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MOOC-based LMS acceptance among female Madrasah Tsanawiyah teachers: age and educational level in TAM

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ABSTRACT

This study examines the acceptance of PINTAR, a MOOC-based Learning Management System (LMS) developed by the Indonesian Ministry of Religious Affairs, among female Madrasah Tsanawiyah (MTs) teachers in Padang, West Sumatra. Using an extended Technology Acceptance Model (TAM), the study investigates the relationships among perceived ease of use (PEU), perceived usefulness (PU), attitude toward using (ATU), behavioral intention (BI), and actual use (AU), while examining the moderating roles of age and educational level. A quantitative cross-sectional survey was conducted with 300 female MTs teachers. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. The results supported all six hypothesized direct relationships. PEU significantly predicted PU ($\beta = 0.663$), PU significantly influenced ATU ($\beta = 0.523$), PEU significantly influenced ATU ($\beta = 0.294$), PU significantly predicted BI ($\beta = 0.650$), ATU strongly predicted BI ($\beta = 0.719$), and BI significantly predicted AU ($\beta = 0.635$, $p < 0.001$). However, neither educational level nor age significantly moderated the BI–AU relationship. These findings support the applicability of TAM in explaining PINTAR acceptance and highlight perceived usefulness, ease of use, and attitude as important determinants of teachers' behavioral intention and actual LMS use.



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Introduction

The digital transformation of education has increasingly positioned online learning platforms as important infrastructure for teacher professional development. Massive Open Online Course (MOOC)-based Learning Management Systems (LMS) provide opportunities for educators to access structured professional learning in flexible, scalable, and self-directed ways. This development has become particularly relevant as education systems increasingly integrate digital technologies into teaching, learning, and professional development. Research on teachers' technology adoption has consequently emphasized the importance of understanding the factors that shape teachers' acceptance and sustained use of digital learning platforms (Bond, 2020; Dindar et al., 2021; Songkram & Osuwan, 2022).

Technology acceptance is an important determinant of whether users adopt and continue to use digital learning systems. Among the established theoretical frameworks for explaining technology acceptance, the Technology Acceptance Model (TAM) developed by Davis (1989) remains one of the most widely applied models. TAM proposes that perceived ease of use (PEU) and perceived usefulness (PU) are fundamental determinants of users' attitudes and behavioral intentions toward technology (Chao, 2019). Subsequent research has demonstrated the applicability of TAM across various educational technology contexts, including mobile learning and LMS environments (Al-Emran et al., 2018; Scherer et al., 2019). More recent empirical studies have likewise shown that TAM constructs remain useful for explaining teachers' acceptance of digital learning platforms in different educational settings (Hidayati et al., 2023; Songkram & Osuwan, 2022).

Nevertheless, an important issue in technology acceptance research concerns the distinction between behavioral intention (BI) and actual use (AU). Many technology acceptance studies emphasize behavioral intention as the principal outcome, while the extent to which intention is translated into actual technology use receives comparatively less attention. This distinction is important because users may express a willingness or intention to use a technology without consistently engaging with it in practice. Recent research has therefore emphasized the importance of examining actual use alongside behavioral intention when evaluating technology adoption and implementation (Al-Adwan et al., 2023; Anthony et al., 2023). Studies involving teachers and LMS adoption have also demonstrated the relevance of examining both intention and actual use to understand technology adoption more comprehensively.

This issue is particularly relevant to MOOC PINTAR, a professional learning platform developed by the Ministry of Religious Affairs of the Republic of Indonesia. The platform is intended to expand access to competency development through flexible and self-directed training. The Ministry of Religious Affairs continues to provide MOOC PINTAR training programs as part of efforts to broaden access to professional development opportunities for educators and other personnel (Camilleri et al., 2025; Herranen et al., 2021). In this context, understanding technology acceptance should not be limited to teachers' willingness or intention to use the platform (Aldosemani, 2023; Alturki & Aldraiweesh, 2023; Galimova et al., 2021). It is also important to determine whether their behavioral intentions are reflected in actual platform use. Although research on LMS acceptance among teachers has increased, evidence concerning technology acceptance in government-administered MOOC platforms for madrasah teacher professional development remains limited (Abubakari & Priyanto, 2021).

A further research gap concerns the role of demographic characteristics in the relationship between behavioral intention and actual technology use. Existing research indicates that teachers do not necessarily constitute a homogeneous group in terms of technology adoption. Differences in prior experience, technological familiarity, and individual characteristics may shape teachers' perceptions and responses to digital learning technologies (Dindar et al., 2021). Research on LMS acceptance has also examined demographic and contextual differences among teachers, although findings regarding the role of such characteristics are not always consistent. For example, Dindar et al. (2021) found differences in LMS-related experiences between teachers with and without prior LMS experience, suggesting that teacher characteristics and experience should be considered when examining technology adoption.

Age and educational level are therefore potentially relevant characteristics to examine in technology acceptance research. Age may reflect differences in technological experience and familiarity, while educational attainment may be associated with differences in learning experiences and digital competencies (Antonietti et al., 2022; García-Murillo et al., 2023). However, the extent to which these characteristics influence the transition from behavioral intention to actual LMS use remains insufficiently examined, particularly among teachers participating in government-supported professional development platforms (Kahnbach et al., 2024). Moreover, existing research has frequently focused on mixed teacher populations, university students, or general LMS users rather than specifically examining female Madrasah Tsanawiyah (MTs) teachers (Xue et al., 2024). Studies of LMS acceptance among teachers in other contexts demonstrate the value of examining teacher-specific technology acceptance rather than assuming that findings from students or other populations can be directly generalized to teachers (Dindar et al., 2021; Hidayati et al., 2023).

The present study addresses these gaps by extending TAM through the inclusion of actual use as the primary behavioral outcome and by examining age and educational level as potential moderators of the relationship between behavioral intention and actual use. The study specifically focuses on female MTs teachers in Padang, West Sumatra, who use the PINTAR platform for professional learning. This focus is important because research examining technology acceptance in madrasah contexts remains comparatively limited, despite the increasing use of digital platforms to support teacher professional development. Recent research in Indonesia has begun to examine LMS readiness and technology acceptance among madrasah teachers, but further

evidence is needed concerning the mechanisms through which teachers' perceptions and intentions translate into actual system use (Hidayati et al., 2023).

Accordingly, this study examines the relationships among perceived ease of use, perceived usefulness, attitude toward using, behavioral intention, and actual use of the PINTAR MOOC-based LMS among female MTs teachers. In addition, the study investigates whether age and educational level moderate the relationship between behavioral intention and actual use. By examining these relationships in the context of a government-administered MOOC-based professional learning platform, this study contributes empirical evidence regarding the application of TAM to teacher technology adoption beyond intention-based outcomes. It also provides practical insights for educational policymakers and platform managers seeking to strengthen teachers' sustained engagement with digital professional development platforms.

Method

Research Design

This study employed a quantitative cross-sectional survey design to examine the acceptance of a MOOC-based Learning Management System (LMS) among female Madrasah Tsanawiyah (MTs) teachers in Padang, West Sumatra, Indonesia (Kaewsaiha & Chanchalor, 2021). The study adopted an extended Technology Acceptance Model (TAM) consisting of five constructs: Perceived Ease of Use (PEU), Perceived Usefulness (PU), Attitude Toward Using (ATU), Behavioral Intention (BI), and Actual Use (AU) (Alyoussef, 2023; García et al., 2024).

The proposed model examined the direct relationships among the five TAM constructs. Specifically, PEU was hypothesized to influence PU and ATU; PU was hypothesized to influence ATU and BI; ATU was hypothesized to influence BI; and BI was hypothesized to influence AU. In addition, age and educational level were incorporated as moderating variables, particularly in relation to the BI–AU relationship. The use of an extended TAM was intended to examine not only teachers' behavioral intention to use the MOOC-based LMS but also the extent to which such intention was associated with actual system use.

Participants and Sampling

The target population consisted of female teachers employed at Madrasah Tsanawiyah (MTs) in Padang, West Sumatra, Indonesia. Participants were selected using purposive sampling to ensure that the respondents possessed characteristics relevant to the objectives of the study. The original study specified female teachers who had engaged with digital ecosystems or demonstrated potential for using a MOOC-based LMS as the basis for participant selection (Rojas & Chiappe, 2024).

A total of 300 valid responses were obtained and included in the analysis. The sample was considered adequate for the application of Structural Equation Modeling (SEM), particularly because the proposed model included multiple constructs and moderating variables. The respondents were drawn from several MTs institutions in Padang, with consideration given to differences in age, teaching experience, educational level, and LMS experience. The demographic characteristics of the 300 respondents are presented in Table 1.

Table 1. Participant Demographic N=300

Demographic	Category	Frequency	%
Age (Years)	20-30	65	21.66%
	31-40	85	28.32%
	41-50	97	32.36%
	51-60	53	17.66%
Education Level	under graduate	263	87.66%
	post graduate	37	12.34%
	1 to 10 Years	107	37.54%
Working Period as a Teacher	11 to 20 Years	94	32.99%
	21 to 30 Years	77	27.01%
	31 to 40 Years	7	2.46%
Experience Using LMS	< 1 Year	38	13.33%
	> 1 Years	247	86.67%
Frequency Of Using LMS Pinter Kemenag	< 5 times	247	86.67%
	> 5 times	38	13.33%

Measures

Data were collected using a structured questionnaire administered online through Google Forms from January 31 to March 25, 2026. The online survey was used to reach teachers from multiple MTs institutions in

Padang. The questionnaire was developed by adapting established Technology Acceptance Model (TAM) literature and measured five primary constructs: Perceived Ease of Use (PEU), which refers to teachers' perceptions of how easy the MOOC-based LMS is to operate; Perceived Usefulness (PU), which reflects teachers' perceptions of the benefits provided by the platform for their teaching and professional activities; Attitude Toward Using (ATU), which represents teachers' positive or negative attitudes toward using the technology; Behavioral Intention (BI), which refers to teachers' intention to continue using the platform; and Actual Use (AU), which reflects teachers' actual use of the system, including the frequency and duration of platform use. Each statement was measured using a five-point Likert scale, ranging from 1 = Strongly Disagree to 5 = Strongly Agree. Demographic information concerning respondents' age and highest educational attainment was also collected for the moderation analysis

Table 2. Constucts and Operational Defenitions

Construct	Code	Operational defenition
Perceived Ease of Use	PEU	Perceived ease of operating the MOOC-based LMS
Perceived Usefulness	PU	Perceived benefits of the LMS for teaching and professional activities
Attitude Toward Using	ATU	Positive or negative orientation toward using the LMS
Behavioral Intention	BI	Intention to continue using the LMS
Actual Use	AU	Actual frequency and dutration of LMS use

Data Collection Produce

Data collection was conducted using an online questionnaire distributed through Google Forms between January 31 and March 25, 2026. The online format enabled the researchers to reach female MTs teachers from different madrasah institutions across Padang. Participants were informed about the purpose of the study and the confidentiality of their responses before completing the questionnaire. A total of 300 valid responses were subsequently included in the analysis

Data Analysis

The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. PLS-SEM was selected to examine the relationships among multiple latent constructs and the moderating effects incorporated into the proposed model. The analysis consisted of two main stages: measurement model assessment (outer model) and structural model assessment (inner model).

Measurement Model

The measurement model was evaluated to assess convergent validity, discriminant validity, and construct reliability, in accordance with the criteria recommended by Hair et al. (2022). Convergent validity was assessed using the outer loading and Average Variance Extracted (AVE) values. An indicator was considered valid if its outer loading value exceeded 0.70, and a construct was considered to satisfy convergent validity if its AVE value exceeded 0.50, indicating that the construct explains more than 50% of the variance of its indicators (Hair, 2022).

Construct reliability was evaluated using Cronbach's alpha and Composite Reliability (rho_c), with a minimum threshold of 0.70 indicating adequate internal consistency (Hair, 2022). Multicollinearity among indicators was examined using the Variance Inflation Factor (VIF), with values below 5 indicating the absence of collinearity problems (Hair, 2022). Discriminant validity was assessed using the Fornell-Larcker criterion, in which the square root of a construct's AVE must exceed its correlations with all other constructs (Fornell & Larcker, 1981), and was further confirmed using the Heterotrait-Monotrait Ratio (HTMT), with a value below 0.90 indicating that the constructs are empirically distinct from one another (Hair, 2022; Henseler et al., 2015).

In the initial model, five indicators X2.3, X1.4, M1.3, M2.3, and Y4 were removed because their outer loading values did not meet the minimum criterion of 0.70. The measurement model was subsequently reassessed after the elimination of these indicators, and the results confirmed that all remaining indicators satisfied the criteria for convergent validity, construct reliability, and discriminant validity, as presented in the Results section.

Structural Model

After assessment of the measurement model, the structural model was evaluated to examine the hypothesized relationships among the constructs. Hypothesis testing was conducted using the bootstrapping procedure in SmartPLS. The analysis generated path coefficients, sample means, standard deviations, t-statistics, and p-values. A relationship was considered statistically significant when the t-statistic exceeded 1.96 and the p-value was below 0.05. The direct-effect analysis examined six hypothesized relationships within the proposed model, namely $PEU \rightarrow PU$, $PU \rightarrow ATU$, $PEU \rightarrow ATU$, $PU \rightarrow BI$, $ATU \rightarrow BI$, and $BI \rightarrow AU$. In addition to these direct relationships, the moderation analysis was conducted to determine whether educational level and age moderated the relationship between Behavioral Intention (BI) and Actual Use (AU).

Research Hypotheses

Based on the proposed TAM framework, the following hypotheses were tested:

H1: Perceived Ease of Use (PEU) significantly influences Perceived Usefulness (PU).

H2: Perceived Usefulness (PU) significantly influences Attitude Toward Using (ATU).

H3: Perceived Ease of Use (PEU) significantly influences Attitude Toward Using (ATU).

H4: Perceived Usefulness (PU) significantly influences Behavioral Intention (BI).

H5: Attitude Toward Using (ATU) significantly influences Behavioral Intention (BI).

H6: Behavioral Intention (BI) significantly influences Actual Use (AU).

H7: Educational level moderates the relationship between Behavioral Intention (BI) and Actual Use (AU).

H8: Age moderates the relationship between Behavioral Intention (BI) and Actual Use (AU).

Results and Discussions

Respondent Characteristics

A total of 300 valid responses from female Madrasah Tsanawiyah (MTs) teachers in Padang, West Sumatra, were included in the analysis. The respondents varied in terms of age, educational level, teaching experience, and LMS experience. The age distribution showed that 65 respondents (21.66%) were aged 20–30 years, 85 (28.32%) were aged 31–40 years, 97 (32.36%) were aged 41–50 years, and 53 (17.66%) were aged 51–60 years. In terms of educational level, 263 respondents (87.66%) held undergraduate qualifications, while 37 (12.34%) held postgraduate qualifications.

Regarding teaching experience, 107 respondents (37.54%) had 1–10 years of experience, 94 (32.99%) had 11–20 years, 77 (27.01%) had 21–30 years, and 7 (2.46%) had 31–40 years of experience. In terms of LMS experience, 38 respondents (13.33%) reported less than one year of experience, whereas 247 respondents (86.67%) reported more than one year. The characteristics of the respondents are presented in Table 3.

Table 3. Characteristics of Respondents (N=300)

Variable	Category	n	%
Age	20–30 years	65	21.67
	31–40 years	85	28.33
	41–50 years	97	32.33
	51–60 years	53	17.67
Educational level	Undergraduate	263	87.67
	Postgraduate	37	12.33
Teaching experience	1–10 years	107	37.54
	11–20 years	94	32.98
	21–30 years	77	27.02
	31–40 years	7	2.46
LMS experience	<1 year	38	13.33
	>1 year	247	86.67

Measurement Model Assessment

The measurement model was assessed to evaluate indicator reliability, convergent validity, construct reliability, and discriminant validity (Hair Jr. et al., 2021). The initial PLS-SEM model showed five indicators with outer loading values below the minimum criterion of 0.70. These indicators were X2.3 (-0.079), X1.4 (-0.167), M1.3 (-0.020), M2.3 (-0.029), and Y4 (-0.024). The five indicators were therefore removed, and the measurement model was subsequently reassessed.

Table 4. Indicators Removed from the initial Measurement Model

Indicator	Outer Loading	Decision
X2.3	□ 0.079	Removed
X1.4	□ 0.167	Removed
M1.3	0.020	Removed
M2.3	□ 0.029	Removed
Y4	□ 0.024	Removed

The removal of these indicators was based on their failure to meet the minimum outer-loading criterion. The subsequent PLS algorithm was then used to obtain the revised measurement model.

Discriminant Validity

Discriminant validity was assessed using the Fornell–Larcker criterion, in which the square root of the AVE for each construct should exceed its correlations with other constructs.

Table 5. Fornell-Larcker Disctiminant Validity Result

Variable	ATU	AU	Age	BI	Educational Level	PEU	PU
ATU	0.734						
AU	0.607	0.718					
Age	0.083	0.064	1.000				
BI	0.739	0.615	0.059	0.694			
Educational Level	□ 0.042	□ 0.032	0.012	□ 0.148	1.000		
PEU	0.641	0.575	0.011	0.617	□ 0.053	0.631	
PU	0.718	0.589	0.114	0.650	□ 0.075	0.663	0.691

Discriminant Validity

The structural model was evaluated using the coefficient of determination (R^2) to determine the proportion of variance in each endogenous construct explained by its predictors. The reported R^2 values were 0.654 for ATU, 0.590 for AU, 0.622 for BI, and 0.670 for PU.

Tabel 6. Coeffiecent of Detetmination

Endogenous Construct	R^2	Adjusted R^2
ATU	0.654	0.651
AU	0.590	0.586
BI	0.622	0.620
PU	0.670	0.668

These results indicate that the model explains 65.4% of the variance in ATU, 59.0% in AU, 62.2% in BI, and 67.0% in PU. Based on the classification reported in the original manuscript, these values range from moderate to strong explanatory power.

Direct Effects and Hypothesis Testing

The direct relationships were examined using the PLS-SEM bootstrapping procedure. The article reports statistically significant results for all six hypothesized direct relationships.

Table 7. Direct-Effect Hypothesis Testing

Hypothesis	Relationship	β	t	p	Decision
H1	PEU → PU	0.5	18.105	<0.001	Supported
H2	PU → ATU	0.4	8.991	<0.001	Supported
H3	PEU → ATU	0.2	4.872	<0.001	Supported
H4	PU → BI	0.5	16.280	<0.001	Supported
H5	ATU → BI	0.5	10.504	<0.001	Supported
H6	BI → AU	0.4	13.431	<0.001	Supported

The strongest direct relationship was ATU → BI ($\beta = 0.719$), followed by PEU → PU ($\beta = 0.663$) and PU → BI ($\beta = 0.650$). The relationship between BI and AU was also positive and statistically significant ($\beta = 0.635$, $t = 13.431$, $p < 0.001$).

Model Fit

The model fit assessment produced an SRMR of 0.078 for the saturated model and 0.750 for the estimated model. The NFI values were 0.609 for the saturated model and 0.557 for the estimated model. These results should be interpreted cautiously, as the reported estimated-model SRMR and NFI do not meet the commonly cited thresholds for acceptable model fit. Therefore, the structural relationships are interpreted primarily on the basis of the PLS-SEM explanatory and hypothesis-testing results rather than an overall claim of satisfactory model fit.

Summary of Hypothesis Testing**Table 8.** Summary of Hypothesis Testing

Hypothesis	Relationship	Result
H1	PEU → PU	Supported
H2	PU → ATU	Supported

Hypothesis	Relationship	Result
H3	PEU → ATU	Supported
H4	PU → BI	Supported
H5	ATU → BI	Supported
H6	BI → AU	Supported
H7	Educational Level × BI → AU	Not Supported
H8	Age × BI → AU	Not Supported

Overall, the results show that all six direct relationships were statistically significant, whereas neither educational level nor age significantly moderated the relationship between behavioral intention and actual use.

The Effect of Perceived Ease of Use on Perceived Usefulness

The findings support H1, demonstrating that Perceived Ease of Use (PEU) has a significant positive effect on Perceived Usefulness (PU) ($\beta = 0.663$, $t = 18.105$, $p < 0.001$). This result indicates that teachers who perceive the MOOC-based LMS as easy to operate are more likely to perceive the platform as useful for their professional learning and teaching-related activities. This finding is consistent with the fundamental proposition of the Technology Acceptance Model (TAM) developed by Davis (1989), which positions perceived ease of use as an important determinant of perceived usefulness. In TAM, users are more likely to recognize the benefits of a technology when they perceive that the technology can be used with relatively little effort (Davis, 1989). The strong coefficient obtained in the present study provides empirical support for this relationship in the context of MOOC-based LMS use among MTs teachers.

The result is also consistent with empirical research on LMS adoption among instructors. For example, research involving vocational college instructors found that perceived usefulness and perceived ease of use were important factors influencing instructors' acceptance of LMS technology, with perceived usefulness emerging as a particularly important predictor of behavioral intention. More recent research involving teachers and MOOCs likewise demonstrates the relevance of PEU and PU in understanding teachers' perceptions and behavioral responses toward MOOCs. In the context of the present study, the relationship may reflect the practical nature of professional learning through PINTAR. When teachers can navigate the platform, access learning materials, and complete learning activities without substantial technical difficulty, they are more likely to recognize the platform as useful. Therefore, platform usability should be regarded not merely as a technical characteristic but as a factor that shapes teachers' perceptions of the educational value of the LMS.

The Effects of Perceived Usefulness and Perceived Ease of Use on Attitude Toward Using

The results support both H2 and H3. Perceived Usefulness significantly influenced Attitude Toward Using (ATU) ($\beta = 0.523$, $t = 8.991$, $p < 0.001$), while Perceived Ease of Use also had a significant positive effect on ATU ($\beta = 0.294$, $t = 4.872$, $p < 0.001$). These findings indicate that teachers' attitudes toward using the MOOC-based LMS are shaped by both the functional benefits they perceive and the effort required to use the technology. This finding extends the logic of TAM by demonstrating that teachers are more likely to develop favorable attitudes when they believe that the platform provides meaningful benefits and can be operated without excessive difficulty (Davis, 1989).

Interestingly, the coefficient for PU ($\beta = 0.523$) is higher than that for PEU ($\beta = 0.294$). This suggests that, within the present sample, perceived usefulness is more influential than perceived ease of use in shaping teachers' attitudes toward the LMS. This pattern is compatible with previous research involving LMS users, in which perceived usefulness has been identified as an important determinant of technology acceptance and behavioral intention. The finding is also relevant to recent research on MOOCs in teacher education. Camilleri et al. (2025) reported that teachers' perceptions of the usefulness and ease of use of MOOCs were important dimensions of their changing attitudes toward MOOC-based learning. Their findings further emphasized that platform usability, flexibility, and access to learning resources can shape teachers' experiences with MOOCs.

Therefore, the findings suggest that improving the PINTAR platform should involve two complementary strategies. First, technical usability should be improved through clear navigation, accessible interfaces, and simple interaction processes. Second, the content and activities provided through the platform should demonstrate clear relevance to teachers' professional needs. A platform that is easy to use but offers limited professional value may not generate a sufficiently positive attitude, whereas useful content delivered through a difficult interface may discourage continued engagement.

The Effects of Perceived Usefulness and Attitude Toward Using on Behavioral Intention

The findings support H4 and H5, showing that Perceived Usefulness significantly influenced Behavioral Intention (BI) ($\beta = 0.650$, $t = 16.280$, $p < 0.001$), while Attitude Toward Using (ATU) had a stronger effect on BI ($\beta = 0.719$, $t = 10.504$, $p < 0.001$). These results are consistent with TAM, which identifies perceived

usefulness as a key determinant of technology acceptance (Davis, 1989), and with previous LMS and MOOC studies demonstrating the importance of usefulness and positive attitudes in shaping behavioral intention. The stronger ATU $\rightarrow$ BI relationship indicates that teachers' intention to use PINTAR depends not only on its perceived benefits but also on their overall experience and attitude toward the platform. Therefore, PINTAR implementation should promote relevant professional-development content, ease of interaction, and positive learning experiences to strengthen teachers' continued intention to use the platform.

The Effect of Behavioral Intention on Actual Use

The findings support H6, demonstrating that Behavioral Intention significantly influences Actual Use ($\beta = 0.635$, $t = 13.431$, $p < 0.001$), indicating that teachers with stronger intentions to use the MOOC-based LMS tend to report higher levels of actual use. This result supports TAM (Davis, 1989), which positions behavioral intention as an important mechanism linking technology acceptance to actual behavior, and is consistent with previous LMS and MOOC adoption research. In the context of PINTAR, the significant BI $\rightarrow$ AU relationship suggests that strengthening teachers' willingness to use the platform can promote greater actual engagement, although intention should not be considered equivalent to actual behavior. Therefore, professional development programs should facilitate the transition from intention to sustained use through structured learning activities, continuous access to relevant resources, and opportunities to apply acquired knowledge in professional practice.

The Moderating Role of Educational Level

Contrary to H7, educational level did not significantly moderate the relationship between Behavioral Intention and Actual Use ($\beta = 0.231$, $t = 1.305$, $p = 0.192$). This finding indicates that the strength of the relationship between teachers' intention to use the LMS and their actual use did not differ significantly according to educational attainment. In other words, the data do not provide sufficient evidence that postgraduate teachers translate behavioral intention into actual LMS use differently from undergraduate teachers. This result is noteworthy because educational attainment may theoretically be associated with differences in exposure to academic and digital technologies. However, TAM research suggests that the central technology acceptance mechanisms are primarily associated with users' perceptions of usefulness, ease of use, attitudes, and intentions rather than formal demographic characteristics alone (Davis, 1989).

The non-significant moderation may also be related to the composition of the sample. Most respondents were undergraduate teachers (87.66%), while only 12.34% were postgraduate teachers. Consequently, the substantial imbalance between the two educational-level groups may have reduced the ability of the moderation analysis to detect statistically significant differences. Therefore, the present finding should not be interpreted as demonstrating that educational level is irrelevant to technology adoption in all contexts. Rather, it suggests that within this particular sample and LMS context, educational level did not significantly change the relationship between behavioral intention and actual use.

The Moderating Role of Age

H8 was also not supported, as age did not significantly moderate the relationship between Behavioral Intention and Actual Use ($\beta = 0.049$, $t = 0.810$, $p = 0.418$). The finding indicates that the relationship between intention and actual LMS use was statistically similar across the age groups represented in the study. This result is particularly interesting because age is frequently considered a potentially important demographic factor in technology adoption research. However, previous LMS research has shown that age does not necessarily have a significant relationship with the core TAM variables. For example, research involving instructors found that age did not significantly correlate with the principal technology acceptance factors examined in the study. This provides empirical support for the possibility that age may not always function as a significant determinant or moderator of technology acceptance.

The result also needs to be interpreted in relation to the participants' LMS experience. A substantial proportion of the respondents reported more than one year of LMS experience. This may suggest that practical familiarity with LMS environments could reduce differences that might otherwise be associated with age. Recent research on teachers' engagement with MOOCs similarly emphasizes that technology acceptance is influenced by contextual factors such as usability, learning experience, technical barriers, instructor support, and the design of the learning environment. Thus, age alone may be insufficient to explain differences in actual LMS use. Nevertheless, because the present study did not directly measure digital competence, self-efficacy, or digital literacy, these explanations should be treated as possible interpretations rather than causal explanations.

Theoretical Implications

The findings provide several theoretical implications for the application of TAM in MOOC-based professional learning. First, the significant relationship between PEU and PU ($\beta = 0.663$) reinforces the fundamental TAM proposition that ease of use contributes to users' perceptions of usefulness (Davis, 1989). Second, the significant effects of PU and PEU on ATU demonstrate that both functional value and usability contribute to teachers'

attitudes toward the technology. This finding extends the application of TAM to a specific professional learning context involving MTs teachers. Third, the strong relationship between ATU and BI ($\beta = 0.719$) highlights the importance of users' attitudes in explaining behavioral intention. This is particularly important because the strongest relationship in the model occurs at the attitudinal-intentional stage.

Fourth, the significant relationship between BI and AU ($\beta = 0.635$) indicates that the acceptance process extends toward reported actual use. This is consistent with the broader logic of technology acceptance models, in which behavioral intention functions as an important mechanism linking users' perceptions and subsequent technology use. Finally, the absence of significant moderating effects for age and educational level demonstrates that demographic variables should not automatically be assumed to moderate technology acceptance relationships. Their effects need to be empirically tested within specific educational and technological contexts.

Practical Implications

The findings provide several practical implications for the implementation of PINTAR and other MOOC-based LMS platforms for teacher professional development. First, platform usability should be prioritized. The significant PEU $\rightarrow$ PU relationship indicates that improving the ease with which teachers interact with the platform may strengthen their perception of its usefulness. Second, the significant PU $\rightarrow$ ATU and PU $\rightarrow$ BI relationships suggest that professional-development content should provide clear and tangible benefits. Teachers should be able to recognize how participation in PINTAR can contribute to their professional knowledge and instructional practice.

Third, the strong ATU $\rightarrow$ BI relationship indicates that implementation strategies should focus on developing positive user experiences, rather than merely providing technical access. Fourth, because BI significantly predicts AU, program managers should provide mechanisms that help teachers transform intention into continued use. Structured courses, relevant professional-development activities, and opportunities for continuous learning may help sustain engagement. Finally, the non-significant moderation effects indicate that PINTAR implementation should not rely exclusively on age- or education-based segmentation. Instead, implementation strategies should emphasize usability, usefulness, relevance, and positive user experience.

Conclusions

This study concludes that the extended Technology Acceptance Model (TAM) effectively explains the acceptance of a MOOC-based LMS among female Madrasah Tsanawiyah teachers. Perceived Ease of Use and Perceived Usefulness significantly shaped teachers' attitudes and Behavioral Intention, which subsequently influenced Actual Use, with Attitude Toward Using showing the strongest effect on Behavioral Intention ($\beta = 0.719$, $p < 0.001$). In contrast, age and educational level did not significantly moderate the relationship between Behavioral Intention and Actual Use. These findings indicate that teachers' acceptance and use of the MOOC-based LMS are primarily driven by perceptions of usefulness, ease of use, and positive attitudes rather than demographic differences. Therefore, MOOC-based professional development should prioritize a useful, accessible, and positive learning experience to promote sustained LMS use.

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