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DIGITAL LEARNING AND EMPLOYEE PERFORMANCE: THE MEDIATING ROLE OF EMPLOYEE ENGAGEMENT IN INDONESIAN BANKING

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Abstract

Digital learning has become a central instrument for workforce development in banking, yet its performance effect may depend on employees' psychological attachment to work. This study examines the effect of digital learning implementation on employee performance and tests employee engagement as a mediating mechanism at PT Bank Rakyat Indonesia (Persero) Tbk, Makassar Ahmad Yani Branch. A quantitative explanatory design was employed using a census of 50 employees who use the company's digital learning platforms. Data were collected through a five-point Likert questionnaire and analyzed with Partial Least Squares–Structural Equation Modeling using SmartPLS 3 and 10,000 bootstrap subsamples. Digital learning implementation positively affects employee engagement ($\beta = 0.455$; $p < 0.001$), while employee engagement positively affects employee performance ($\beta = 0.431$; $p = 0.002$). The direct effect of digital learning on employee performance is not significant ($\beta = 0.251$; $p = 0.093$), whereas the indirect effect through employee engagement is significant ($\beta = 0.196$; $p = 0.017$), indicating indirect-only/full mediation. The findings show that digital learning produces stronger performance implications when it succeeds in strengthening employee engagement.

Keywords: *Banking; Digital learning; Employee engagement; Employee performance; PLS-SEM*

1. INTRODUCTION

Employee performance is a strategic determinant of organizational effectiveness, particularly in banking, where employees must simultaneously meet business targets, maintain service quality, comply with regulation, and adapt to rapidly evolving digital systems. Contemporary human resource management therefore requires organizations to develop capabilities that are not only technically relevant but also continuously renewed through learning (Noe, 2020; Robbins & Judge, 2019). Digital transformation has expanded this requirement by shifting employee development from predominantly classroom-based training toward technology-enabled learning ecosystems supported by learning management systems, mobile applications, analytics, and cloud-based platforms (Marler & Boudreau, 2017).

Digital learning refers to the use of digital technologies as the principal infrastructure for delivering, accessing, interacting with, and evaluating learning content. It provides flexibility of time and place, scalable access, varied multimedia formats, and opportunities for interactive learning (Picciano, 2017). From a connectivist perspective, learning in a digital environment is increasingly embedded in networks of information, people, and technology; the ability to access and connect distributed knowledge becomes central to workplace learning (Siemens, 2005). These characteristics are particularly relevant to banking employees, whose knowledge requirements change quickly as products, compliance rules, service channels, and customer interfaces become more digital.

However, the availability of digital platforms does not automatically guarantee better performance. The Job Demands-Resources (JD-R) perspective suggests that learning opportunities can function as job resources that foster motivation and work engagement (Bakker & Demerouti, 2007; Bakker et al., 2023). Employee engagement is a positive work-related psychological state reflected in vigor, dedication, and absorption (Schaufeli et al., 2002). Engaged employees tend to invest greater physical, cognitive, and emotional energy in their work, making engagement an important proximal mechanism through which organizational resources can be converted into performance (Harter et al., 2002; Rich et al., 2010). Caring and supportive HR practices can further strengthen this relationship because employees interpret development opportunities as evidence of organizational investment in their growth (Saks, 2022).

Empirical evidence increasingly supports the role of engagement in digital and developmental contexts. Training and development have been shown to influence performance through employee engagement in banking (Ahmed et al., 2024), while engagement has also been identified as a mechanism linking job resources to performance (Lee & Jo, 2023). Digital leadership (Li et al., 2024), leadership and job resources (Tummers & Bakker, 2021), workplace digital transformation (Ye et al., 2024), and public-sector digitalization (Zhan & Xie, 2025) have likewise been associated with work engagement. In the Indonesian banking context, studies of e-learning and digitalization generally report favorable associations with employee performance or productivity (Purwanto & Suratman, 2022; Sari et al., 2024; Silaen et al., 2021; Umboh, 2025). Research on BRI employees also indicates that employee engagement is positively associated with performance (Puspa & Sagala, 2018).

Despite these findings, two issues remain unresolved. First, prior banking studies frequently emphasize direct effects of e-learning or digitalization on performance, leaving the motivational process between learning resources and work outcomes underexplored. Second, the performance effect of digital learning may be temporally and psychologically contingent: employees must perceive the learning as accessible and relevant, internalize it, and remain sufficiently engaged to transfer knowledge into day-to-day work. The present

study therefore positions employee engagement as the mechanism that explains how digital learning implementation contributes to employee performance.

The study is conducted at BRI Makassar Ahmad Yani Branch, where employees are connected to the organization's digital learning ecosystem, including BRISmart and BRILiaN Apps. Internal branch data reported in the thesis show improving business and service indicators alongside increasing digital-learning completion, but such aggregate trends do not identify the individual-level mechanism that converts learning into performance. The study addresses this gap by testing four relationships simultaneously: digital learning implementation → employee engagement; employee engagement → employee performance; digital learning implementation → employee performance; and the indirect digital learning → engagement → performance pathway.

Methodologically, the study uses PLS-SEM because the model contains a mediation path, reflective constructs, and a relatively small population. Contemporary guidance emphasizes careful evaluation of measurement quality, collinearity, explained variance, effect size, and bootstrapped indirect effects when reporting PLS-SEM results (Becker et al., 2023; Hair & Alamer, 2022; Hair et al., 2019; Hair et al., 2022; Henseler et al., 2015; Ringle et al., 2015; Sarstedt et al., 2022; Zhao et al., 2010). Recent management studies involving Muh Al Fatah Arief Putra also provide relevant contextual and methodological touchpoints: employee competence–performance mediation in Makassar (Haeruddin, Ciptagustia, et al., 2026), SEM-PLS mediation in a Makassar consumer setting (Aslam et al., 2023; Haeruddin, Riu, et al., 2026), digital strategy implementation (Burhanuddin et al., 2026), and competitive adaptation within Makassar's business environment (Putra et al., 2026). These works underscore the value of context-sensitive management research while illustrating the broader diffusion of digital and mediation-oriented research designs.

Accordingly, this study aims to determine whether digital learning implementation improves employee performance directly or primarily through employee engagement. The contribution is threefold. Theoretically, it extends the JD-R logic by treating digital learning as a job resource whose performance value may operate through engagement. Empirically, it provides branch-level evidence from an Indonesian state-owned bank. Practically, it clarifies why completion rates and platform availability should not be treated as sufficient indicators of learning effectiveness unless they are accompanied by higher employee engagement and observable work application.

2. RESEARCH METHOD

This study employed a quantitative explanatory design with a cross-sectional survey. The exogenous construct was Digital Learning Implementation (DLI), Employee Engagement (EE) was specified as the mediating construct, and Employee Performance (EP) was the endogenous construct. The unit of analysis was the individual employee of BRI

Makassar Ahmad Yani Branch. The population consisted of 50 employees who used the company's digital learning platforms, and because the population was relatively small, a census/total sampling approach was applied so that all 50 employees were included in the analysis.

Primary data were collected in 2026 through an online questionnaire using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Digital Learning Implementation was measured using six reflective indicators covering accessibility and platform reliability, learning-material quality, and interactivity/collaboration. Employee Engagement was measured with six indicators reflecting vigor, dedication, and absorption, conceptually grounded in the Utrecht Work Engagement framework (Schaufeli et al., 2002). Employee Performance was measured with six reflective indicators representing work quality, work quantity, timeliness, initiative/innovation, business-target contribution, and application of learning in daily work.

The analysis was conducted using Partial Least Squares–Structural Equation Modeling (PLS-SEM) in SmartPLS 3 (Ringle et al., 2015). PLS-SEM is appropriate for models oriented toward explanation and prediction, especially when mediation is tested and sample size is limited (Becker et al., 2023; Hair & Alamer, 2022; Hair et al., 2019; Hair et al., 2022; Sarstedt et al., 2022). Measurement-model assessment examined indicator loadings, Cronbach's alpha, rho_A, composite reliability, average variance extracted (AVE), Fornell–Larcker criteria, cross-loadings, Heterotrait–Monotrait Ratio (HTMT), and indicator variance inflation factors (VIF) (Hair et al., 2019; Henseler et al., 2015). Structural-model assessment included inner VIF, R^2, f^2, SRMR, NFI, direct effects, specific indirect effects, and total effects. Hypotheses were tested using two-tailed bootstrapping with 10,000 subsamples and 95% bias-corrected and accelerated confidence intervals. Mediation classification followed the logic of direct and indirect effect significance (Zhao et al., 2010).

Four hypotheses were tested: H1, Digital Learning Implementation positively affects Employee Engagement; H2, Employee Engagement positively affects Employee Performance; H3, Digital Learning Implementation positively affects Employee Performance; and H4, Employee Engagement mediates the effect of Digital Learning Implementation on Employee Performance. A positive path was considered statistically significant when $p < 0.05$ and the 95% confidence interval excluded zero.

3. RESULTS AND DISCUSSION

3.1 Respondent Profile and Descriptive Results

The respondent profile indicates a relatively balanced gender composition and a workforce dominated by experienced, university-educated employees. Of the 50 respondents, 52% were men and 48% women. Half were older than 35 years, 48% were 25-35 years old, and 88% held an undergraduate degree. Respondents represented managerial,

supervisory, operational, relationship-management, and support functions, enabling the analysis to capture perceptions across both business and supporting roles.

Table 1 Respondent Profile

Characteristic	Category	n (%)
Gender	Male	26 (52.0)
	Female	24 (48.0)
Age	< 25 years	1 (2.0)
	25–35 years	24 (48.0)
	> 35 years	25 (50.0)
Education	Diploma	1 (2.0)
	Bachelor	44 (88.0)
	Master	5 (10.0)
Position	Manager	2 (4.0)
	Supervisor	3 (6.0)
	Operational	5 (10.0)
	RM Funding & Transaction	15 (30.0)
	RM Credit	10 (20.0)
	Support	15 (30.0)
Tenure	1-5 years	16 (32.0)
	6-10 years	15 (30.0)
	11-15 years	10 (20.0)
	16-20 years	5 (10.0)
	> 20 years	4 (8.0)

Source: *Proceed Data, 2026*

Descriptively, all three constructs were rated very highly. Digital Learning Implementation recorded the highest mean (4.353), followed by Employee Performance (4.293) and Employee Engagement (4.277). These values indicate that respondents generally perceived the digital learning system, their engagement, and their own work performance positively. Nevertheless, descriptive strength alone cannot establish causal or mediating relationships; therefore, the measurement and structural models were evaluated before interpreting the hypotheses.

3.2 Measurement Model

All 18 indicators exceeded the recommended loading threshold of 0.70. Digital Learning Implementation loadings ranged from 0.800 to 0.857, Employee Engagement from 0.714 to 0.820, and Employee Performance from 0.804 to 0.879. The reliability coefficients and AVE values also met the recommended criteria (Hair et al., 2019; Henseler et al., 2015).

HTMT values ranged from 0.472 to 0.575, below the conservative 0.85 threshold, indicating satisfactory discriminant validity (Henseler et al., 2015).

Table 2 Measurement Model Quality

Construct	Loading range	Cronbach α	rho_A	CR	AVE
Digital Learning Implementation	0.800-0.857	0.911	0.918	0.930	0.690
Employee Engagement	0.714-0.820	0.876	0.890	0.905	0.614
Employee Performance	0.804-0.879	0.922	0.928	0.939	0.720

Source: *Proceed Data, 2026*

The square roots of AVE were 0.831 for Digital Learning Implementation, 0.784 for Employee Engagement, and 0.849 for Employee Performance; each exceeded the corresponding inter-construct correlations. Cross-loadings were highest on their intended constructs. Outer VIF values ranged from 2.300 to 3.084. Although several indicators slightly exceeded 3, all remained well below 5, indicating no serious indicator-collinearity problem. Taken together, these results support convergent validity, discriminant validity, and internal consistency, allowing structural-model interpretation.

3.3 Structural Model and Hypothesis Testing

Digital Learning Implementation explained 20.7% of the variance in Employee Engagement ($R^2 = 0.207$; adjusted $R^2 = 0.190$), while Digital Learning Implementation and Employee Engagement jointly explained 34.7% of the variance in Employee Performance ($R^2 = 0.347$; adjusted $R^2 = 0.320$). Inner VIF values ranged from 1.000 to 1.261, indicating no structural collinearity concern. Effect sizes were moderate for Digital Learning Implementation → Employee Engagement ($f^2 = 0.261$) and Employee Engagement → Employee Performance ($f^2 = 0.226$), but small for the direct Digital Learning Implementation → Employee Performance path ($f^2 = 0.076$). The model's SRMR was 0.089, which remains within the commonly used < 0.10 acceptable range, while NFI was 0.685; therefore, model fit should be interpreted cautiously and together with the model's explanatory purpose (Becker et al., 2023; Hair & Alamer, 2022; Hair et al., 2019; Hair et al., 2022; Sarstedt et al., 2022).

Table 3 Structural Model Summary

Indicator / Path	Value	Interpretation	Notes
R^2 Employee Engagement	0.207	Weak	DLI explains 20.7%
R^2 Employee Performance	0.347	Moderate	DLI + EE explain 34.7%
f^2 DLI → EE	0.261	Moderate	Meaningful effect
f^2 EE → EP	0.226	Moderate	Meaningful effect
f^2 DLI → EP	0.076	Small	Limited direct effect
SRMR	0.089	Acceptable	Below 0.10
NFI	0.685	Relatively low	Interpret cautiously

Source: *Proceed Data, 2026*

Table 4 Hypothesis Testing Results

H	Path	β	t	p	95% CI	Decision
H1	DLI→EE	0.455	5.603	<0.001	[0.248; 0.579]	Supported
H2	EE→EP	0.431	3.087	0.002	[0.148; 0.698]	Supported
H3	DLI→EP	0.251	1.682	0.093	[-0.064; 0.522]	Not supported
H4	DLI→EE→EP	0.196	2.388	0.017	[0.045; 0.355]	Supported

Source: *Proceed Data, 2026*

The total effect of Digital Learning Implementation on Employee Performance was 0.447 (t = 3.803; p < 0.001; 95% BCa CI [0.175; 0.645]). Because the direct effect was not significant while the specific indirect effect was significant, the mediation pattern is classified as indirect-only/full mediation (Zhao et al., 2010). The variance-accounted-for calculation indicates that approximately 43.9% of the total effect was transmitted through Employee Engagement.

3.4 Discussion

The first finding confirms that Digital Learning Implementation has a positive and significant effect on Employee Engagement (β = 0.455; p < 0.001). This result is consistent with the JD-R proposition that resources supporting learning, competence, and development stimulate a motivational process that strengthens engagement (Bakker & Demerouti, 2007; Bakker et al., 2023). Digital platforms that are accessible, technically reliable, relevant to daily work, and sufficiently interactive reduce learning barriers and increase employees' sense that the organization invests in their capability development. This interpretation is compatible with research linking digital leadership and digitalized work environments with higher engagement (Li et al., 2024; Ye et al., 2024; Zhan & Xie, 2025) and with evidence that supportive HR practices help sustain employee engagement (Saks, 2022). The result also extends Indonesian banking evidence by showing that the benefit of digital learning is not limited to knowledge acquisition; it also influences the employee's psychological relationship with work (Purwanto & Suratman, 2022; Umboh, 2025).

The second finding shows that Employee Engagement positively affects Employee Performance (β = 0.431; p = 0.002). This is the strongest direct predictor of performance in the tested model. The result supports the idea that engaged employees invest more energy, attention, and persistence in their work roles (Rich et al., 2010; Schaufeli et al., 2002). It also aligns with evidence that engagement is associated with business outcomes and individual performance (Harter et al., 2002; Lee & Jo, 2023). In Indonesian banking, the finding is consistent with research on BRI employees and other banking contexts where engagement contributes to higher performance (Puspa & Sagala, 2018). Practically, the implication is that performance management should not treat engagement merely as an attitudinal outcome; it is a productive mechanism that supports quality, target achievement, timeliness, and initiative.

The third finding is more nuanced: the direct effect of Digital Learning Implementation on Employee Performance is positive but statistically non-significant (β = 0.251; p = 0.093). This differs from studies that reported direct positive effects of e-learning or banking digitalization on performance and productivity (Sari et al., 2024; Silaen et al., 2021). The difference does not necessarily imply that digital learning is ineffective. Instead, it indicates that within this sample the effect does not materialize automatically as a direct performance increase. Training and learning create capabilities and opportunities, but employees still need motivation, role relevance, managerial reinforcement, and opportunities to apply newly acquired knowledge (Noe, 2020). The small direct effect size and relatively limited sample also reduce statistical power for detecting modest direct effects.

The mediation result resolves this apparent contradiction. Employee Engagement significantly mediates the relationship between Digital Learning Implementation and Employee Performance (indirect β = 0.196; p = 0.017), while the direct path is not significant. This pattern indicates that the performance value of digital learning is primarily motivational rather than automatic. Digital learning acts as a job resource; engagement is the psychological activation mechanism; and performance is the downstream outcome. The result is consistent with banking evidence showing engagement as a mediator between training/development and job performance (Ahmed et al., 2024), and with broader job-resources research in which engagement transmits the effect of workplace resources to performance (Lee & Jo, 2023). It also reinforces the logic of indirect-only mediation described in contemporary mediation analysis (Zhao et al., 2010).

The findings also have implications for how organizations evaluate digital learning. Completion rates, login frequency, and the availability of modules are process indicators, not final indicators of effectiveness. Management should assess whether learning content is relevant to employees' roles, whether supervisors provide time and encouragement to learn, whether employees can apply learned material to actual tasks, and whether engagement improves after learning interventions. The relatively low R^2 for Employee Engagement (0.207) further suggests that digital learning is only one of several engagement resources. Leadership quality, supervisor support, reward systems, organizational climate, autonomy, and workload remain important complementary factors (Li et al., 2024; Tummers & Bakker, 2021).

This interpretation is also compatible with recent management research conducted in or connected to Makassar. Haeruddin, Ciptagustia, et al. (2026) show that competence can directly support employee performance even when a proposed motivational mediator is not significant, emphasizing that mediation patterns are context-dependent. Aslam et al. (2023) and Haeruddin, Riu, et al. (2026) demonstrate the usefulness of PLS-SEM for simultaneously testing direct and indirect effects in Makassar-based behavioral research. Burhanuddin et al. (2026) illustrate the managerial importance of structured digital-strategy implementation, while Putra et al. (2026) emphasize continuous adaptation within

increasingly competitive local business environments. Together, these studies support a broader conclusion: digital initiatives generate organizational value when they are embedded in an appropriate behavioral and managerial mechanism rather than treated as stand-alone technology adoption.

The theoretical contribution lies in specifying Digital Learning Implementation as a concrete job resource within the JD-R motivational process. Rather than assuming a linear digital learning → performance relationship, the results show that engagement is the mechanism through which learning resources become productive behavior. This also helps reconcile mixed prior evidence: studies that omit engagement may observe a significant aggregate direct relationship, whereas models that explicitly include engagement can reveal that a substantial portion of the effect is transmitted through motivational involvement. The study therefore provides a more process-oriented explanation of digital learning effectiveness in banking.

4. CONCLUSION

This study demonstrates that digital learning implementation contributes to employee performance primarily through employee engagement. Digital Learning Implementation significantly increases Employee Engagement ($\beta = 0.455$; $p < 0.001$), and Employee Engagement significantly improves Employee Performance ($\beta = 0.431$; $p = 0.002$). The direct Digital Learning Implementation → Employee Performance relationship is positive but not statistically significant ($\beta = 0.251$; $p = 0.093$). In contrast, the indirect effect through Employee Engagement is significant ($\beta = 0.196$; $p = 0.017$), indicating indirect-only/full mediation. The model explains 20.7% of Employee Engagement and 34.7% of Employee Performance. These findings imply that organizations should not evaluate digital learning solely through access, platform usage, or module completion. Digital learning should be designed to strengthen engagement through relevant content, adequate learning time, supervisor support, interactive features, and clear opportunities to apply learning at work. The study is limited by its single-branch setting, small sample, cross-sectional design, and self-reported performance measure. Future research should employ larger multi-branch samples, longitudinal designs, supervisor- or KPI-based performance measures, and additional variables such as leadership, learning culture, organizational support, and work climate. Predictive assessment using Q^2 or PLSpredict may also strengthen future PLS-SEM evaluations.

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