Understanding Generation Z's Continuance Intention to Use Mobile-Assisted Language Learning Applications: Evidence from Indonesia

Gede Darma[1], Lisana Lisana[2*]

[1,2]Department of Informatics, Faculty of Engineering, University of Surabaya, Surabaya, East Java, Indonesia
E-mail: [1]gededarma161@gmail.com, [2*]lisana@staff.ubaya.ac.id

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Abstract

Recently, the number of users of mobile-assisted language learning (MALL) in Indonesia has increased. MALL has become a promising solution for language learning without time or space limitations. Previous studies have shown that MALL can help learners acquire language skills while providing access to a wide range of learning resources. Moreover, Generation Z needs to learn more languages to keep up with globalization and support their studies and careers. Previous studies have examined MALL adoption and continuance intention, but the evidence on continuance intention among Generation Z in Indonesia remains limited. Therefore, this study aims to investigate the factors influencing their continuance intention to use MALL as a medium for learning languages. From October 2025 to January 2026, a cross-sectional study was conducted targeting Generation Z in Java and Bali via an online survey. A total of 447 valid respondents were obtained using convenience sampling, with the majority residing in East Java. The data were then analyzed using covariance-based structural equation modeling (CB-SEM) with AMOS. The results indicated that perceived ease of use ($\beta = .163$), perceived usefulness ($\beta = .233$), perceived enjoyment ($\beta = .191$), gamification ($\beta = .124$), and self-regulation skills ($\beta = .221$) significantly influence users' continuance intention, with an R^2 of 0.564. The results bridge a research gap concerning the continuance intention to use MALL among Indonesian Generation Z users. In practice, the study provides guidelines for educators and developers to refine MALL tools and curricula, ensuring they meet learners' specific needs and promote continuous engagement.

Keywords: Continuance Intention, Structural Equation Modeling, Generation Z, MALL, Indonesia.

I. INTRODUCTION

With 74.93 million people, Generation Z has emerged as the most populous generation in Indonesia, accounting for nearly 28% of the nation [1]. Currently, Generation Z is at the age of pursuing education and entering the workforce. Generation Z is also known for their high technological skills, as they have been exposed to technology since birth [2]. To support their studies or career opportunities, more languages should be learned.

However, Indonesia still faces challenges in foreign language learning. For example, Indonesia still ranked 80th out of 123 in the EF English Proficiency Index (EPI) 2025 with a score of 471, which is lower than the average global score of 488 [3]. There are some problems behind that lower score. Firstly, learners lack strong motivation to learn other languages [4]. Secondly, Aisyah et al. [5] noted that resource and trainer limitations also play a crucial role in the difficulty of learning Chinese in Indonesia. Finally, there are still some uncertainties regarding language-teaching policy for Arabic language learning [6].

Mobile-assisted language learning (MALL) is a part of mobile learning that focuses on language learning [7], [8]. MALL is known for its flexibility, personalization, and ease of access. Moreover, learners can easily access information and learn from anywhere without the limitation of time and place [7], [9]. According to Business of Apps [10], a third-party source, the number of active Duolingo users worldwide has increased significantly, from 8.5 million in 2020 to 46.6 million in 2025. In addition, other MALL applications popular in Indonesia, like ELSA Speak and Cake, have large numbers of downloads: 329,860 and 105,663, respectively, as reported by Statista [11]. Moreover, it is also known that learners' ability to acquire foreign languages is enhanced when they spend more time in interactive technology-enabled MALL [8], [12], [13]. Following its benefits, MALL should become a solution for Generation Z to learn languages.

Beyond their digital familiarity, Generation Z is important in the context of MALL because of their distinctive learning characteristics. A previous study by Shizarian et al. [14] suggests that Generation Z prefers flexible, personalized, and technology-integrated learning environments. They also tend to engage in self-directed learning and value immediate feedback and rewards. They also expect learning technologies to provide interactive and enjoyable experiences. These characteristics are closely related to the core features of MALL.

Davis [15] proposed the Technology Acceptance Model (TAM), which provides a well-established framework for explaining users' acceptance and continued use of technology through perceived ease of use and perceived usefulness. However, in the context of MALL, continuance intention is influenced not only by users' cognitive evaluations of technology but may also depend on motivational and application design such as enjoyment and game-based rewards, as well as their ability to regulate their own learning. Therefore, extending TAM with constructs relevant to motivation and self-regulation may provide a more comprehensive explanation of continuance intention.

Although several studies have examined MALL in the Indonesian context, most focus primarily on initial adoption, such as [16], [17], [18]. To the best of our knowledge, only a limited number of studies have explored the continuance intention of MALL applications, for example [9], [19], [20], [21]. Existing continuance intention studies have also examined different combinations of cognitive, motivational, and learner-related factors across different user populations and MALL platforms. However, evidence focusing specifically on Generation Z users that combine TAM's cognitive constructs together with motivational and self-regulatory factors, especially in Indonesia, remains limited. As summarized in Table 1, recent Indonesian studies have begun to explore the factors associated with MALL continuance intention, the results regarding key predictors remain inconsistent across different user populations and platforms.

Table 1. Comparison of Prior Indonesian MALL Continuance Intention Research

Author	Focus	Significant Factors (on CI)	Insignificant Factors (on CI)	Target
Faozi and Handayani [9]	General MALL	PU, SAT, SR	-	General
Tifanny et al. [19]	General MALL	TRU, SAT, ATT, GAM	PU	General
Ulfiah et al. [20]	Gamified MALL Apps.	SAT	EFF, LEARN, ERRS, MEM	Users aged 17-25
Afifah et al. [21]	Duolingo	PCOMP, PEOU, PE	-	General

Note(s): PU = Perceived Usefulness, SAT = Satisfaction, SR = Self-regulation Skills, TRU = Trust, ATT = Attitude, GAM = Gamification, PCOMP = Perceived Competence, PEOU = Perceived Ease of Use, PE = Perceived Enjoyment, EFF = Efficiency, LEARN = Learnability, ERRS = Errors, MEM = Memorability

Even though initial adoption and continuance intention are related, they represent different stages of technology use. Initial adoption refers to users' willingness to begin using a technology [22], while continuance intention concerns their intention to keep using technology after gaining actual experience [9]. Therefore, this study aims to investigate the factors influencing the continuance intention to use MALL applications among Generation Z users in Indonesia. Based on the research gap identified above, this study addresses the following research question:

RQ1: What factors significantly influence Generation Z users' continuance intention to use MALL applications in Indonesia?

To address RQ1, this study focuses on MALL applications in general rather than any single platform, allowing the proposed model to be examined across commonly used language-learning applications. The research examines core predictors such as perceived ease of use and perceived usefulness. Perceived ease of use refers to the simplicity of operating a MALL application [23], whereas perceived usefulness concerns the effectiveness of a MALL application in improving learning performance [24]. Both factors are established predictors of continuance intention. To capture motivational and learning-specific factors, the TAM framework is extended with perceived enjoyment, gamification, and self-regulation skills. Perceived enjoyment refers to the extent to which users perceive the MALL application as enjoyable in its own right, regardless of any performance outcomes [25] and has been shown to positively impact usage persistence [26]. In contrast, gamification refers to the incorporation of game design elements, such as points, badges, leaderboards, and rewards, into non-game learning environments to enhance user engagement and motivation [27]. Although both constructs are associated with user engagement, perceived enjoyment captures users' intrinsic emotional experience, whereas gamification captures the external design mechanisms intended to stimulate that experience. Finally, the self-regulation skills factor is also evaluated to determine how a learner's discipline in learning influences continuance intention [9]. By investigating these factors, this study bridges the gap in the literature on user retention in the Indonesian context and provides practical insights for educators and developers to foster sustained engagement in language learning.

The remainder of this article is organized as follows. Section II describes the research methods, including the research design, participants, questionnaire, and data analysis procedures. Section III presents the results and discusses the findings in relation to previous research and the proposed hypotheses, including the contributions of the research. Finally, section IV concludes the study.

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II. METHODS

This study adopted a quantitative research approach to examine the factors influencing Generation Z learners' continuance intention to use Mobile-Assisted Language Learning (MALL) applications. The research process consisted of several sequential stages, beginning with problem identification and literature review, followed by research model development, questionnaire development, data collection, data analysis, and hypothesis testing.

This study proposes a research model grounded in the Technology Acceptance Model (TAM) and in extended frameworks. Five hypotheses were proposed: H1, perceived ease of use has a significant influence on continuance intention; H2, perceived usefulness has a significant influence on continuance intention; H3, perceived enjoyment has a significant influence on continuance intention; H4, gamification has a significant influence on continuance intention; and H5, self-regulation skills has a significant influence on continuance intention. The proposed hypotheses are depicted in Figure 1.

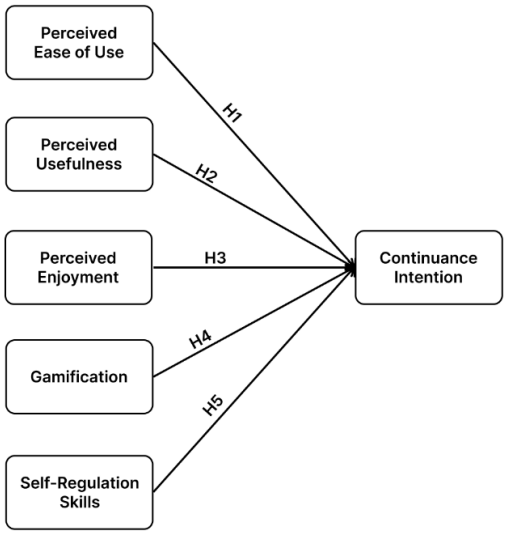

Figure 1. Proposed Research Model

A cross-sectional study design was used to obtain data from a specific time period, according to Neuman [28]. An online survey was used to collect data. To ensure accessibility among respondents, the survey was administered in two languages, English and Bahasa Indonesia. To ensure the validity of the measurement items, an expert in online learning and information systems evaluated the questionnaire primarily for content relevance, contextual appropriateness, and measurement suitability, as well as the language translation, while a professional English-language teacher reviewed the wording, grammar, and language consistency between the English and Bahasa Indonesia versions.

The survey is divided into two parts: respondents' characteristics and the questionnaire for the measurement instrument. All the measurement instruments were captured on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The items used to measure each construct were derived from existing research to ensure theoretical consistency, as listed in Table 2.

Table 2. Measurement Items

Variable	Indicator	Item	Ref
Perceived Ease of Use	PEOU1	Learning to use MALL is effortless	[29]
	PEOU2	Become skillful on using the MALL application is easy	
	PEOU3	Using MALL application to study languages is easy	
Perceived Usefulness	PU1	I can master a language that I am learning faster when I use MALL	[24]
	PU2	My language mastery performance improves when I use MALL	
	PU3	MALL improves my learning efficiency	
	PU4	MALL is useful for my language learning	
Perceived Enjoyment	PE1	I believe using MALL is entertaining	[25]
	PE2	I feel very excited when using MALL	
	PE3	I feel fun when using MALL	
	PE4	I feel studying is more enjoyable when using MALL	
Gamification	GAM1	The level of complexity of the material arranged in stages in MALL helps me increase my motivation to learn	[27]
	GAM2	Points can attract me to learn in MALL	
	GAM3	Badges can increase my motivation to take action in order to earn them in MALL	
Self-Regulation Skills	SR1	I reassess how well I comprehend the learning exercises in MALL	[9]
	SR2	I try to use MALL consistently when learning a language	
	SR3	I am looking for a support if there is any difficulty while using MALL	

Variable	Indicator	Item	Ref
	SR4	I am able to use MALL to effectively and efficiently plan my language learning strategies	
Continuance Intention	CI1	In the future, I plan to use MALL to learn other languages	[9]
	CI2	I plan to continuously use MALL regularly	
	CI3	I plan on using MALL to learn languages that is more complex	

To further validate the instrument, a pilot study with eight participants was conducted to gather practical feedback, which was used to refine and finalize it before data collection.

Following Neuman [28], this study employed a non-probability convenience sampling technique, in which respondents were selected based on their accessibility and willingness to participate. The survey targeted Generation Z MALL users across Java and Bali. However, because this study employed convenience sampling, the sample may not be proportionally representative of all regions of Java and Bali. The online questionnaire was distributed through schools, universities, and social media platforms to recruit eligible respondents voluntarily. To be eligible for participation, respondents were required to (1) belong to Generation Z, (2) reside in Java and Bali, (3) have prior experience using at least one MALL application for language learning, and (4) have used a MALL application for at least one month. MALL-user eligibility was verified using questionnaire items that asked respondents to identify the MALL application(s) they used and report their weekly usage duration. Responses that did not meet the criteria or contained incomplete information were excluded from the analysis. Participation in this study was voluntary. Respondents were informed of the study objectives before completing the questionnaire. For participants aged 13-17 years, the questionnaire was completed under the supervision of their parents or teachers. No formal parental or guardian consent procedure was implemented. Therefore, adult supervision was used as an additional safeguard during participation.

Following the guidelines established by Israel [30], the minimum sample size was calculated to determine the initial target for survey data collection. As the number of MALL application users is unavailable, the estimated population of MALL application downloads in Indonesia, which is 5,305,109, was used; then a minimum sample of 400 participants was determined to be necessary to maintain a 95% confidence level and a 5% margin of error per that guideline. The statistical analysis followed a sequential procedure: (1) descriptive statistics with outlier removal using Z-scores (±3.0 threshold) as referred from Osborne and Overbay [31]; (2) Confirmatory Factor Analysis (CFA) requiring factor loadings > 0.4 as referred from Straub and Gefen [32], a minimum standardized factor loading of 0.40 was considered acceptable, provided that the items loaded on their intended constructs, while items that did not meet this criterion were removed; (3) Cronbach's Alpha for internal consistency (≥ 0.7 = acceptable, ≥ 0.8 = good, ≥ 0.9 = excellent, referred from [25]); (4) normality testing via skewness (< 3.0) and kurtosis (< 7.0) as determined by Kline [33]; and (5) Structural Equation Modelling (SEM) using IBM SPSS Statistics 27 and IBM AMOS 24. Items with inadequate factor loadings were removed before estimating the final measurement and structural models.

III. RESULTS AND DISCUSSION

A. Results

Initially, the data collection gathered 505 respondents from October 2025 to January 2026. After removing 45 invalid responses and 13 outliers, the dataset comprised 447 valid responses. The demographic profiles of these participants are detailed in Table 3. The gender distribution was nearly even, with males accounting for 50.8% of the sample and females 49.2%. In terms of age, the 13-17 age group constituted the largest segment at 56.2%, followed by the 18-22 category at 27.1%, and the 23-28 group at 16.8%. Regarding occupation, students constituted the majority (80.1%), followed by workers (17.2%), entrepreneurs (2.5%), and housewives (0.2%). The vast majority of respondents (93.1%) were from East Java. The remaining participants were spread across West Java (1.8%), Bali (1.3%), Banten (1.3%), Central Java (1.1%), Jakarta (0.9%), and Yogyakarta (0.4%), each representing only a minor portion of the residency profile. In terms of MALL usage frequency, 73.1% spent less than three hours per week, while only 1.3% were high-frequency users spending over ten hours weekly.

Table 3. Respondents Demographic Profiles

Variable	Item	Count	Percentage
Gender	Male	227	50.8%
	Female	220	49.2%
Age	13-17 years old	251	56.2%
	18-22 years old	121	27.1%
	23-28 years old	75	16.8%
Residency	Bali	6	1.3%
	Banten	6	1.3%
	Central Java	5	1.1%
	East Java	416	93.1%
	Jakarta	4	0.9%
	West Java	8	1.8%
	Yogyakarta	2	0.4%
Occupation	Student	358	80.1%
	Worker	77	17.2%
	Entrepreneur	11	2.5%
	Housewives	1	0.2%
MALL usage per week	< 3 hours	327	73.1%
	4-6 hours	95	21.3%
	7-10 hours	19	4.3%
	> 10 hours	6	1.3%

Regarding the languages learned via MALL, English was the most commonly studied (76.06%), followed by Japanese (31.54%) and Chinese (30.20%). Korean (16.33%) and German (11.86%) also showed a notable presence, while other languages accounted for under 4% each. In terms of the application used, Duolingo was overwhelmingly dominant (91.72%), followed by ELSA Speak (14.32%) and EF Hello (13.20%). Although the study was designed to investigate MALL applications in general, the samples were predominantly composed of Duolingo users. This distribution is likely related to Duolingo's widespread adoption among Indonesian learners. Moreover, the primary motivations for MALL use were personal enrichment (54.36%), academic purposes (48.77%), career development (33.78%), and travel preparation (27.96%), indicating that both intrinsic and extrinsic motivations drive MALL engagement among Indonesian Generation Z.

To assess the potential for common method bias resulting from the use of a single self-administered questionnaire, Harman's single-factor test was conducted. All retained measurement items were included in the analysis using a single-factor solution. The first factor accounted for 40.159% of the total variance, which is below the recommended threshold of 50% by [34]. Therefore, common method bias was not considered a significant concern in this study.

Table 4 presents the descriptive statistics and standardized factor loadings for all measurement indicators. Overall, all indicators yielded mean scores ranging from 3.67 (PU1) to 4.15 (PU4 and PE1), all of which exceed the scale midpoint of 3.0, indicating that respondents generally held positive perceptions across all constructs. Among the constructs, Perceived Enjoyment (PE1, mean = 4.15) and Perceived Usefulness (PU4, mean = 4.15) recorded the highest mean scores, suggesting that respondents particularly valued the entertaining nature of MALL and its overall usefulness for language learning. Conversely, PU1 (mean = 3.67) recorded the lowest mean, indicating that respondents were comparatively less confident that MALL helps them master a language faster. Standard deviation values ranged from .786 (PU4) to .926 (CI3), reflecting moderate variability and suggesting that respondents interpreted the items with reasonable consistency across the five-point Likert scale.

The validity testing was conducted through Confirmatory Factor Analysis (CFA). During the testing stage, the variable SR1 did not load adequately with the other indicator of the self-regulation skills construct. SR1 was therefore removed from the model to improve the construct's measurement validity. Furthermore, the internal consistency of the constructs was evaluated using Cronbach's Alpha. The indicator GAM1 was then removed because its inclusion reduced the internal consistency of the gamification construct. Although the construct already demonstrated acceptable reliability, removing GAM1 increased the Cronbach's Alpha coefficient.

Following the removal of SR1 and GAM1, all subsequent reliability, validity, model fit, and structural analyses were conducted using the retained indicators. The remaining indicators demonstrated satisfactory validity, with all factor loadings exceeding the minimum 0.4 threshold recommended by Straub and Gefen [32]. Although higher thresholds (e.g., 0.50 or 0.70) are commonly adopted in more recent SEM studies, the 0.40 criterion remains an acceptable minimum for retaining theoretically meaningful indicators. However, all the factor loadings have already exceeded the 0.70 threshold, which are in the range of .712 to .865 as depicted in Table 4.

Table 4. Descriptive Statistics and Standardized Factor Loadings

Variable	Indicator	Mean	Std. Dev.	Factor Loadings
Perceived Ease of Use	PEOU1	4.10	.822	.781
	PEOU2	3.89	.826	.790
	PEOU3	4.08	.834	.801
Perceived Usefulness	PU1	3.67	.855	.784
	PU2	3.82	.823	.809
	PU3	3.89	.822	.788
	PU4	4.15	.786	.753
Perceived Enjoyment	PE1	4.15	.801	.773
	PE2	3.79	.812	.832
	PE3	3.97	.803	.850
	PE4	4.09	.820	.784
Gamification	GAM2	4.00	.798	.873
	GAM3	4.02	.856	.865
Self-Regulation Skills	SR2	3.92	.812	.837
	SR3	3.83	.823	.712
	SR4	3.93	.809	.828
Continuance Intention	CI1	4.07	.864	.853
	CI2	3.81	.882	.814
	CI3	3.97	.926	.801

Then, as shown in Table 5, all constructs demonstrated satisfactory internal consistency, with Cronbach's Alpha values ranging from 0.834 to 0.883 and were considered good, exceeding the 0.7 threshold stated by [25]. Indicating good reliability and consistent responses across items. In addition, composite reliability (CR) values ranged from 0.833 to 0.884, further confirming the strong internal consistency of the measurement model as recommended by [35], which passed 0.7. The average variance extracted (AVE) values ranged from 0.614 to 0.755, exceeding the recommended threshold of 0.5 by [35], indicating that each construct explains more than half of the variance of its indicators and demonstrates good convergent validity. The results of the reliability and validity assessments indicate that the measurement instrument demonstrated good reliability and acceptable convergent validity, suggesting consistent measurement across constructs.

Table 5. Measurement Model Assessment

Variable	Num. of Indicators	Cronbach's Alpha	Composite Reliability	AVE
PEOU	3	.834	.833	.625
PU	4	.863	.864	.614
PE	4	.883	.884	.657
GAM	2	.859	.861	.755
SR	3	.837	.836	.631

Variable	Num. of Indicators	Cronbach 's Alpha	Composite Reliability	AVE
CI	3	.862	.863	.677

Moreover, discriminant validity was assessed using the Fornell-Larcker criterion as shown in Table 6. The square root of average variance extracted (AVE) for each construct, shown on the diagonal, exceed its correlations with all other constructs. Specifically, the diagonal values ranged from 0.784 to 0.869, while the highest inter-construct correlation was 0.663. These results indicate that each construct shares more variance with its own indicators than with other constructs, which confirming adequate discriminant validity as recommended by Fornell & Larcker [36].

Table 6. Discriminant Validity with Fornell-Larcker

Construct	PEOU	PU	PE	GAM	SR	CI
PEOU	0.791					
PU	0.566	0.784				
PE	0.491	0.663	0.810			
GAM	0.508	0.541	0.570	0.869		
SR	0.472	0.604	0.551	0.496	0.794	
CI	0.556	0.653	0.618	0.552	0.606	0.823

In addition, to ensure the data's suitability for Structural Equation Modeling (SEM), a descriptive analysis of skewness and kurtosis was conducted to evaluate distributional assumptions. The results demonstrated that all values are suitable for SEM analysis, with skewness less than 3.0 and kurtosis less than 7.0, as stated by Straub and Gefen [32].

The SEM analysis was conducted using 447 valid observations (N = 447) and the Maximum Likelihood (ML) estimation method. No missing data were present in the final dataset. Prior to hypothesis testing, the overall model fit was assessed using five widely accepted indices, as presented in Table 7. The model yielded a chi-square (χ^2) value of 256.709 with 137 degrees of freedom (df), resulting in the CMIN/DF value of 1.874, which falls well below the threshold of 3.0, indicating an acceptable chi-square to degrees-of-freedom ratio. The Goodness-of-Fit Index (GFI = .942) exceeded the recommended threshold of 0.90, confirming adequate absolute model fit [37]. Both incremental fit indices, the Comparative Fit Index (CFI = .975) and the Tucker-Lewis Index (TLI = .969), surpassed the 0.90 threshold, indicating strong incremental model fit. Furthermore, the Root Mean Square Residual (RMR = .024) indicates a relatively small discrepancy between the relationships observed in the data and those reproduced by the proposed model. Finally, the Root Mean Square Error of Approximation (RMSEA = .044, 90% CI [.036, .053]) was well below the 0.08 threshold recommended by [38], indicating a good model fit. Collectively, these indices confirm that the structural model demonstrates a good fit to the data, providing a good basis for hypothesis testing.

Table 7. Model-Fit Assessment

Metric	Value	Threshold	Interpretation
CMIN/ DF	1.874	< 3.0	Good
GFI	.942	> 0.90	Good
CFI	.975	> 0.90	Good
TLI	.969	> 0.90	Good
RMSEA	.044	< 0.08	Good

The structural model was evaluated using IBM AMOS, with significance level categorized as $p < 0.001$ (***), $p < 0.01$ (**), and $p < 0.05$ (*), and not significant (NS) as mentioned by [25]. The SEM results are detailed in Table 8 and depicted in Figure 2. As the proposed model does not include any mediating constructs, only direct effects were estimated and reported. Therefore, indirect and total effects were not applicable in this study. The results indicate that all five proposed hypotheses were significant, with each p-value below the 0.05 threshold. The standard errors (S.E.) ranged from 0.060 to 0.076, suggesting stable parameter estimation, while critical ratios (C.R.) ranged from 2.181 to 3.755, confirming the statistical significance of all path coefficients. Notably, perceived usefulness (H2) and self-regulation skills (H5) exhibited the highest levels of significance ($p < 0.001$), emphasizing their important roles in the Indonesian Generation Z users' continuance intention to use MALL applications. In addition, the structural model explained 56.4% of the variance in continuance intention ($R^2 = 0.564$), indicating moderate explanatory power. These findings provide empirical support for the proposed conceptual framework, demonstrating that the model successfully identifies the key factors driving continuance intention to use in the MALL application.

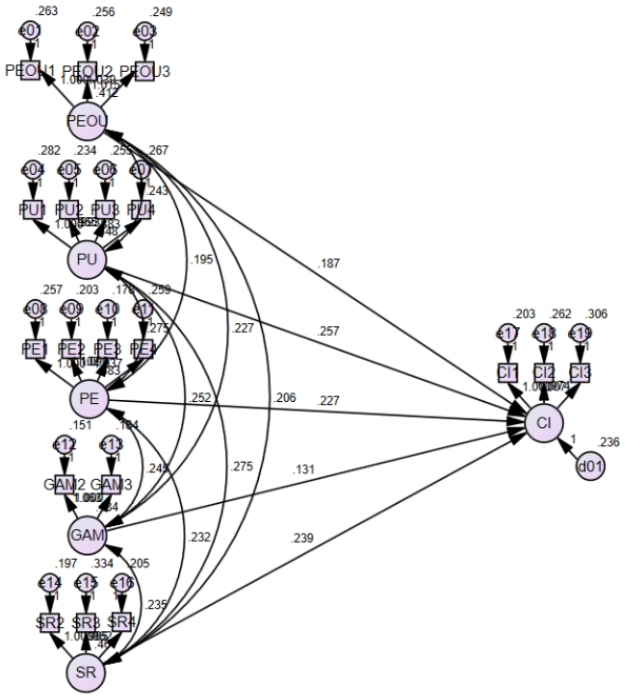

Figure 2. SEM Result from IBM AMOS

Table 8. SEM Result

Hypothesis	Estimate	β	S.E.	C.R.	P-value	Result
H1: CI ← PEOU	.187	.163	.065	2.871	.004	Supported
H2: CI ← PU	.257	.233	.076	3.366	***	Supported
H3: CI ← PE	.227	.191	.075	3.020	.003	Supported
H4: CI ← GAM	.131	.124	.060	2.181	.029	Supported
H5: CI ← SR	.239	.221	.064	3.755	***	Supported

B. Discussion

The results confirmed that all five hypotheses were statistically supported, indicating that the proposed relationships among the constructs were consistent with the conceptual framework. Firstly, the relationship between perceived ease of use and continuance intention (H1) was confirmed with a significant p-value of 0.004. This result mirrors the findings of [23], who suggested that when users perceive a MALL platform as easy to use and feel competent in operating it, their intention to continue using the application increases. This is particularly relevant to Generation Z, who have been exposed to technology since birth and possess high technological skills. They are considered technology-savvy, and their expectations regarding easy-to-use applications are high. This finding is consistent with the findings by Daneji et al. [24], which also reported a significant positive relationship between perceived ease of use and continuance intention. The finding is also consistent with the TAM framework [15], which mentions that ease of use reduces cognitive load, allowing learners to focus more on their primary task or learning activity. Thus, the significant relationship found in this study suggests that learners' perceptions of ease are associated with their intention to continue using them.

Similarly, perceived usefulness (H2) demonstrated a highly significant impact on continuance intention with a standardized coefficient (β) value of .257 and a p-value of less than 0.001. Consistent with research by [24] and [9], the result indicates that as learners recognize the application's benefits, such as mastering a language faster or improving learning efficiency, their likelihood of continued use increases significantly. Notably, perceived usefulness appeared as the main predictor in this study. This finding, however, contrasts with the recent study by [19], which reported that perceived usefulness has no significant influence on MALL continuance intention. In Indonesia, where learners face challenges in learning languages, MALL applications serve as an important tool for bridging the proficiency gap. When learners believe that MALL can help them learn a foreign language and improve their language mastery, it becomes part of their ongoing use of MALL. This suggests that curriculum developers along with application developers should prioritize demonstrating measurable learning outcomes to sustain user engagement.

Furthermore, perceived enjoyment (H3) was a highly significant predictor of continuance intention (p-value = 0.003). This aligns with studies by [26] and [25], strengthening the idea that the "fun" and entertaining value of a MALL application is essential for maintaining learners' retention in using the application. Similarly, [21] found that perceived enjoyment was significantly associated with continuance intention in the context of a specific MALL application. For Generation Z, intrinsic motivation derived from an exciting, stress-free learning process is a critical factor in user retention. This finding directly addresses the lack of motivation, a barrier to language learning in Indonesia [4], and suggests that fun, enjoyable, and engaging learning is essential for learners to continue using digital learning platforms like MALL.

The impact of gamification (H4) was also supported (p-value = 0.029). While this effect was not as strong as the other variables in the model, it remains an important component to support user experience. As stated in the studies [27] and [26], the inclusion of game design elements, such as points and badges, effectively motivates learners and encourages them to return to the application. However, gamification showed the weakest association in this study, consistent with the finding reported by [19]. The gamification construct itself was represented by two retained indicators related to reward-based game elements. The observed association primarily reflects these gamification features rather than gamification as a broader multidimensional construct. Nevertheless, this result suggests that gamification is most effective as a complementary engagement mechanism rather than the primary driver of learners' continuance intention on using MALL. Future developments in MALL should still integrate gamification alongside its content quality and perceived usefulness.

Finally, self-regulation skills (H5) had a highly significant influence on continuance intention (p-value < 0.001), making it the second-strongest predictor in this study. This result confirms that learners with high discipline in managing their own learning consistency are more likely to persist in using MALL applications, supporting the findings of [9]. In the Indonesian context, this factor is particularly important because learners need strong discipline when using MALL. Without such discipline, they may underutilize its flexibility and ability to support language learning without time and place constraints. The findings suggest that learners who can effectively and efficiently plan their language-learning strategies and re-evaluate their understanding are most capable of maintaining regular usage habits, and that educators need to incorporate training in self-regulation skills alongside MALL adoption for their learners.

Moreover, although Duolingo was the dominant MALL application among the respondents, gamification was the weakest predictor of continuance intention. This finding suggests that gamification features may be less influential in sustaining learners' intention to continue using MALL than intrinsic and cognitive factors. From a motivation perspective, reward-based gamification may primarily provide external motivation that encourages initial engagement, whereas perceived enjoyment reflects a more intrinsic form of

motivation that may contribute more strongly to continued engagement. Similarly, self-regulation plays an important role, as learners who can manage and sustain their own learning process are more likely to continue using MALL applications over time.

In this study, 56.2% of respondents were aged 13-17 years, suggesting that the findings may reflect the perceptions and learning behaviors of younger Generation Z learners. In addition, most respondents were students (80.1%), who may have different language-learning needs and motivations than those from other occupational backgrounds. For example, students may use MALL applications primarily to support their formal education, academic requirements, or study abroad, whereas working adults or entrepreneurs may use them for work- or business-related purposes. However, this study did not examine whether the relationships among the proposed constructs differ across age groups and occupational backgrounds.

In addition, the respondent profile revealed that 73.1% of participants used MALL applications for less than three hours per week. This suggests that, although MALL applications are used regularly, many Generation Z learners in Indonesia engage with them for relatively short periods. This usage behavior may reflect the flexible and supplementary nature of MALL, as mentioned by [39], where learners integrate short learning sessions into their daily routine. Despite the relatively low weekly usage intensity, all proposed factors significantly influenced continuance intention, indicating that users' perceptions of the app and their learning experience may be more important than the amount spent in the application.

It is also important to note that the findings describe learners' continuance intention of MALL applications. Although continuance intention is widely regarded as a significant predictor of future technology use, intentions do not always translate into actual behavior. Continued user usage may be associated with contextual factors, changing factors, or external constraints that were not studied in this study. Therefore, the significant relationships identified in this study should be interpreted as factors associated with users' intention to continue using MALL, rather than as evidence of actual long-term usage behavior.

C. Contributions

This study provides significant theoretical and practical contributions. Theoretically, it addresses the empirical gap in MALL continuance intention research within the Indonesian context by extending the TAM framework to incorporate perceived enjoyment, reward-based gamification features, and self-regulation skills. The study demonstrates that continuance intention to use MALL is shaped not only by functional perceptions of the technology but also by affective experiences, reward-based motivational features, and learners' self-regulation. This perspective provides a broader basis for understanding continuance intention in mobile learning environments, particularly among Generation Z users.

From a practical standpoint, these findings provide insights for MALL developers and educators. For developers, MALL applications should prioritize a balance between core functionality and ease of use, with features that actively enhance learners' engagement. Since perceived enjoyment was a stronger predictor than reward-based gamification features in this study, developers may prioritize creating enjoyable and engaging learning experiences rather than relying primarily on reward-based features such as badges or points. These reward-based gamification features may be integrated strategically to support engagement but should not replace high-quality educational content. For educators, MALL can be positioned as a valuable supplementary resource for language learning rather than a replacement for formal instruction. To support sustained use, educators may also incorporate self-regulation strategies, such as goal-setting and progress monitoring, to equip learners with the internal discipline necessary to maintain regular MALL use alongside their formal studies.

IV. CONCLUSION

Overall, the findings suggest that MALL continuance intention among the Generation Z respondents in this study is shaped not only by technology-related perceptions but also by learners' enjoyment and their ability to regulate their own learning. By extending the TAM framework to include perceived enjoyment, gamification, and self-regulation skills, this study provides a broader perspective on the factors associated with MALL continuance intention in the Indonesian context. Practically, the findings provide insights for educators and MALL developers in designing applications and learning environments that better support users' continuance intention. However, the sample was geographically concentrated in East Java, with 93.1% of respondents from the region, and Duolingo was the dominant MALL application among the respondents. In addition, the majority of the respondents were aged 13-17 and were students. These limitations may limit the generalizability of the findings to users of other applications, regions, and age groups of Generation Z. Furthermore, this study examined continuance intention rather than actual continued use, and its cross-sectional design captured it at a single point in time. Future research should include more geographically and demographically diverse samples, adopt longitudinal designs or experimental designs, and examine additional factors such as social influence, information quality, word of mouth, and self-efficacy to further explain continuance intention toward MALL applications. Multi-group SEM could also be used to investigate whether the relationships among the proposed constructs differ across age groups and occupational backgrounds.

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