.

Table 5 Mapping Attention Category to the MDA Model

Subcategory: Perceptual Arousal	
Question	What can be done to get perceptual and tangible attention?
Aesthetics	The game environment is designed as if the player is visiting another world (Fantasy).
Dynamics	When a player enters the game there is an opening greeting, for example, "Welcome" added a level badge along with the player's name.
Mechanics	Badges.
Subcategory: Inquiry Arousal	
Question	What can be done to trigger request behavior?
Aesthetics	Designing a challenging game environment with attractive rewards that encourage players to keep playing the game (Challenge).
Dynamics	There is a task or mission accompanied by a reward and level system.
Mechanics	Rewards, Mission (Tasks), Badges, Level Up System
Subcategory: Variability	
Question	What needs to be done so that the attention obtained can be properly maintained?
Aesthetics	There is an element of competition so that players are encouraged to do more than other players (Expression).
Dynamics	There is a dashboard of players with the best scores in the game.
Mechanics	Leaderboard.

4.3 Mapping the ARCS Model Relevance Category to the MDA Model

The Relevance category in the ARCS model consists of three sub-categories: Goal Orientation, Motive Matching, and Familiarity. The results of mapping the Relevance subcategories on the MDA model can be seen in Table 6.

Table 6 Mapping Relevance Category to the MDA Model

Subcategory: Goal Orientation	
Question	How to find the goal of the player?
Aesthetics	There are a variety of missions that players can choose to express themselves (Expression).
Dynamics	When the player enters the game there is a choice of missions and rewards that will be received if the mission is completed by the player.
Mechanics	Rewards, Mission (Tasks).

Subcategory: Motive Matching	
Question	When and how to give choice and responsibility to players?
Aesthetics	Designing game missions according to organizational urgency, missions can be modified according to organizational goals, and in the end, the missions carried out by players affect organizational performance (Expression).
Dynamics	When players enter the game there are missions and features to provide feedback.
Mechanics	Rewards, Mission (Tasks), Feedback.
Subcategory: Familiarity	
Question	How to link instructions with player interaction (user experience)?
Aesthetics	Designing a game environment that allows players to immediately recognize the progress of the game being played, feel challenged, and express themselves in the game (Challenge, Expression).
Dynamics	When the player enters the game, the player receives an illustration of the progress of the game in the form of visuals and numbers, which can be shared on the forum.
Mechanics	Badges, Level, Points, Progress Bar, Chat.

4.4 Mapping the ARCS Model Confidence Category to the MDA Model

The Confidence category in the ARCS model consists of three sub-categories: Learning Requirements, Success Opportunities, and Personal Control. The results of mapping the Confidence subcategories on the MDA model can be seen in Table 7.

Table 7 Mapping Confidence Category to the MDA Model

Subcategory: Learning Requirements	
Question	What needs to be done in order to encourage players to have positive expectations and achieve success for each activity?
Aesthetics	There is a feature that shows the progress of the player's game and the next mission that needs to be done to reach the next level (Expression, Challenge).
Dynamics	When the player enters the game there is a player's game progress and the next mission that needs to be accomplished to be able to go to the

	next level and be able to discuss with other players.
Mechanics	Mission (Tasks), Progress Bar, Chat, Tutorial, Feedback.
Subcategory: Success Opportunities	
Question	How can an activity increase a player's confidence in his competence?
Aesthetics	Designing a game environment that helps players learn the mission to be carried out (Expression).
Dynamics	Upon entering the game, the player can learn the next mission to be carried out.
Mechanics	Chat, Tutorial.
Subcategory: Personal Control	
Question	What needs to be done so that players understand that success or success is based on their efforts and skills?
Aesthetics	Designing a game environment that allows direct interaction after the player completes a mission and receives rewards, allowing the player to complete the next mission (Expression, Challenge).
Dynamics	After completing the mission, there is a visualization that provides information to the player directly about the player's success in completing the mission.
Mechanics	Progress Bar, Points, Badges

4.5 Mapping the ARCS Model Satisfaction Category to the MDA Model

The Satisfaction category in the ARCS model consists of three sub-categories: Natural Consequences, Positive Consequences, and Equity. The results of mapping the Satisfaction subcategory on the MDA model can be seen in Table 8.

Table 8 Mapping Satisfaction Category to the MDA Model

Subcategory: Natural Consequences	
Question	What needs to be done so that players have the opportunity to participate in activities?
Aesthetics	Designing a game environment capable of showing the player's achievements and subsequent challenges (Challenge).
Dynamics	Upon entering the game, the player is allowed to choose and learn the missions to perform.
Mechanics	Tutorial, Missions (Tasks).
Subcategory: Positive Consequences	
Question	What kind of support can be provided to ensure player success?
Aesthetics	Designing a game environment that

	allows players to interact and support each other (Expression).
Dynamics	Upon entering the game, players can provide feedback to other players.
Mechanics	Chat, Feedback.
Subcategory: Equity	
Question	What needs to be done in order for the player to have a positive feeling about the success achieved?
Aesthetics	Designing a game environment to interact directly when a player completes a mission and receives a reward, which can encourage the player to share his success with other players (Expression).
Dynamics	There is a direct visualization when the player completes the mission.
Mechanics	Badges, Rewards, Points, Progress Bar.

4.6 Criteria for Assessment and Rating of Trainer Performance

After discussion with the manager, it was found that the formulation of the trainer level grouping that will be used consists of five levels:

- Level 1: Successor

A successor is a trainer who has general knowledge and skills about basic techniques and concepts related to the topic/field. The proficiency level at the successor level is fundamental awareness (basic knowledge).

- Level 2: Co-facilitator

Co-facilitators are trainers who have a level of experience gained in classrooms and/or experimental scenarios or as trainees in a supervised workplace. The proficiency level at the co-facilitator level is Novice (limited experience).

- Level 3: Facilitator

The facilitator is a trainer who has the ability to complete the task in competence as requested and can carry out a good set of knowledge and skills. The proficiency level at the facilitator level is Capable (practical application).

- Level 4: Role Model

A role model is a trainer who has immediate recognition within the organization as "someone to ask" when difficult questions arise about skills and knowledge. The proficiency level at the role model level is Excellent (applied theory).

▪ Level 5: Mentor

Mentors are trainers who are known as experts in certain fields and are able to form a learning culture within the organization. Trainers at this level have the ability to provide guidance, problem-solving, and answer questions related to the area of expertise and the area in which these skills are used. The proficiency level at the mentor level is Expert (recognized authority).

The trainer level assessment described above is assessed based on the six components of performance appraisal which can be seen in Table 9.

Table 9 Performance Appraisal Component

Assessment Component	% Rating Weight
Teaching Hours	20%
Customer Satisfaction Index	30%
Target Audience	15%
TOEFL Score	5%
Number of Module Developed	15%
Certification	15%

Teaching hours are assessed based on the number of hours of training activities that have been taught by the trainer. The teaching hours assessment criteria based on the level can be seen in Table 10.

Table 10 Teaching Hours Assessment Criteria

Level	Proficiency Level	Teaching Hours
1	Fundamental Awareness (Successor)	< 50 hours
2	Novice (Co-facilitator)	50-57 hours
3	Capable (Facilitator)	58-74 hours
4	Excellent (Role Model)	75-100 hours
5	Expert (Mentor)	> 100 hours

The Customer Satisfaction Index is assessed based on the evaluation results of the trainers filled in by the trainees after the trainers have finished providing the training. The assessment is carried out by calculating the average of the questionnaires that have been filled out by the training participants with a Likert scale of 1-4. The evaluation criteria

for the Customer Satisfaction Index based on the level can be seen in Table 11.

Table 11 Customer Satisfaction Index Assessment Criteria

Level	Proficiency Level	Customer Satisfaction Index (Total of 6)
1	Fundamental Awareness (Successor)	4.3 – 4.5
2	Novice (Co-facilitator)	Min. 4.5 – 4.9
3	Capable (Facilitator)	Min. 5 – 5.5
4	Excellent (Role Model)	Min. 5.6 – 5.7
5	Expert (Mentor)	> 5.7

Each level of trainer has a minimum target audience for training (which is based on the participant's job band), where the assessment criteria can be seen in Table 12.

Table 12 Target Audience Assessment Criteria

Level	Proficiency Level	Target Audience
1	Fundamental Awareness (Successor)	Staff-Officer
2	Novice (Co-facilitator)	Supervisor
3	Capable (Facilitator)	Manager
4	Excellent (Role Model)	Manager-Senior Manager
5	Expert (Mentor)	Director, Managerial level

The TOEFL score is assessed based on the acquisition of the TOEFL trainer test results, as evidenced by submitting the TOEFL test results that have been carried out. The TOEFL score assessment criteria based on the level is a minimum of 525 for Level 1, while other levels must be above 550.

The number of Module Developed is assessed based on the number of modules developed by the trainer. The assessment criteria for the number of modules developed based on the level can be seen in Table 13.

Table 13 Number of Module Developed Assessment Criteria

Level	Proficiency Level	Number of Module Developed
1	Fundamental Awareness (Successor)	0
2	Novice (Co-facilitator)	Min. 1
3	Capable (Facilitator)	Min. 2
4	Excellent (Role Model)	3-4
5	Expert (Mentor)	> 5

Certification is assessed based on the certification of the expertise possessed by the trainer, as evidenced by the submission of a certificate that has been fulfilled. This certification assessment is only required at Level 4-5.

After evaluating the six components of the assessment criteria, the total score obtained by the trainer will be calculated as a level determination.

Table 14 Trainer Level Assessment Score Criteria

Level	Proficiency Level	Range Score
1	Fundamental Awareness (Successor)	0-100
2	Novice (Co-facilitator)	101-185
3	Capable (Facilitator)	186-270
4	Excellent (Role Model)	271-370
5	Expert (Mentor)	371-455

5. CONCLUSION

Based on the results of the mapping between the categories in the ARCS model and the MDA framework elements, it can be concluded that the related Mechanics and Aesthetics elements in this research are as follows:

- Relevant Mechanics game elements:
 - Player progress: Achievements (Badges, Rewards), Points (Score), Leaderboard, Level System, and Progress Bar.
 - Mission/Task: Mission (Task).
 - Additional features: Tutorial, Feedback, and Chat.
- Relevant Aesthetic Elements: Expression, Challenge, and Fantasy.

The results of the mapping of the ARCS model and the MDA framework elements, the relevant gamification elements are expected to answer the

problems that occur, which through the ranking of trainers' performance to assist administrators making the right trainer assignment for a training. These results are expected to be guideline and priority elements to be applied in designing and developing an instructor management system.

6. LIMITATION AND FUTURE RESEARCH

The limitation of this study is limited to analyzing the elements of gamification that are relevant in assessing and ranking the performance of trainers. For further research, it is suggested to examine other processes, such as recruiting trainers or developing trainer skills using the gamification system. The administrator will manage subsequent content development.

REFERENCES:

- [1] D. S. Riatmaja, M. Suyanto, Muafi, and W. Prajogo, "Motivational affordances to gamification in workplace: A literature review and proposed framework," *Test Eng. Manag.*, vol. 82, no. 8536, pp. 8536–8559, 2020.
- [2] A. Ferriz-Valero, O. Østerlie, S. G. Martínez, and ..., "Gamification in physical education: Evaluation of impact on motivation and academic performance within higher education," *Int. J. ...*, 2020, [Online]. Available: <https://www.mdpi.com/749076>.
- [3] Z. Turan, Z. Avinc, K. Kara, and Y. Goktas, "Gamification and education: Achievements, cognitive loads, and views of students," *Int. J. Emerg. Technol. Learn.*, vol. 11, no. 7, pp. 64–69, 2016, doi: 10.3991/ijet.v11i07.5455.
- [4] D. Johnson, S. Deterding, K. A. Kuhn, A. Staneva, S. Stoyanov, and L. Hides, "Gamification for health and wellbeing: A systematic review of the literature," *Internet Interv.*, vol. 6, no. February 2017, pp. 89–106, 2016, doi: 10.1016/j.invent.2016.10.002.
- [5] L. Hassan, H. Jylhä, M. Sjöblom, and J. Hamari, "Flow in VR: A study on the relationships between preconditions, experience and continued use," *Proc. Annu. Hawaii Int. Conf. Syst. Sci.*, vol. 2020-Janua, no. January, pp. 1196–1205, 2020, doi: 10.24251/hicss.2020.149.
- [6] Y. Feng, H. Jonathan Ye, Y. Yu, C. Yang, and T. Cui, "Gamification artifacts and

- crowdsourcing participation: Examining the mediating role of intrinsic motivations,” *Comput. Human Behav.*, vol. 81, pp. 124–136, 2018, doi: 10.1016/j.chb.2017.12.018.
- [7] M. Pereira, M. Oliveira, A. Vieira, R. M. Lima, and L. Paes, “The gamification as a tool to increase employee skills through interactivities work instructions training,” *Procedia Comput. Sci.*, vol. 138, no. January, pp. 630–637, 2018, doi: 10.1016/j.procs.2018.10.084.
- [8] E. D. Mekler, F. Brühlmann, A. N. Tuch, and K. Opwis, “Towards understanding the effects of individual gamification elements on intrinsic motivation and performance,” *Comput. Human Behav.*, vol. 71, pp. 525–534, 2017, doi: 10.1016/j.chb.2015.08.048.
- [9] C. Perryer, N. A. Celestine, B. Scott-Ladd, and C. Leighton, “Enhancing workplace motivation through gamification: Transferrable lessons from pedagogy,” *Int. J. Manag. Educ.*, vol. 14, no. 3, pp. 327–335, 2016, doi: 10.1016/j.ijme.2016.07.001.
- [10] M. Fathian, H. Sharifi, E. Nasirzadeh, and ..., “Towards a comprehensive methodology for applying enterprise gamification,” *Decis. Sci.* ..., 2021, [Online]. Available: <http://growingscience.com/beta/dsl/4825-towards-a-comprehensive-methodology-for-applying-enterprise-gamification.html>.
- [11] A. Shpakova, V. Dörfler, and J. MacBryde, “Changing the game: a case for gamifying knowledge management,” *World J. Sci. Technol. Sustain. Dev.*, vol. 14, no. 2/3, pp. 143–154, 2017, doi: 10.1108/wjstd-01-2017-0002.
- [12] G. P. Kusuma, E. K. Wigati, Y. Utomo, and L. K. Putera Suryapranata, “Analysis of Gamification Models in Education Using MDA Framework,” *Procedia Comput. Sci.*, vol. 135, pp. 385–392, 2018, doi: 10.1016/j.procs.2018.08.187.
- [13] L. Husniah, F. Fannani, A. S. Kholimi, and A. E. Kristanto, “Game Development to Introduce Indonesian Traditional Weapons using MDA Framework,” *Kinet. Game Technol. Inf. Syst. Comput. Network, Comput. Electron. Control*, vol. 4, no. 1, pp. 27–36, 2018, doi: 10.22219/kinetik.v4i1.713.
- [14] J. Friedrich, M. Becker, F. Kramer, M. Wirth, and M. Schneider, “Incentive design and gamification for knowledge management,” *J. Bus. Res.*, vol. 106, no. February, pp. 341–352, 2020, doi: 10.1016/j.jbusres.2019.02.009.
- [15] F. L. Khaleel, N. S. Ashaari, T. S. M. T. Wook, and A. Ismail, “Gamification elements for learning applications,” *Int. J. Adv. Sci. Eng. Inf. Technol.*, vol. 6, no. 6, pp. 868–874, 2016, doi: 10.18517/ijaseit.6.6.1379.
- [16] A. M. Toda *et al.*, “A taxonomy of game elements for gamification in educational contexts: Proposal and evaluation,” *Proc. - IEEE 19th Int. Conf. Adv. Learn. Technol. ICALT 2019*, vol. 2161–377X, no. September, pp. 84–88, 2019, doi: 10.1109/ICALT.2019.00028.
- [17] R. Hunicke, M. Leblanc, and R. Zubek, “MDA: A formal approach to game design and game research,” *AAAI Work. - Tech. Rep.*, vol. WS-04-04, no. August, pp. 1–5, 2004.
- [18] K. Li and D. R. Moore, “Motivating Students in Massive Open Online Courses (MOOCs) Using the Attention, Relevance, Confidence, Satisfaction (ARCS) Model,” *J. Form. Des. Learn.*, vol. 2, no. 2, pp. 102–113, 2018, doi: 10.1007/s41686-018-0021-9.
- [19] X. Zhou and Y. He, “Study on Application of ARCS Motivational Model on Cross-Border E-Commerce Course Design,” *Proc. Int. Conf. Ment. Heal. Humanit. Educ. (ICMHHE 2020)*, vol. 433, no. Icmhhe, pp. 288–293, 2020, doi: 10.2991/assehr.k.200425.065.
- [20] C. T. Si Xue, “A Literature Review on Knowledge Management in Organizations,” *Res. Bus. Manag.*, vol. 4, no. 1, p. 30, 2017, doi: 10.5296/rbm.v4i1.10786.