

The Effect of Gamification Implementation in the Learning Management System (LMS) Platform on Perceived Usefulness, Learning Motivation, and Engagement in PNM Jambi Employees

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Abstract: Digital learning transformation through Learning Management Systems (LMS) does not automatically ensure employee engagement and learning motivation, making gamification relevant for creating engaging learning experiences. This study aims to examine the effects of gamification on perceived usefulness, learning motivation, and engagement, while testing the mediating roles of perceived usefulness and learning motivation among employees of PT Permodalan Nasional Madani Jambi Branch. This quantitative study surveyed 84 employees using the SINAR LMS. Data were collected through Likert-scale questionnaires and analyzed using PLS-SEM with SmartPLS 4.0. The results show that gamification has positive and significant effects on perceived usefulness and engagement but has no significant effect on learning motivation. Perceived usefulness does not significantly affect learning motivation or engagement, whereas learning motivation positively and significantly affects engagement. Perceived usefulness does not mediate the effect of gamification on learning motivation, while perceived usefulness and learning motivation fail to serially mediate the effect of gamification on engagement. These findings indicate that gamification is more effective in directly strengthening employee engagement in organizational digital learning.

Keywords: Gamification, Perceived Usefulness, Learning Motivation, Engagement, Learning Management System.

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I. INTRODUCTION

The development of digital technology has encouraged organizational transformation, including in the management and development of human resources (HR), so that organizational learning has become increasingly important to improve employee competence and adaptability. One form of such transformation is utilization *Learning Management System* (LMS) that allows companies to provide materials, monitor participant progress, conduct evaluations, and document competencies in an integrated manner without being limited by space and time. However, the existence of an LMS does not automatically guarantee the effectiveness of learning because a system that is only used as a medium for delivering material has the potential to create a passive and task-oriented learning process. The effectiveness of digital learning also requires motivation and involvement (*engagement*) users so that technology can truly produce meaningful learning experiences (Erlangga et al. 2023; Ahmed, El-Sabagh, in

Elbourhamy 2025). In perspective *Technology Acceptance Model* (TAM), the condition is related to *perceived usefulness*, i.e. the user's belief that technology can improve the effectiveness and performance of his or her activities [3].

The problem of user involvement in digital learning becomes increasingly relevant when it is associated with low *employee engagement* globally and the emergence of the phenomenon *quiet quitting*, when employees tend to meet minimum demands without showing optimal engagement. This condition is also a concern for PT Permodalan Nasional Madani (PNM), which has implemented LMS *One in Space* since February 2018 as a means of independent learning for employees. At PNM Jambi Branch, the need for digital learning is increasing as the number of employees increases from 1,063 people in 2024 to 1,146 people in 2025. Although the LMS is available, the results of initial observations of the SINAR (Monday Learning) program show a tendency to delay the completion of modules, with a work rate of around 90% in the

initial period, increasing to 95% when the deadline approaches, and only reaching 100% on the last day, even partially completed about an hour before access is closed.

One potential approach to answer this problem is *gamification*, i.e. the application of game elements and mechanics in a non-game context to increase user motivation and engagement. Implementation *gamification* in digital learning can be realized through *challenge*, *achievement*, *feedback*, *progress*, and *reward*, as well as elements such as *points*, *badges*, *leaderboards*, and *certificates* [4], [5], [6]. Previous research has shown that *gamification* have a positive impact on user motivation and engagement, although their effectiveness may differ based on user characteristics and the context of their implementation [7]. The integration of *gamification* in the LMS is also related to increasing motivation through the fulfillment of psychological needs that can be explained through *Self-Determination Theory* [8], as well as contributing to increased motivation and user engagement in digital learning [9]. However, previous research still leaves a gap. *Gamification* has been shown to increase motivation, but the mechanism in an organizational setting has not been widely explained (Alzahrani in Alhalafawy 2023) The study of the fulfillment of psychological needs still focuses a lot on students [11] *perceived usefulness* has been known to influence the use of LMS but has not been widely associated with *engagement* [12] whereas the relationship *gamification* with *engagement* still open testing opportunities through the dual mediation mechanism or *serial mediation* [13].

Based on previous research studies, this study found several types of research gaps (*research gap*), namely *theoretical gap*, *relationship gap*, and *contextual gap*. *Theoretical gap* It can be seen from the limited research that integrates *Technology Acceptance Model* From (FULL) *Self-Determination Theory* (SDT) in explaining the implementation *gamification*. *Relationship gap* shown by the limited testing of mediation mechanisms *perceived usefulness* and learning motivation, especially through *serial mediation* against *engagement*. Meanwhile, *contextual gap* arise due to research *gamification* It is still dominated by the context of formal education and is relatively limited to the organizational environment. Therefore, *novelty* This research lies in the integration of TAM and SDT, testing *serial mediation* through *perceived usefulness* and learning motivation, as well as the application of the model to the LMS of PT PNM Jambi Branch employees.

Based on the background of the above problems, it can be determined that this study aims to analyze the influence of implementation *gamification* in the *Learning Management System* (LMS) against *perceived usefulness*, motivation to learn, and *engagement* employees of PT Permodalan Nasional Madani (PNM) Jambi Branch. In addition, this study aims to analyze the influence of *perceived usefulness* on learning motivation and the influence of learning motivation on *engagement*. This study also examined the role of *perceived usefulness* in mediating the influence of implementation *gamification* On learning motivation, the role of learning motivation in mediating the influence of implementation *gamification* against *engagement*, as well as the role of

perceived usefulness and motivation to learn as a mediator in order (*serial mediation*) in the relationship between the implementations *gamification* and *engagement* employees.

II. LITERATURE REVIEW

➤ *Technology Acceptance Model (TAM)*

Technology Acceptance Model (TAM) is a theory developed by Davis (1989) to explain the factors that affect the acceptance and use of technology by individuals. TAM explains that the acceptance of technology is mainly influenced by *perceived usefulness* and *perceived ease of use*, where *perceived usefulness* indicates a person's level of confidence that the use of a technology can improve the performance or effectiveness of his or her activities. In context *Learning Management System (LMS)*, TAM can be used to explain how employees' perception of the benefits of the system affects their response to digital learning. The greater the perceived benefits of an LMS, such as ease of obtaining materials, increased learning effectiveness, and support for competency development, the more positive the employee's response to its use. Therefore, this study uses TAM as a foundation to explain the formation of *perceived usefulness* from the implementation *gamification* and its role in encouraging learning motivation and *engagement* employees.

➤ *Self-Determination Theory (SDT)*

Self-Determination Theory (SDT) is a motivation theory developed by (Ryan in Deci 2020) to explain how individual motivation is formed and influences behavior in carrying out an activity. SDT emphasizes three basic psychological needs, namely *autonomy* (*autonomy*), *competence* (*competence*), and *connectivity* (*relatedness*), which if fulfilled can encourage the formation of stronger and more sustainable motivation. In LMS-based learning, the *gamification* such as *points*, *badges*, *challenges*, *feedback*, *rewards*, and *progress* can provide an experience of achievements, challenges, and feedback that supports the psychological needs of users and increases motivation to learn. This motivation can further encourage employees to be more active, consistent, and involved in learning activities. Thus, this study uses SDT as a theoretical foundation to explain the psychological mechanisms that link implementation *gamification*, motivation to learn, and *engagement* employees in the use of LMS.

➤ *Gamification*

Gamification is the application of game elements, mechanisms, and principles into non-game contexts with the aim of increasing individual motivation, participation, and involvement in an activity. In the context of *Learning Management System (LMS)*, *gamification* can be applied through various elements such as *points*, *badges*, *leaderboards*, *challenges*, *rewards*, *feedback*, and *visualization progress* to create a more engaging and interactive learning experience. The application of these elements can provide a stimulus for users to complete learning activities while encouraging more active involvement in the learning process. (Ouafae Benzizoune to Mounir Chibi 2024) shows that *gamification* can increase motivation, *engagement*, and user satisfaction, whereas [16] found that the use of elements such as *points* and *leaderboard* has a positive influence on learning motivation.

Thus, *gamification* In this study, it is understood as the implementation of game elements and mechanisms in LMS aimed at creating a more interesting, motivating, and able to increase employee engagement.

➤ Perceived Usefulness

Perceived usefulness is the level of individual belief that the use of a technology or system can provide benefits and increase effectiveness in carrying out certain activities. This concept is one of the main constructs in Technology Acceptance Model (TAM), where Davis (1989) explains that a person tends to accept and use technology when they believe that it is capable of improving their performance. In the context of LMS, perceived usefulness Describe the extent to which employees assess that the learning system can provide benefits, such as facilitating access to materials, increasing learning effectiveness, assisting competency development, and supporting work implementation. (Eagles in Fuchs 2022) shows that perceived usefulness has a positive role in shaping user attitudes and increasing the impact of perceived learning. Therefore, perceived usefulness In this study, it is defined as the employee's perception of the level of benefits obtained from the use of LMS in supporting the learning process and competency development.

➤ Learning Motivation

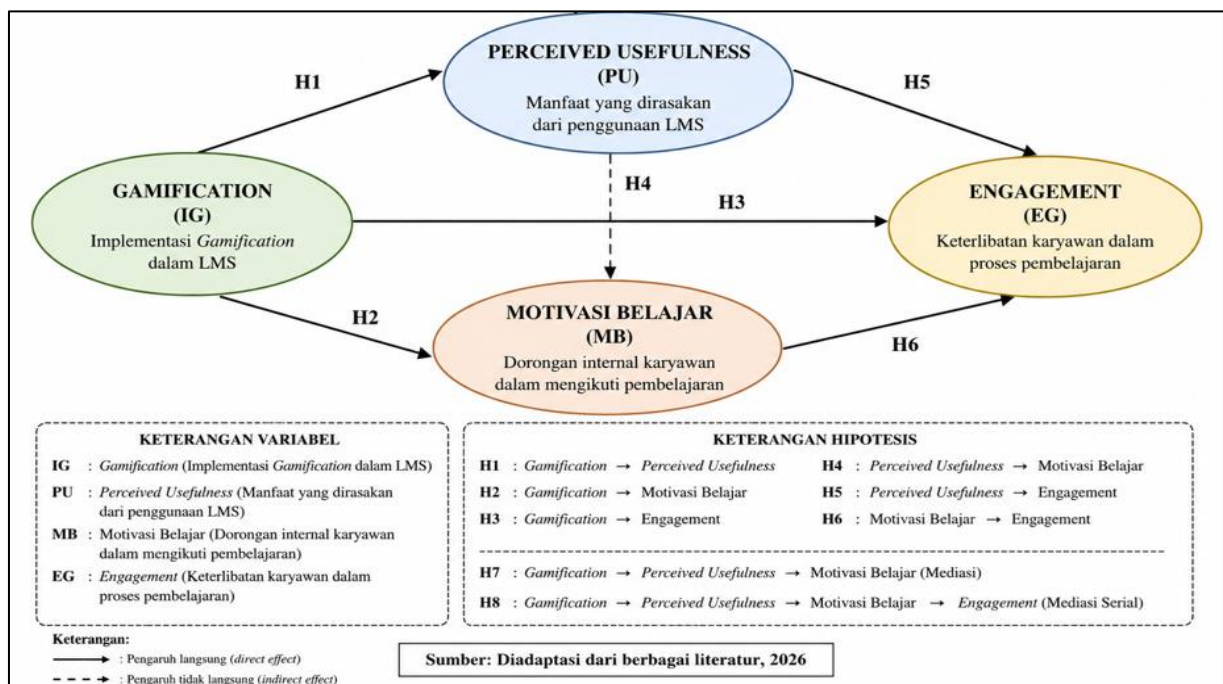
Learning motivation is an internal and external drive that moves individuals to engage, maintain efforts, and achieve goals in the learning process. In perspective Self-Determination Theory (SDT), motivation can develop when the activities carried out are able to meet the psychological needs of the individual, especially the need for autonomy (autonomy), competence (competence), and connectivity (relatedness). In

LMS-based learning, learning motivation is reflected through employees' willingness to participate in learning activities, improve knowledge and competence, complete materials, and maintain learning consistency without relying solely on organizational obligations. [18] shows that gamification-based learning can increase learning motivation, while [19] found that gamification In training activities, it is able to increase participants' motivation to learn. Thus, learning motivation in this study is understood as an encouragement that causes employees to actively and continuously follow the learning process through LMS to improve their knowledge and competence.

➤ Engagement

Engagement In the context of learning, it is the level of active involvement of individuals cognitively, emotionally, and behaviorally during the learning process. Involvement is not only shown through the presence or completion of the material, but also through the attention, enthusiasm, active participation, perseverance, and commitment of the individual in carrying out learning activities. In the use of LMS, engagement This can be seen from the intensity of employees participating in learning activities, responding to materials, actively completing tasks, and maintaining engagement without being solely driven by deadlines. Somova and [20] found that the implementation of gamification able to improve engagement users significantly, while (2024) shows that gamification can encourage engagement through improved user satisfaction and experience. Therefore, engagement In this study, it is defined as the level of active involvement of employees in the learning process through LMS which is reflected in attention, participation, enthusiasm, and consistency in participating in learning activities.

➤ Frame of Mind



Source: Researcher-Processed Data (2026)

Fig 1 Research Framework

Based on Figure 1, the research framework describes the relationship between the implementation *gamification* in *Learning Management System* (LMS), *perceived usefulness*, motivation to learn, and *engagement* employees. Implementation *gamification* is thought to have a direct effect on *perceived usefulness*, motivation to learn, and *engagement*, while *perceived usefulness* is thought to affect learning motivation and *engagement*, as well as learning motivation is estimated to affect *engagement*. In addition to these direct influences, the research model also examines indirect influences through the role of mediation *perceived usefulness* on the relationship *gamification* with learning motivation, as well as serial mediation mechanisms *gamification* → *perceived usefulness* → motivation to learn → *engagement*. Thus, this frame of thought explains that the increase in *engagement* Employees in learning can not only be formed directly through implementation *gamification*, but also through increasing the perception of LMS benefits and gradual employee learning motivation.

III. RESEARCH METHODS

This study uses a quantitative approach with the type of *explanatory research* and survey methods to explain causal relationships between variables through hypothesis testing (Sigh, 2019). The research will be carried out in 2026 at PT Permodalan Nasional Madani (PNM) Jambi Branch with an employee analysis unit who participates in learning through LMS in the SINAR (Monday Learning) program. The research variables include *gamification* as an independent variable, *perceived usefulness* and learning motivation as a mediation variable, and *engagement* employee as a dependent variable. Measurement of variables using a five-point Likert scale with an indicator *gamification* which refers to the game elements in the LMS (Sigh, 2017), *perceived usefulness* based on the perception of the benefits of technology (Davis, 1989), learning motivation based on the dimensions *autonomy*, *competence*, and *relatedness* (Deci & Ryan, 2000), and *engagement* based on behavioral, emotional, and cognitive dimensions. The study population amounted to 84 active employees using LMS, while the determination of respondents used *purposive sampling* based on the criteria of active employees, having participated in learning through the LMS, and using an LMS that implements the *gamification* [24].

The research data consists of primary data obtained through the distribution of questionnaires and secondary data sourced from PNM's internal reports and relevant literature

(Sigh, 2021). The questionnaire was distributed online using *Google Form* with a five-point Likert scale to measure respondents' attitudes and perceptions, as well as tested for validity and reliability before being used in the analysis. The data was further analyzed using *Structural Equation Modeling–Partial Least Squares* (SEM-PLS) with SmartPLS because it is suitable for analyzing complex relationships and mediating effects and does not require strict data normality. Evaluation *outer model* include convergent validity, discriminant validity, and construct reliability, whereas *inner model* evaluated through R^2 , *path coefficient*, and f^2 . Hypothesis testing is carried out through *bootstrapping* with criteria *t-statistic* > 1.96 and *p-value* < 0.05, including direct and indirect influence testing to identify mediation mechanisms between research variables [26].

IV. RESULTS AND DISCUSSION

PT Permodalan Nasional Madani (PNM) is a State-Owned Enterprise (SOE) that plays a role in expanding access to financing while increasing the capacity of MSME actors through financing and business assistance services. PNM Jambi Branch carries out this function through the ULaMM and Mekaar networks spread across the Jambi Province area and is supported by digital-based human resource competency development. One of the forms is the utilization *Learning Management System* (LMS) through the SINAR (Learning Monday) program for Branch Office and ULaMM employees to provide training materials, assessments, evaluations, certifications, and monitoring of learning progress flexibly. SINAR LMS also implements *gamification* through elements such as *reward*, *badge*, *challenge*, *achievement*, and *learning progress* to create a more engaging learning experience and increase employee participation. However, its implementation still shows a tendency for employees to complete modules towards the deadline, which indicates that learning is not yet fully sustainable.

➤ Respondent Characteristics Analysis

The characteristics of the respondents in this study were used to provide an overview of the profiles of 84 employees of PT Permodalan Nasional Madani (PNM) Jambi Branch who were respondents to the study. These characteristics were grouped based on gender and work unit, so that the composition of respondents who used LMS SINAR (Monday Learning) could be known. A summary of the characteristics of the respondents is presented in Table 4.1 as follows:

Table 1 Demographic Characteristics of Respondents

Table 1 Demographic Characteristics of Respondents				
No.	Features	Category	Number (People)	Percentage (%)
Gender				
1	Gender	Male	58	69,05
2	Gender	Women	26	30,95
	Quantity		84	100,00
Work Unit				
1	Work Unit	Branch Office	48	57,14
2	Work Unit	ULaMM	36	42,86
	Quantity		84	100,00

Source: Survey Results Data (2026)

Based on Table 1, of the 84 respondents who participated in the study, as many as 58 people or 69.05% were male and 26 people or 30.95% were female, so that the respondents were dominated by male employees. Based on work units, as many as 48 respondents or 57.14% came from Branch Offices, while 36 respondents or 42.86% came from ULaMM. The composition shows that the research respondents have included employees from both work units that are targeted by the use of SINAR LMS, although the proportion of respondents from Branch Offices is larger than ULaMM. Thus, the characteristics of the respondents provide an overview of the SINAR LMS users which are the basis for analyzing the implementation

gamification, Perceived Usefulness, motivation to learn, and *Engagement* employees of PT PNM Jambi Branch.

➤ Descriptive Statistical Analysis of Variables

Descriptive statistics were used to provide an overview of the tendencies of 84 respondents' answers to all indicators of research variables, namely *Gamification* (IG), *Engagement* (EG), *Learning Motivation* (MB), and *Perceived Usefulness* (PU). Analysis is carried out based on the value *mean* and standard deviation on the Likert scale of 1–5. The descriptive statistical results of each indicator and the average of each variable are presented in Table 2 below:

Table 2 Descriptive Statistics of Research Variable Items

Variable	Indicator	Scale	N	Mean	Standard Deviation	Category
Gamification (IG)	IG1	1–5	84	4.18	0.60	High
	IG2	1–5	84	4.21	0.64	High
	IG3	1–5	84	4.24	0.53	High
	IG4	1–5	84	4.23	0.59	High
	IG5	1–5	84	4.25	0.58	High
	IG6	1–5	84	4.23	0.68	High
	IG7	1–5	84	4.20	0.55	High
	IG8	1–5	84	4.21	0.60	High
	IG9	1–5	84	4.21	0.79	High
	IG10	1–5	84	4.29	0.69	High
	IG Average	1–5	84	4.22	0.63	High
Engagement (EG)	EG1	1–5	84	4.24	0.55	High
	EG2	1–5	84	4.24	0.53	High
	EG3	1–5	84	4.19	0.59	High
	EG4	1–5	84	4.12	0.63	High
	EG5	1–5	84	4.20	0.53	High
	EG6	1–5	84	4.23	0.59	High
	EG Average	1–5	84	4.20	0.57	High
Learning Motivation (MB)	MB1	1–5	84	4.17	0.66	High
	MB2	1–5	84	4.19	0.61	High
	MB3	1–5	84	4.21	0.56	High
	MB4	1–5	84	4.12	0.63	High
	MB5	1–5	84	4.14	0.64	High
	MB6	1–5	84	4.18	0.58	High
	MB Average	1–5	84	4.17	0.61	High
Perceived Usefulness (PU)	PU1	1–5	84	4.10	0.72	High
	PU2	1–5	84	4.10	0.69	High
	PU3	1–5	84	4.12	0.70	High
	PU4	1–5	84	4.15	0.74	High
	PU5	1–5	84	4.18	0.75	High
	PU Average	1–5	84	4.13	0.72	High

Source: Primary data processed using SmartPLS 4.0 (2026)

Based on Table 2, all research variables are in the high category with an average value *Gamification* by 4.22, *Engagement* 4.20, *Learning Motivation* of 4.17, and *Perceived Usefulness* by 4.13. *Gamification* obtained the highest average, indicating that respondents gave a positive rating to the implementation of gamification elements in the LMS, while *Perceived Usefulness* has the lowest average although it remains in the high category. At the indicator level, the *mean* the highest value was found in IG10 at 4.29, while the lowest value was found in PU1 and PU2 at 4.10 respectively. Overall, the results showed that respondents had a positive perception

of implementation *gamification* and benefits of LMS and demonstrate a level of motivation to learn and *engagement* high in participating in digital learning.

➤ Data Analysis

• Outer Model Test Results

The next stage is to analyze the data using the *Structural Equation Modeling* (SEM) based on variance with an approach *Partial Least Squares* (PLS) through SmartPLS software version 4.1.1.4. This method is used to analyze the

relationships between variables in the research model, namely *Gamification*, *Perceived Usefulness*, Learning Motivation, and *Engagement*, including the direct and indirect influence

between these variables. The latent variable model used as the basis in the SEM-PLS analysis process is presented in Figure 2.

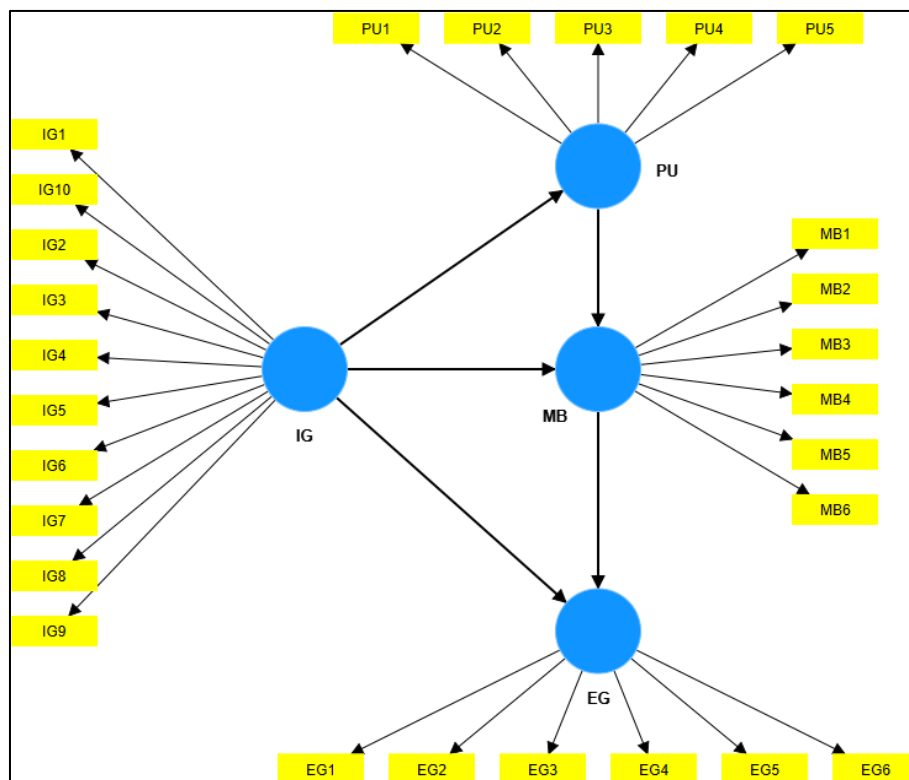


Fig 2 Latent Variable Model Research

After the research model is established, the testing process is carried out through two main stages, namely the evaluation of the measurement model (*outer model*) and structural models (*inner model*). Evaluation *outer model* aims to ensure that the indicator is able to measure constructs validly and reliably through testing *convergent validity*, *discriminant validity*, and

construct reliability. Next, evaluate *inner model* used to assess the model's ability to explain the relationship between latent variables through the value of R^2 , the path coefficient (*path coefficient*), as well as the degree of significance of the relationship, including testing for direct and indirect influences in the research model.

Table 3 Results of Outer Loading Convergent Validity Test

Variable	Indicator	Outer Loading	Status
Engagement	EG1	0.872	Valid
	EG2	0.883	Valid
	EG3	0.850	Valid
	EG4	0.868	Valid
	EG5	0.915	Valid
	EG6	0.855	Valid
Gamification	IG1	0.811	Valid
	IG2	0.788	Valid
	IG3	0.802	Valid
	IG4	0.869	Valid
	IG5	0.854	Valid
	IG6	0.829	Valid
Learning Motivation	IG7	0.921	Valid
	IG8	0.828	Valid
	IG9	0.771	Valid
	IG10	0.785	Valid
	MB1	0.857	Valid
	MB2	0.764	Valid
	MB3	0.905	Valid

	MB4	0.868	Valid
	MB5	0.863	Valid
	MB6	0.889	Valid
Perceived Usefulness	PU1	0.921	Valid
	PU2	0.933	Valid
	PU3	0.894	Valid
	PU4	0.927	Valid
	PU5	0.885	Valid

Source: Primary data processed using SmartPLS 4.0 (2026)

Based on the results of data processing using SmartPLS 4.0 in Table 3, all indicators in the construct *Engagement*, *Gamification*, *Learning Motivation*, and *Perceived Usefulness* have met the criteria *convergent validity* because it has value *outer loading* above 0.70 as recommended criteria by Hair et al. (2022). Value *outer loading* on *Engagement* is in the range of 0.850–0.915, *Gamification* 0.771–0.921, *Learning Motivation* 0.764–0.905, and *Perceived Usefulness* by 0.885–

0.933. Although there is a variation in the strength of the indicators in reflecting each construct, all of these values still exceed the required minimum. Thus, there are no indicators that need to be eliminated, so that the measurement model is declared to meet convergent validity and is suitable for continuing to test discriminant validity, construct reliability, and structural model evaluation (*inner model*).

Table 4 AVE Convergent Validity Test Results

Variabel	AVE	Ket
Engagement	0,764	Valid
Gamification	0,684	Valid
Learning Motivation	0,738	Valid
Perceived Usefulness	0,832	Valid

Source: Primary data processed using SmartPLS 4.0 (2026)

Based on the results of data processing using SmartPLS 4.0 in Table 4, all research constructs have met the criteria *convergent validity* because it has value *Average Variance Extracted* (AVE) greater than 0.50, according to the criteria of Hair et al. (2022). AVE value on the variable *Engagement* by 0.764, *Gamification* 0.684, *Learning Motivation* of 0.738, and

Perceived Usefulness of 0.832. The results show that each construct is able to explain more than 50% of the variance of the indicators that make it up, with *Perceived Usefulness* have the highest AVE score and *Gamification* has the lowest value, but remains above the required limit.

Table 5 Results of Cross-Loading Discriminant Validity Tes

Indicator	Engagement	Gamification	Learning Motivation	Perceived Usefulness
EG1	0.872	0.719	0.810	0.674
EG2	0.883	0.751	0.695	0.558
EG3	0.850	0.779	0.780	0.672
EG4	0.868	0.706	0.807	0.681
EG5	0.915	0.789	0.760	0.698
EG6	0.855	0.756	0.673	0.588
IG1	0.648	0.811	0.562	0.551
IG2	0.681	0.788	0.566	0.435
IG3	0.685	0.802	0.602	0.580
IG4	0.735	0.869	0.706	0.700
IG5	0.765	0.854	0.671	0.590
IG6	0.709	0.829	0.581	0.780
IG7	0.817	0.921	0.682	0.664
IG8	0.803	0.828	0.752	0.690
IG9	0.605	0.771	0.536	0.735
IG10	0.621	0.785	0.587	0.812
MB1	0.765	0.625	0.857	0.656
MB2	0.676	0.557	0.764	0.462
MB3	0.777	0.634	0.905	0.658
MB4	0.780	0.658	0.868	0.682
MB5	0.692	0.667	0.863	0.687
MB6	0.759	0.760	0.889	0.719
PU1	0.652	0.707	0.691	0.921

PU2	0.712	0.784	0.691	0.933
PU3	0.655	0.709	0.656	0.894
PU4	0.701	0.721	0.697	0.927
PU5	0.652	0.709	0.707	0.885

Source: Primary data processed using SmartPLS 4.0 (2026)

Based on test results *cross loading* In Table 5, all indicators have met the criteria *discriminant validity* because it has value *loading* higher in the original construct compared to other constructs, according to the criteria of Hair et al. (2022). Indicators *Engagement* (EG1–EG6) has a value of *loading* by 0.850–0.915, *Gamification* (IG1–IG10) of 0.771–0.921, *Learning Motivation* (MB1–MB6) of 0.764–0.905, and *Perceived Usefulness* (PU1–PU5) of 0.885–0.933 in their

respective constructs. These results show that each indicator is able to represent and distinguish the construct it measures from other constructs in the research model. Thus, all constructs are declared to meet the discriminant validity based on the test *cross loading*, so that the measurement model is feasible to proceed at the stage of construct reliability testing and structural model evaluation (*inner model*).

Table 6 Construct Reliability Test Results

Variabel	Cronbach's Alpha	Composite Reliability	Remarks
Engagement	0,938	0,939	Reliabel
Gamification	0,948	0,951	Reliabel
Learning Motivation	0,928	0,932	Reliabel
Perceived Usefulness	0,949	0,950	Reliabel

Source: Primary data processed through SmartPLS 4.0 (2026)

Based on Table 6, all research constructs have met the reliability criteria because they have a value of *Cronbach's Alpha* and *Composite Reliability* above 0.70 as recommended by Hair et al. (2022). Value *Cronbach's Alpha* is in the range of 0.928–0.949, while the value of *Composite Reliability* ranges from 0.932–0.951. *Perceived Usefulness* has value *Cronbach's Alpha* highest by 0.949, while *Gamification* Earn

Grades *Composite Reliability* 0.951. The results show that the indicators in the construct *Engagement*, *Gamification*, *Learning Motivation*, and *Perceived Usefulness* has excellent internal consistency. Thus, the entire construct is declared reliable and suitable for use in structural model testing (*inner model*).

Table 7 Model Fit Test Results

Parameter	Saturated Model	Estimated Model
SRMR	0.074	0.074
d ULS	2.054	2.063
d G	2.898	2.897
Chi-Square	992.031	992.665
NFI	0.681	0.680

Source: Primary data processed through SmartPLS 4.0 (2026)

Based on test results *Model Fit* using SmartPLS 4.0 in Table 7, SRMR values in *Saturated Model* and *Estimated Model* each of 0.074, so that it has met the criteria *good fit* because it is below the limit of 0.08 as recommended by Hair et al. (2022). Meanwhile, the values of d_ULS, d_G, and *Chi-square* used as supporting information in evaluating model non-conformance and is generally assessed through procedures *bootstrapping*. The NFI value is 0.681 on *Saturated Model* and 0.680 on *Estimated Model* indicates that the level of model suitability has not reached the ideal value of 0.90. However, based on the SRMR value that has met the criteria and is supported by the fulfillment of the validity and reliability of the construct, the research model can be declared to have adequate

suitability and is suitable to be continued in the evaluation of the structural model (*inner model*) as well as hypothesis testing.

• Inner Model Test Results

Testing *R-Square* (R^2) is used to determine the ability of independent variables to explain variations in dependent or endogenous variables in structural models. The higher the R^2 value, the greater the ability of predictive constructs to explain the analyzed endogenous constructs. In this study, R^2 testing was carried out on three endogenous variables, namely *Engagement*, *Learning Motivation*, and *Perceived Usefulness*, as presented in Table 8.

Table 8 R-Square Test Results (R^2)

Dependent Variable	R-Square	R-Square Adjusted
Engagement	0,844	0,840
Learning Motivation	0,638	0,629
Perceived Usefulness	0,634	0,630

Source: Primary data processed through SmartPLS 4.0 (2026)

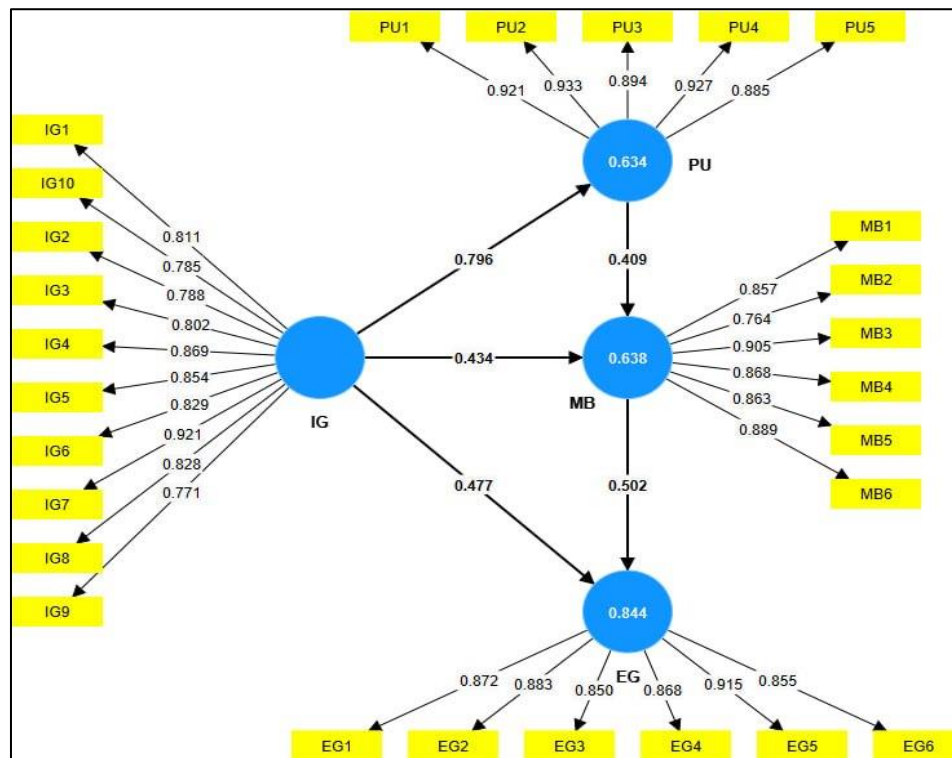


Fig 3 PLS SEM Algorithm Model Output

Based on Table 8 value R^2 Engagement by 0.844 indicates that 84.4% variation Engagement can be explained by the predictor variables in the model, while the remaining 15.6% are influenced by factors other than the research model. Learning Motivation obtained an R^2 value of 0.638, which means that 63.8% of the variation can be explained by the construct that affects it in the model, while 36.2% is explained by other

factors. Furthermore, *Perceived Usefulness* has an R^2 value of 0.634, so that 63.4% of the variation can be explained by *Gamification*, while the remaining 36.6% came from factors outside the model. Overall, the value showed that the model had strong explanatory abilities, especially in explaining Engagement employees on the use of the SINAR LMS.

Table 9 Effect Size (f^2) Test Results

Indicator	Engagement	Gamification	Learning Motivation	Perceived Usefulness
Engagement	—	—	—	—
Gamification	0.616	—	0.190	1.734
Learning Motivation	0.683	—	—	—
Perceived Usefulness	—	—	0.169	—

Source: Primary data processed through SmartPLS 4.0 (2026)

Referring to Hair et al. (2022), the value of effect size (f^2) is categorized as small at 0.02, medium at 0.15, and large at 0.35 or more. Based on the test results in Table 4.16, *Gamification* has a great effect on *Engagement* ($f^2 = 0.616$) then *Perceived Usefulness* ($f^2 = 1.734$), as well as a moderate effect on *Learning Motivation* ($f^2 = 0.190$). *Learning Motivation* also showed a large effect on *Engagement* with an f^2 value of 0.683,

while *Perceived Usefulness* gave a moderate effect on *Learning Motivation* of 0.169. These findings show that *Gamification* has a very strong contribution, especially in shaping *Perceived Usefulness*, while other structural relationships show moderate to large effect sizes. Thus, exogenous constructs in the model make a meaningful contribution in explaining changes in the endogenous constructs of the study.

Table 10 Path Coefficient Bootstrapping Results for Direct Effects

Hypothesis	Path Coefficient	Original Sample	T Statistics	P Values	Decision
H1	Gamification → Perceived Usefulness	0.796	13.229	0.000	Accepted
H2	Gamification → Learning Motivation	0.434	1.804	0.071	Rejected
H3	Gamification → Engagement	0.477	5.680	0.000	Accepted
H4	Perceived Usefulness → Learning Motivation	0.409	1.533	0.125	Rejected
H5	Perceived Usefulness → Engagement	0.206	1.534	0.125	Rejected
H6	Learning Motivation → Engagement	0.502	5.904	0.000	Accepted

Source: Primary Data Processed Through Smartpls 4.0 (2026)

Based on Table 10, the test results *path coefficient* through the procedure *bootstrapping* showed that of the six direct relationships analyzed, three hypotheses were accepted and three hypotheses were rejected. A significant proven relationship is the influence *Gamification* against *Perceived Usefulness*, *Gamification* against *Engagement*, as well as Learning Motivation towards *Engagement* with a *p* value of <

0.05. Conversely, the influence *Gamification* on Learning Motivation, *Perceived Usefulness* on Learning Motivation, and *Perceived Usefulness* against *Engagement* did not show a significant influence because it had a *p*> value of 0.05. Furthermore, the test *indirect effect* was conducted to analyze the role of mediation variables in the relationship between research variables as presented in Table 11.

Table 11 Path Coefficient Bootstrapping Results for Indirect Effects

Hypothesis	Path Coefficient	Original Sample	T Statistics	P Values	Decision
H7	Gamification → Perceived Usefulness → Learning Motivation	0.326	1.438	0.150	Rejected
H8	Gamification → Perceived Usefulness → Learning Motivation → Engagement	0.164	1.423	0.155	Rejected

Source: Primary data processed through SmartPLS 4.0 (2026)

Based on Table 11, the test results *indirect effect* through the procedure *bootstrapping* It shows that both mediation hypotheses do not gain empirical support because they have a *p*> value of 0.05. Indirect influence *Gamification* to Learning Motivation through *Perceived Usefulness* (H7) produce *p*-value by 0.150, while the serial mediation *Gamification* against *Engagement* through *Perceived Usefulness* and Learning Motivation (H8) obtained *p*-value by 0.155. The results show that *Perceived Usefulness* has not been proven to act as a mediator in the relationship *Gamification* with Learning Motivation. Similarly, a combination of *Perceived Usefulness* and Learning Motivation as a mediator in order has not been able to bridge the influence *Gamification* against *Engagement*. Thus, H7 and H8 were declared rejected.

V. DISCUSSION

➤ The Effect of Gamification Implementation on Perceived Usefulness

The results of the study show that the implementation of *Gamification* have a positive and significant effect on *Perceived Usefulness*, so that Hypothesis 1 (H1) is accepted. These findings indicate that the better the application of gamification elements in the SINAR LMS (Learning Monday), the higher the perception of employees of PT Permodalan Nasional Madani (PNM) Jambi Branch regarding the benefits of the system in supporting learning, competency development, and work. These results are in line with *Technology Acceptance Model* (TAM) Davis (1989), who explains that *Perceived Usefulness* reflects the user's belief that technology is capable of improving its performance. Elements such as *reward*, *achievement*, learning progress, and feedback can make the learning process more interactive while increasing the value of LMS benefits for users. These findings support [27], [28], and [29] which shows that *gamification* can improve the user experience and perception of the benefits of digital learning systems. Thus, the development of gamification elements in the SINAR LMS needs to be maintained so that the learning benefits felt by employees are more optimal.

➤ The Influence of Gamification on Learning Motivation

The results of the study show that the implementation of *Gamification* does not have a significant effect on Learning Motivation, so Hypothesis 2 (H2) is rejected. This finding indicates that the existence of gamification elements in the SINAR LMS has not directly been the main factor that

increases the learning motivation of PT PNM Jambi Branch employees. Based on *Self-Determination Theory* (SDT) Deci and Ryan (1985), intrinsic motivation develops when psychological needs are *autonomy*, *competence*, and *relatedness* fulfilled, so that the provision of external stimuli through gamification features is not necessarily enough to form an encouragement to learn from within employees. This result is different from (Alonso-Sánchez, Alonso, in Santana-Monagas 2025) who found that *gamification* can increase motivation through meeting the psychological needs of users, which shows that the effectiveness of gamification can differ based on user characteristics and the context of its application. In the context of PNM Jambi Branch, learning through the SINAR LMS is part of the organizational competency development program so that employee participation can be further driven by obligations, module completion targets, and job demands. Therefore, increasing learning motivation also needs to be supported by a learning culture, work environment, and HR development strategy that is able to strengthen employee intrinsic motivation.

➤ The Effect of Gamification Implementation on Engagement

The results of the study prove that the implementation of *Gamification* have a positive and significant effect on *Engagement*, so that Hypothesis 3 (H3) is accepted. The findings show that the application of gamification elements in the SINAR LMS is able to increase employee participation, attention, and engagement in participating in digital learning. Features such as *Badge*, points, *leaderboard*, *challenge*, learning progress, and rewards make learning activities more interactive and reduce the impression of monotony. These results are in accordance with *Self-Determination Theory* (SDT), which explains that learning experiences that provide challenges, achievements, and a sense of competence can encourage individual involvement in learning activities. The research findings are also in line with [31] and (Abdurahmanovic in Cadenbach 2025) which shows that *gamification* has a positive impact on user experience and engagement in digital systems. Thus, the implementation of gamification in the SINAR LMS is one of the effective instruments to encourage employee involvement in learning and competency development programs at PT PNM Jambi Branch.

➤ *The Effect of Facilitating Conditions on Behavioral Intention*

The test results show that *Facilitating Conditions* have a positive and significant effect on *Behavioral Intention* with a value of $\beta = 0.422$ and $p = 0.006$, so that H4 is accepted. The findings show that the more adequate organizational and infrastructure support felt by employees, the stronger their intention to utilize the financial services features in the PNM Digi application. In the framework *Unified Theory of Acceptance and Use of Technology* developed by (Alonso-Sánchez, Alonso, in Santana-Monagas 2025) Describe the user's confidence regarding the availability of technical and organizational resources that support the use of technology. Thus, the availability of facilities, user guidance, technical assistance, and adequate system support can strengthen employees' confidence and intention to use technology in a sustainable manner.

➤ *The Effect of Perceived Usefulness on Engagement*

The results of the study show that *Perceived Usefulness* has no significant effect on *Engagement*, so that Hypothesis 5 (H5) is rejected. Based on *Technology Acceptance Model* (THERE) Davis (1989) *Perceived Usefulness* describes the belief that the use of a technology can improve performance, but the perception of those benefits does not necessarily automatically shape engagement because *engagement* are also influenced by motivational, psychological, and work environment aspects. These findings differ from (Eagles in Fuchs 2022) that affirms the importance of *Perceived Usefulness* in the acceptance and use of the LMS, and [33] which shows that the perceived benefits can increase user participation in digital learning. In the context of PT PNM Jambi Branch, the use of SINAR LMS as part of the organization's learning program allows employees to stay involved in learning activities due to job demands or policies, so that the perception of the benefits of LMS alone is not enough to increase engagement. Therefore, the increase in *Engagement* requires the support of other factors, especially internal motivation and a conducive organizational environment.

➤ *The Influence of Learning Motivation on Engagement*

The results of the study prove that Learning Motivation has a positive and significant effect on *Engagement*, so that Hypothesis 6 (H6) is accepted. The findings show that the stronger the employee's motivation to learn, the higher their involvement in participating in learning activities through the SINAR LMS. These results support *Self-Determination Theory* (SDT), which explains that the fulfillment of psychological needs in the form of competence, autonomy, and connectedness can encourage motivation as well as individual involvement in the learning process. These findings are also in line with [27] which shows the importance of motivation in encouraging *engagement* on digital learning. In the context of PT PNM Jambi Branch, employees with higher learning motivation tend to be more enthusiastic about participating in the SINAR program, completing learning activities, and utilizing training materials to improve their competencies. Thus, learning motivation is an important factor that needs to be strengthened to maintain employee engagement in LMS-based learning.

➤ *The Role of Perceived Usefulness Mediation on the Relationship of Gamification Implementation to Learning Motivation*

The results of the study show that *Perceived Usefulness* Unable to mediate the relationship between implementations *Gamification* and Learning Motivation, so Hypothesis 7 (H7) is rejected. These findings mean that although *Gamification* able to increase employees' perception of the benefits of LMS, increased *Perceived Usefulness* is not enough to encourage Learning Motivation. Based on *Technology Acceptance Model* (TAM), the perception of benefits is an important factor in the acceptance of technology, while *Self-Determination Theory* (SDT) emphasizes that learning motivation is formed through the fulfillment of psychological needs such as autonomy, competence, and connectedness. This result is different from [27] and [29] which shows that *gamification* can drive motivation and user experience through certain mechanisms [34][35][36]. These differences indicate that the mediation mechanism can be influenced by the characteristics and context of the user, especially because the learning motivation of PT PNM Jambi Branch employees may be more related to training targets, career needs, job demands, and organizational culture than the perception of LMS benefits alone.

➤ *The Role of Perceived Usefulness and Learning Motivation Mediation in the Relationship of Gamification Implementation to Engagement*

The results of the study show that *Perceived Usefulness* and Learning Motivation is not able to become a mediator sequentially (*serial mediation*) on the implementation relationship *Gamification* against *Engagement*, so that Hypothesis 8 (H8) was rejected. The findings indicate that the influence of *Gamification* employee engagement tends to take place directly and does not have to go through an increase *Perceived Usefulness* which then forms Learning Motivation. This result is different from (Alonso-Sánchez, Alonso, in Santana-Monagas 2025) which explains that *gamification* can increase engagement through the fulfillment of psychological needs and motivation, but is still in line with (Jovanović & Milosavljević, 2022) regarding the existence of direct influences *gamification* on user experience and engagement. In addition, (Abdurahmanovic in Cadenbach 2025) affirms that the success of *gamification* can depend on the characteristics of the user and the design of the system, so the mediation mechanism can differ between contexts. At PT PNM Jambi Branch, the characteristics of learning in a formal work environment allow employee involvement to be more strongly influenced by gamification features and organizational policies rather than through a series of changes in the perception of benefits and motivation for learning.

VI. CONCLUSION

Based on the results of the analysis using *Partial Least Squares-Structural Equation Modeling* (PLS-SEM), this study shows that the implementation of *Gamification* in LMS SINAR (Monday Learning) PT Permodalan Nasional Madani (PNM) Jambi Branch has been proven to have a positive and significant effect on *Perceived Usefulness* and *Engagement*, but has not shown a significant effect on Learning Motivation. In addition, *Perceived Usefulness* has not been proven to have

a significant effect on Learning Motivation or *Engagement*, while Learning Motivation has a positive and significant influence on *Engagement*. The findings indicate that gamification elements are more effective in shaping perceptions of system benefits and increasing direct employee engagement, while increased learning motivation requires other supporting factors beyond gamification implementation.

The results of the mediation test also showed that *Perceived Usefulness* unable to bridge influence *Gamification* to Learning Motivation. Similarly, *Perceived Usefulness* and Learning Motivation has not been proven to play a role as a mediator sequentially (*serial mediation*) on the relationship between *Gamification* and *Engagement*. Thus, the influence *Gamification* against *Engagement* Employees tend to take place directly compared to through mechanisms to increase the perception of benefits and motivation to learn. These findings confirm that the success of digital learning through the SINAR LMS is not enough to rely only on gamification features, but needs to be supported by organizational strategies that are able to strengthen intrinsic motivation, quality of learning experience, and employee engagement in a sustainable manner.

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