



The Effect of Perceived Competence and Perceived Ease of Use on Continuance Intention with Perceived Enjoyment as a Mediating Variable

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DOI: <https://doi.org/10.61987/jemr.v5i2.1992>

ABSTRACT

Keywords:

Perceived
Competence;
Perceived Enjoyment;
Continuance Intention

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The development of digital technology has accelerated the adoption of online learning platforms such as Duolingo in Indonesia. Despite its high level of popularity, the platform still faces challenges related to user retention and high churn rates. The inconsistency of previous research findings regarding the factors influencing continuance intention indicates a research gap that requires further investigation, particularly within the context of gamification-based learning applications. This study aims to analyze the effects of perceived competence and perceived ease of use on continuance intention, with perceived enjoyment serving as a mediating variable among Duolingo users in Indonesia. This research employed a quantitative approach with a causal design and involved 280 respondents selected through purposive sampling. Data were collected using a Likert-scale questionnaire and analyzed using Structural Equation Modeling (SEM) with AMOS. The results indicate that perceived competence and perceived ease of use have a positive and significant effect on perceived enjoyment and continuance intention. Furthermore, perceived enjoyment significantly mediates these relationships. These findings emphasize that the sustainability of learning application usage is influenced not only by cognitive factors but also by users' affective experiences.

Article History:

Received: December 2025; Revised: January 2025; Accepted: February 2026

Please cite this article in APA style as:

Sofia., Afifah, N., Purmono, B. B., Juniwati., & Setiawan, H (2026). The Effect of Perceived Competence and Perceived Ease of Use on Continuance Intention with Perceived Enjoyment as a Mediating Variable. *Journal of Educational Management Research*, 5(2), 2097-2108.

INTRODUCTION

The rapid expansion of digital technology has significantly transformed the educational landscape in Indonesia. This transformation occurs because increasing internet penetration enables broader access to online learning platforms, including foreign language applications. Evidence shows that the number of internet users in Indonesia increased from 106 million in 2018 to 185.3

million in January 2024 (GoodStats, 2024), indicating a substantial growth in digital connectivity. At the global level, the education app sector generated more than \$6 billion in revenue in 2024, with over one-third contributed by online courses (Business of Apps, 2025). This trend highlights the growing reliance on digital platforms for learning purposes. Consequently, the expansion of digital infrastructure and market demand creates significant opportunities for language learning applications to attract and engage users in increasingly competitive digital environments.

Despite this promising growth, a gap exists between the ideal expectations of sustained engagement and the actual behavior of users. Ideally, high internet penetration and strong market demand should translate into consistent user participation and long-term engagement. However, evidence suggests that many users discontinue usage shortly after initial adoption. For example, although Duolingo reported 103.6 million Monthly Active Users (MAU) in Q4 2024, only 34.1 million were Daily Active Users (DAU), resulting in a DAU/MAU ratio of 32.9% (Duolingo, 2024; Userpilot, 2025). Furthermore, the platform's next-day retention rate is approximately 55% (Medium, 2025). These figures demonstrate a discrepancy between user acquisition and sustained engagement. Therefore, understanding the factors influencing continuance intention becomes essential for maintaining competitive advantage and improving user retention.

To explain this issue, several psychological constructs are central to continuance intention in digital learning contexts. Continuance intention refers to a user's intention to continue using a system over time, reflecting post-adoption behavior. According to technology acceptance and motivational perspectives, perceived competence, perceived ease of use, and perceived enjoyment play crucial roles in shaping such intention. Perceived competence relates to users' beliefs about their ability to successfully perform tasks within the system, fostering intrinsic motivation. Perceived ease of use refers to the degree to which a system is perceived as effortless, thereby reducing cognitive burden. Perceived enjoyment reflects the extent to which using a system is perceived as pleasurable beyond its functional value. These constructs collectively influence users' satisfaction and motivation, suggesting that psychological experiences within the platform are critical determinants of sustained usage.

Previous studies provide empirical support for the importance of these variables in predicting continuance intention. Research indicates that when users feel competent, their enjoyment increases, leading to positive engagement and stronger long-term commitment (Guan et al., 2023). Perceived competence enhances persuasive system outcomes and long-term usage commitment. In addition, perceived ease of use has been shown to increase enjoyment by reducing cognitive load. Studies also demonstrate that perceived ease of use

positively influences continuance intention in various digital contexts (Putra et al., 2023; Alfani et al., 2023). These findings collectively suggest that both cognitive and affective factors are instrumental in encouraging sustained engagement with digital learning applications.

However, other studies reveal inconsistent findings that warrant further investigation. While some research confirms significant effects of perceived competence, perceived ease of use, and perceived enjoyment on continuance intention (Shi et al., 2025), contrasting evidence also exists. Wu and Kang (2023) reported that the relationship between enjoyment and continuance intention is not always consistent across contexts. Similarly, no direct effect of perceived competence on continuance intention was found in certain technology-mediated environments. These mixed results indicate that contextual factors, platform characteristics, and user experiences may moderate or mediate these relationships. Therefore, a research gap emerges in understanding how these psychological variables interact specifically within gamified language learning applications such as Duolingo.

In the context of Duolingo as a gamified language learning platform, this issue becomes particularly urgent. Duolingo integrates elements such as streaks, points, levels, and competitive rankings to sustain user motivation. Ideally, these gamification features should enhance users' sense of competence, simplify interaction, and increase enjoyment, thereby strengthening continuance intention. However, the relatively moderate retention and engagement metrics indicate that not all users experience sustained motivation. Some users may initially feel enthusiastic but gradually lose interest due to perceived repetition, difficulty imbalance, or reduced novelty. This situation highlights the need to systematically examine whether perceived competence, perceived ease of use, and perceived enjoyment truly function as key drivers of continued usage within this specific platform context.

Based on these considerations, this study aims to investigate the influence of perceived competence, perceived ease of use, and perceived enjoyment on continuance intention in the context of Duolingo users. The research problem centers on whether these psychological factors significantly affect users' intention to continue using the application and how strong these relationships are. Accordingly, the objectives of this study are to test the direct effects among the variables and to clarify inconsistencies found in previous research. To achieve these objectives, a quantitative research approach is employed, utilizing statistical analysis to examine the relationships and causal influences among variables. Through this method, the study seeks to provide empirical evidence that contributes to both theoretical development and practical strategies for enhancing user retention in gamified language learning platforms.

RESEARCH METHODS

This study employed a quantitative approach with a causal research design to examine the effects of Perceived Competence and Perceived Ease of Use on Continuance Intention, with Perceived Enjoyment serving as a mediating variable (Haq & Yasin, 2025; Henline-Hall, 2024; Takona, 2024). The research focused on Duolingo users residing in Indonesia as the target population. A purposive sampling technique was applied to ensure that respondents met specific criteria, namely being at least 17 years old and having subscribed to Duolingo within the last two months. The minimum sample size was calculated based on Hair et al. (2017), who recommend at least ten times the number of research indicators. Given that this study included 13 indicators, a minimum of 130 respondents was required. However, considering that covariance-based Structural Equation Modeling (CB-SEM) generally requires a larger sample for stable parameter estimation, a sample size of at least 200 respondents was targeted in accordance with Hair et al. (2017).

The measurement instruments were adapted from established and validated scales in prior studies. Perceived Competence was measured using items adapted from Sigmundsson et al. (2023), Hakim et al. (2022), and Soto et al. (2022). Perceived Ease of Use was assessed based on Banjarnahor and Setyorini (2022). Perceived Enjoyment was measured using items adapted from Shafwa and Kumalasari (2024). Meanwhile, Continuance Intention was adapted from Banjarnahor and Setyorini (2022). All constructs were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), ensuring consistency and comparability across variables.

Data were collected through an online survey questionnaire distributed to eligible respondents. The data collection procedure involved screening questions to confirm respondents' age and recent subscription status before they proceeded to the main questionnaire. After the data were gathered, the analysis was conducted using Structural Equation Modeling (SEM) with AMOS software to test both direct and indirect relationships among variables. The CB-SEM approach was selected because it allows simultaneous examination of measurement and structural models, including mediation effects. The analysis process included assessment of model fit, validity, reliability, and hypothesis testing to determine the significance of structural paths among Perceived Competence, Perceived Ease of Use, Perceived Enjoyment, and Continuance Intention.

RESULTS AND DISCUSSION

Results

Table 1. Characteristics Respondents

Category	Item	Frequency (f)
Sex	Woman	158
	Man	122
	Total	280
Age	17–22 years	133
	23–28 years	103
	29–35 years	52
	> 35 years	12
	Total	280
Current Occupation	Student (School)	15
	University Student	107
	Self-employed	54
	Private Employee	59
	Civil Servant (ASN/PNS)	20
	Lecturer/Teacher	17
	Not Yet Working	8
	Total	280
Domicile	Sumatra	34
	Java	129
	Kalimantan	41
	Sulawesi	27
	Bali	21
	Nusa Tenggara (NTB/NTT)	13
	Maluku	10
	Papua	4
	Riau Islands	1
	Total	280
Duolingo Usage Frequency (Last 2 Months)	Every Day	77
	Several Times a Week	126
	Several Times a Month	63
	Only 1–2 Times	14
	Total	280
Current Duolingo Subscription Status	Super	103
	Family Super	107
	Max	54
	Family Max	16
	Total	280

Based on Table 1, respondents were predominantly female, aged 17-28, students, and domiciled on the island of Java. The majority used Duolingo several times a week and were paying subscribers, indicating level involvement and commitment use Which relatively high.

Measurement Models

Table 2. Standardized Loading Factor (SLF), Construct Reliability (CR), and Average Variance Extracted (AVE)

Construct	Items	SLF	CR	AVE
Perceived Competence	I am confident that I can improve my language skills by continuously using Duolingo.	0.856	0.857	0.644
	I improve my language skills through Duolingo according to the targets I set.	0.878		
	I remain motivated even when I fail in some Duolingo exercises.	0.792		
	I stay encouraged to keep learning despite difficulties in Duolingo exercises.	0.731		
Perceived Ease of Use	I find Duolingo easy to operate when learning languages.	0.845	0.818	0.687
	I feel that the Duolingo application is easy to use anytime according to my needs.	0.850		
	I feel that Duolingo runs smoothly without technical issues such as lag or errors.	0.791		
Perceived Enjoyment	I enjoy learning using Duolingo.	0.808	0.786	0.609
	I feel enthusiastic every time I learn using Duolingo.	0.777		
	I feel that time passes quickly while learning on Duolingo because I enjoy it.	0.756		
Continuance Intention	I intend to continue subscribing to Duolingo for language learning.	0.821	0.825	0.650
	I will frequently use Duolingo to practice my language skills.	0.820		
	I will recommend Duolingo to friends or others who want to learn a language.	0.778		

Based on the table, all constructs in the research model have a Standardized Loading Factor (SLF) value above 0.7, a Construct Reliability (CR) value above 0.7, and an Average Variance Extracted (AVE) value above 0.5, so it can be concluded that all indicators are valid and reliable. These results indicate that the constructs of Perceived Competence, Perceived Ease of Use, Perceived Enjoyment, and Continuance Intention able to measure its variables consistently and has a good level of reliability and convergent validity in explaining the research model as a whole.

Table 3. Goodness of Fit Index

Goodness of Fit Index	Cut-off Value	Results
χ^2 (Chi-square)	Expected to be low	242.419
df	—	60
χ^2 Significance Probability	≥ 0.05	0.000
CMIN/DF	≤ 3.00	4.040
RMSEA	≤ 0.08	0.104
RMR	< 0.05	0.319
NFI	≥ 0.90	0.904
IFI	≥ 0.90	0.926
TLI	≥ 0.90	0.903
CFI	≥ 0.90	0.926

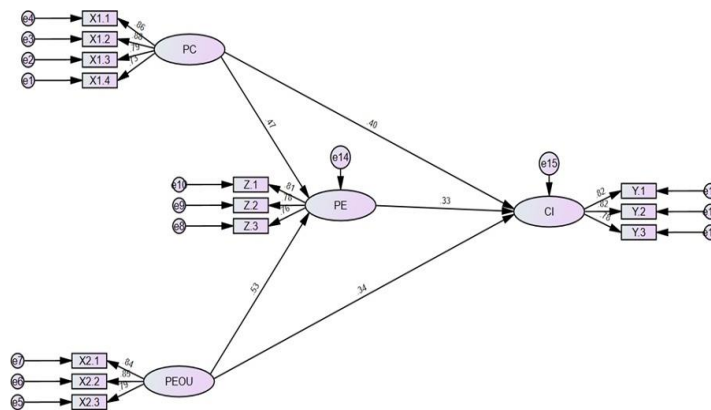


Figure 1. Full Model Testing

Based on Table 3, the model is considered acceptable because NFI, IFI, TLI, and CFI meet the required cut-off values. Although not all indices reach the ideal criteria, the model can still be accepted since at least three goodness-of-fit indicators meet the recommended standards.

Hypothesis Testing

Table 4. Hypothesis Testing Results

Hypothesis	Path	Estimate	S.E.	C.R.	p-value
H1	Perceived Competence → Perceived Enjoyment	0.503	0.070	7.200	***
H2	Perceived Competence → Continuance Intention	0.436	0.077	5.651	***
H3	Perceived Ease of Use → Perceived Enjoyment	0.469	0.059	7.899	***
H4	Perceived Ease of Use → Continuance Intention	0.316	0.067	4.751	***
H5	Perceived Enjoyment → Continuance Intention	0.343	0.089	3.838	***

Based on the hypothesis testing results in Table 4, all hypotheses are supported (C.R. > 1.96; $p < 0.05$). Perceived Competence and Perceived Ease of Use have a positive effect on Perceived Enjoyment and Continuance Intention, while Perceived Enjoyment significantly influences Continuance Intention. These findings indicate that the higher the users' perceived competence, ease of use, and enjoyment, the stronger their intention to continue using Duolingo.

Table 5. Sobel Test – Significance of Mediation

Hypothesis	Path	Sobel Test Statistic (z)	Two-tailed Probability
H6	Perceived Competence → Perceived Enjoyment → Continuance Intention	3.396	0.00068
H7	Perceived Ease of Use → Perceived Enjoyment → Continuance Intention	4.056	0.00004

The Sobel test results indicate that Perceived Enjoyment significantly mediates the relationship between Perceived Competence and Continuance Intention ($z = 3.396$; $p = 0.00068$), as well as between Perceived Ease of Use and Continuance Intention ($z = 4.056$; $p = 0.00004$). Since both z-values exceed 1.96 and p-values are below 0.05, the indirect effects are statistically significant. Therefore, Perceived Enjoyment acts as a partial mediator in both relationships.

Discussion

The research results show that a positive Duolingo user experience is formed from a combination of Perceived Competence and Perceived Ease of Use. When users feel capable of following the learning process and easily interact with the system, the learning process becomes more comfortable and engaging. This finding aligns with Jo (2022) who emphasize that a positive user experience arises from the interaction between perceived competence and perceived ease of use of the technology.

Perceived competence has been shown to enhance engagement and enjoyment in learning. When users recognize their growing abilities, they develop a sense of confidence that increases their commitment to continue using digital learning systems (Ghalavand et al., 2024; He & Li, 2023). Furthermore, a sense of competence also makes the learning process more enjoyable and less burdensome, as supported by Sudi et al. (2022). With thus, in context Duolingo, perception competence becomes the main foundation that strengthens the intention of sustainable use.

Perceived Ease of Use also contributes to Perceived Enjoyment and Continuance Intention. Ease of understanding features, clear navigation, and minimal technical difficulties help reduce cognitive load and enhance the enjoyable experience (To & Trinh, 2021). Ease of use also encourages continued app use (Avisca & Djakasaputra, 2024; Yuwono & Ellyawati, 2022). However, in learning apps like Duolingo, this influence is stronger when mediated by a pleasurable affective experience, so ease of use serves as a foundation for enjoyment.

Furthermore, this study confirms that Perceived Enjoyment plays a central role in driving Continuance Intention. Users who feel happy and enthusiastic tend to have long-term usage commitments, as supported by Damanik. et al. (2022), Huang & Liu (2024), Monica & Japariato (2022), and Pambudi et al. (2023).

Overall, continued use of Duolingo is influenced by Perceived Competence and Perceived Ease of Use, Good in a way direct or through Perceived Enjoyment as an affective mechanism. These findings reinforce previous literature but provide a contextual contribution to gamification-based language learning applications, which are still relatively limited compared to other digital sectors such as e-wallets or mobile banking (Avisca & Djakasaputra, 2024; Monica & Japariato, 2022; Yuwono & Ellyawati, 2022). This study's limitations lie in the use of perception-based data via questionnaires, thus relying on on the subjective assessment of respondents.

CONCLUSION

The most important finding of this study is that users' continuance intention toward Duolingo is significantly influenced by perceived competence and perceived ease of use, both directly and indirectly through perceived enjoyment. The key insight derived from this research is that sustained engagement in gamified language learning applications is not driven solely by functional efficiency, but by the psychological experience created during use. When users feel capable of completing learning tasks and perceive the application as easy to operate, they experience greater enjoyment, which in turn strengthens their intention to continue using the platform. This finding reinforces the central role of enjoyment as a pivotal mechanism that transforms cognitive evaluations into sustained behavioral commitment. Thus, the study highlights that successful retention strategies in gamified educational applications must integrate usability, competence support, and affective engagement simultaneously.

In terms of scholarly contribution, this study strengthens the theoretical understanding of continuance intention by empirically validating the mediating role of perceived enjoyment within a gamified language learning context. By integrating constructs from technology acceptance and motivational perspectives into a single structural model, the research provides clearer evidence of how cognitive and affective factors interact to shape post-adoption behavior. However, this study is limited by its cross-sectional design and its focus on Duolingo users in Indonesia, which may restrict generalizability. Future research is recommended to employ longitudinal designs to examine behavioral changes over time, explore additional moderating variables such as habit or learning goals, and compare different gamified learning platforms to enhance external validity and theoretical refinement.

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