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ANALYZING GAMIFICATION DRIVERS INFLUENCING USER MOTIVATION IN LANGUAGE LEARNING APPLICATIONS USING OCTALYSIS FRAMEWORK

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Abstract
Language learning applications such as Duolingo, Busuu, Memrise, and Babbel have transformed how individuals learn new languages by offering mobile, interactive, and gamified experiences. While these platforms attract millions of users, maintaining long-term user motivation remains a critical challenge. Many learners begin with strong enthusiasm but gradually reduce their participation before reaching their learning goals. This suggests that although gamification elements are widely implemented, their motivational potential may not be fully optimized. This study investigated user motivation in language learning applications using the Octalysis Framework to identify the most influential motivational drivers in gamified environments. A quantitative approach was used using Partial Least Squares Structural Equation Modeling (PLS-SEM). Data were collected through an online questionnaire from 410 active users of language learning applications in Indonesia. The results indicate that five core drives which are Accomplishment, Empowerment, Ownership, Scarcity, and Unpredictability have significant positive effects on user motivation. Among these, Accomplishment emerged as the strongest predictor, highlighting the importance of progress tracking, achievement systems, and level advancement in sustaining motivation. While, Epic Meaning, Social Influence, and Avoidance did not show significant effects. These findings suggested that achievement-oriented and autonomy-supportive mechanisms are more influential than socially driven or avoidance-based factors. This study contributed a validated model for designing more effective language learning application and offers practical guidelines for optimizing user motivation in EdTech platforms.
Keywords: *Language Learning Application, User Motivation, Gamification, Octalysis Framework, E-learning.*

1. Introduction

Language proficiency has become increasingly important in a globalized world due to cross-border communication, international employment opportunities, and intercultural exchange. This trend has contributed to the growing popularity of language learning applications such as Duolingo, Busuu, Babbel, and Memrise, which provide accessible, mobile-friendly, and interactive alternatives to traditional classroom learning (Shortt et al., 2023). The language learning application market continues to grow rapidly, reaching over 26.5 million global installs in August 2024 (Statista, 2024). Indonesia represents one of the largest markets for these applications, particularly for Duolingo, which has surpassed one million downloads on the Google Play Store and Apple App Store (Statista, 2024). As mobile devices become more widespread, understanding the effectiveness and impact of language learning applications has become increasingly important (Shortt et al., 2023).

Many of these applications employ gamification, which integrates elements such as rewards, achievements, progress tracking, and challenges to enhance learner motivation (Shortt et al., 2023), (Bereziuk & Hyliarska, 2023). Gamification has been widely recognized as an effective approach for increasing engagement in digital learning environments (Luan et al., 2023). revious studies report that gamified language learning can improve motivation, engagement, and language skill development (Shen et al., 2024),(Zolfaghari et al., 2025), (Al-Hoorie & Albijadi, 2025), (Alenazi, 2025), (Diana et al., 2025), (Al-Dosakee & Ozdamli, 2021). owever, some studies also note that motivational effects may be short-term and that excessive reliance on extrinsic rewards may limit deeper learning (Azzouz Boudadi & Gutiérrez-Colón, 2020), (Al-Hoorie & Albijadi, 2025), (Ratinho & Martins, 2023). Experimental and quasi-experimental work comparing gamified and non-gamified conditions similarly reports higher motivation, engagement, time-on-task, and retention in gamified groups (Kumar & Vairavan, 2024), (Al-Hoorie & Albijadi, 2025), (Alenazi, 2025), (Diana et al., 2025).Although gamification can initially attract users, maintaining long-term motivation remains challenging, as language learning applications often experience high dropout rates (Griffith et al., 2020), (Ajisoko, 2020). Effective gamification therefore requires aligning external rewards with deeper intrinsic motivational factors (Chou, 2019).

One comprehensive model for understanding motivation in gamified systems is the Octalysis Framework, developed by Yu-Kai Chou, which explains user behavior through eight core motivational drives such as accomplishment, ownership, empowerment, scarcity, and unpredictability (Chou, 2019).

However, limited studies have applied the Octalysis Framework to examine motivational drivers in language learning applications, particularly in the Indonesian context. Therefore, this study aims to analyze the most influential motivational drivers affecting users of language learning applications. The findings are expected to contribute to the development of more effective gamification strategies that enhance user motivation and improve digital language learning systems.

2. Literature Review

A. Language Learning Applications :

Language learning applications have emerged as transformative tools in second language acquisition. These applications offer flexible and user-friendly platforms that support independent learning and easy access to learning materials. Research shows that language learning applications are effective for building basic skills such as vocabulary and reading. However, many studies also report clear limitations. Learners often experience repetitive activities, limited speaking practice, and a lack of real interaction. Over time, these issues reduce motivation and lead many users to stop using the applications. Loewen et al. (2019) found that while language learning application improve vocabulary and reading, they often fall short in developing speaking and listening skills (Loewen et al., 2019).

B. Gamification in Language Learning Applications

Gamification is widely used in language learning applications to increase user motivation and engagement. Common game features include points, badges, levels, streaks, and leaderboards, which encourage learners to practice regularly and build learning habits, especially during early use (Shortt et al., 2023). For example, Duolingo's experience points, virtual rewards, and daily streaks are frequently cited by users as critical motivators for continued participation (Loewen et al., 2019). These findings suggest that gamification alone does not guarantee long-term engagement. Most language learning applications rely on similar game mechanics, yet disengagement remains common. This indicates that some motivational factors are emphasized while others are weak or missing. As a result, it is necessary to examine how well different motivational elements are balanced, rather than simply whether gamification features are present (Medina-Gómez et al., 2024).

C. User Motivation in Language Learning Applications

User motivation is a multidimensional variable encompassing emotional, cognitive, and behavioral involvement with a platform. In the context of language learning application, motivation serves as both a predictor of retention and a key indicator of learning success (Griffith et al., 2020). Research shows that gamified tasks and adaptive learning features encourage consistent practice, while social interaction promotes emotional connection and persistence [19]. However, maintaining motivation over time remains difficult. Many learners reduce their usage or stop completely after an initial period of enthusiasm (Bereziuk & Hyliarska, 2023), (Griffith et al., 2020). These findings suggest that engagement

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problems are not caused by a lack of features, but by how motivation is designed and sustained. To better understand this issue, motivation must be analyzed through a framework that can identify which motivational factors are strong and which are underused.

D. Octalysis Framework

The Octalysis framework, developed by Yu-Kai Chou, provides a comprehensive model for analyzing motivational drivers in gamified systems. This study adopts the Octalysis Framework developed by Yu-kai Chou as the primary theoretical foundation to analyze user motivation in language learning applications. The Octalysis Framework identifies eight core drives that influence human motivation in gamified systems, These core drives represent both intrinsic and extrinsic motivational factors that shape user behavior and learning persistence in digital environments (Chou, 2019), (Medina-Gómez et al., 2024).

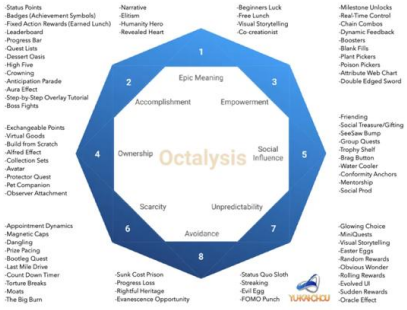

Figure 1. Octalysis Framework

This framework has been widely applied in educational technologies and digital platforms because it provides a structured approach to understanding how gamification elements influence motivation beyond simple reward-based systems.

2.1 Research Model

This study adopts a quantitative and analytical research design to examine the influence of gamification drivers on user engagement in language learning applications using the Octalysis framework. The research aims to understand how different motivational drivers embedded in gamified learning platforms influence users' motivation and engagement in language learning activities. The study is based on primary data collected through an online survey questionnaire distributed to users of language learning applications in Indonesia. The questionnaire targeted individuals who have experience using mobile language learning platforms such as Duolingo, Busuu, Babbel, and Memrise. Data collection was conducted over a period of approximately two months, resulting in 411 responses. A convenience sampling technique was used due to accessibility and time constraints. The questionnaire consisted of closed-ended statements measured using a five-point Likert scale, ranging from Strongly Disagree (1) to Strongly Agree (5). The instrument was designed to measure several constructs based on the Octalysis Framework developed by Yu-Kai Chou. The constructs include eight core gamification drivers and user motivation in language learning applications. The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the SmartPLS software. This method allows for the analysis of complex relationships between multiple latent variables and provides reliable results even with moderate sample sizes (Hair & Alamer, 2022). The analysis involved evaluating both the measurement model (outer model) and the structural model (inner model). Reliability and validity tests, including Cronbach's Alpha, composite reliability, and discriminant validity, were conducted to ensure the robustness of the measurement instruments. The structural model was then assessed to examine the relationships between gamification drivers, motivation, and user engagement. The scope of this study is limited to language learning application users in Indonesia, and the findings are based on responses from 410 participants. Therefore, the results may not be fully generalizable to other countries or educational contexts.This research model shown in Figure 2 focuses exclusively on motivation as the primary outcome variable, enabling a more precise analysis of how specific gamification elements influence users' internal drive to continue learning. Motivation is a critical factor in language learning applications because it determines users' willingness to persist, practice regularly, and achieve long-term learning goals (Luan et al., 2023), (Yuen & Schlote, 2024). By examining motivation directly, this study provides clearer insights into which gamification elements are most effective in strengthening and sustaining users' motivation in digital language learning environments.

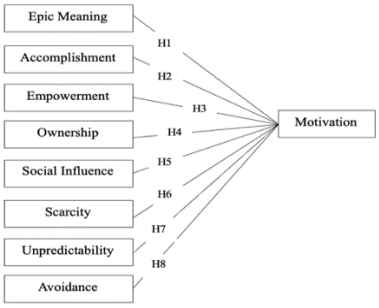

Figure 2. Research Model

The hypothesis for the research model below in Table 1 is the hypothesis that will be tested in this study.

Table 1. Research Hypothesis

Hypothesis	Description
H1	Epic meaning (CDA) has a positive effect on Motivation (CDI) in language learning applications.
H2	Accomplishment (CDB) has a positive effect on Motivation (CDI) has a positive effect on user motivation in language learning applications
H3	Empowerment (CDC) has a positive effect on Motivation (CDI) in language learning applications.
H4	Ownership (CDD) has a positive effect on Motivation (CDI) in language learning applications.
H5	Social influence (CDE) has a positive effect on Motivation (CDI) in language learning applications.
H6	Scarcity (CDF) has a positive effect on Motivation (CDI) in language learning applications.
H7	Unpredictability (CDG) has a positive effect on Motivation (CDI) in language learning applications.
H8	Avoidance (CDH) has a positive effect on Motivation (CDI) in language learning applications.

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3. Results and Discussion

This chapter presents the results of data analysis and discusses the findings in relation to the research objectives. The analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 3.0. Prior to analysis, the dataset was screened for completeness, consistency, and validity. Missing values were not observed in the dataset, and all responses were complete and usable. Inconsistent responses were carefully reviewed and removed during the screening process. As a result, 410 valid responses from active users of language learning applications were retained for further analysis.The data collection began with creating the questionnaire consisting of three sections: demographic information, user responses to language learning applications based on the eight Octalysis core drives, and a single open-ended question presented in Indonesian. Each core drive was measured through three questions using a five likert scale response format. The survey was distributed across diverse groups and regions in Indonesia for about 2 months, gathering 411 responses. The dataset is shared with public to support the future research here: https://www.kaggle.com/datasets/dindapermatasari/language-learning-application-motivation.

After screening for completeness and validity. A total of 410 valid responses were included in the analysis. The majority of respondents were aged 25–34 years (175 respondents), followed by 18–24 years (148 respondents) and 35–44 years (70 respondents). Only a small proportion of respondents were aged 45–54 years (15 respondents) and 55–65 years (2 respondents). In terms of domicile, most respondents were located in the Jabodetabek area (303 respondents), while 107 respondents resided outside Jabodetabek. Regarding language learning application usage, 302 respondents were active users, whereas 108 respondents reported that they were no longer actively using such applications.The study analyzes the data using Partial Least Squares Structural Equation Modeling (PLS-SEM) and evaluates the results through two stages: the measurement model (outer model) and the structural model (inner model).

.1 Measurement Model Evaluation

The measurement model evaluation is meant to test the reliability and validity of each construct and reliability tests were conducted in this stage.

3.1.1 Convergent Validity

All variables met the convergent validity requirement, with outer loading values above 0.70 and AVE values exceeding 0.50 (Hair & Alamer, 2022), as shown in Table 2. This indicates that each indicator is strongly correlated with its latent variable. Variables such as Accomplishment, Empowerment, Ownership, Scarcity, and Unpredictability demonstrate high measurement accuracy, reflecting consistent user responses related to gamification features in language learning applications.

Table 2. Convergent Validity

Variable	Indicator	Outer Loadings	AVE	Description
Epic Meaning (CDA) → Motivation (CDI)	0.029	0.485	0.628	*Not Significant*
Accomplishment (CDB) → Motivation (CDI)	0.233	3.485	0.001	Significant
Empowerment (CDC) → Motivation (CDI)	0.184	3.163	0.002	Significant
Ownership (CDD) → Motivation (CDI)	0.139	2.036	0.042	Significant
Social Influence (CDE) → Motivation (CDI)	-0.027	0.412	0.680	*Not Significant*
Scarcity (CDF) → Motivation (CDI)	0.146	2.381	0.018	Significant
Unpredictability (CDG) → Motivation (CDI)	0.126	2.012	0.045	Significant
Loss Avoidance (CDH) → Motivation (CDI)	0.063	0.911	0.363	*Not Significant*

3.1.2 Reliability Testing

Cronbach's Alpha and Composite Reliability values for all constructs exceeded 0.70, demonstrating good internal consistency as shown in Table 3.

Table 3. Construct Reliability

Variable	Indicator	Cronbach's Alpha	rho_A	Composite Reliability (rho_C)
Epic Meaning	CDA	0.819	0.826	0.893
Accomplishment	CDB	0.86	0.864	0.915
Empowerment	CDC	0.846	0.846	0.907
Ownership	CDD	0.855	0.857	0.912
Social Influence	CDE	0.869	0.869	0.92
Scarcity	CDF	0.862	0.862	0.916
Unpredictablity	CDG	0.848	0.848	0.908
Avoidance	CDH	0.862	0.863	0.916

3.2 Structural Model Evaluation

After confirming the measurement model, the next step was to evaluate the structural model to determine the relationships among variables.

3.2.1 Path Coefficients

Bootstrapping results in SmartPLS were used to test all paths. A p-value < 0.05 indicates statistical significance. It showed significant positive effects on motivation. Meanwhile, Epic Meaning (CDA), Social Influence (CDE) and Loss Avoidance (CDH) were not significant. Overall, the results in Table 4 indicate that accomplishment, empowerment, ownership, scarcity, and unpredictability are key gamification drivers that increase user motivation.

Table 4. Path Coefficients

Path Relationship	Original Sample (β)	T Statistics	P Values	Result
Epic Meaning (CDA) → Motivation (CDI)	0.029	0.485	0.628	Not Significant
Accomplishment (CDB) → Motivation (CDI)	0.233	3.485	0.001	Significant
Empowerment (CDC) → Motivation (CDI)	0.184	3.163	0.002	Significant
Ownership (CDD) → Motivation (CDI)	0.139	2.036	0.042	Significant
Social Influence (CDE) → Motivation (CDI)	-0.027	0.412	0.680	Not Significant
Scarcity (CDF) → Motivation (CDI)	0.146	2.381	0.018	Significant
Unpredictability (CDG) → Motivation (CDI)	0.126	2.012	0.045	Significant
Loss Avoidance (CDH) → Motivation (CDI)	0.063	0.911	0.363	Not Significant

This study tested all hypotheses, with five showing significant results ($p < 0.05$) as shown in Table 5. The findings show that gamification elements such as Accomplishment, Empowerment, Ownership, Scarcity, and Unpredictability positively influence user motivation.

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Table 5. Construct Validity

Hypothesis	Relationship	Result	Description
H1	Epic Meaning has a positive effect on Motivation	Rejected	p = 0.628, not significant
H2	Accomplishment has a positive effect on Motivation	Accepted	p = 0.001, significant positive effect
H3	Empowerment has a positive effect on Motivation	Accepted	p = 0.002, significant positive effect
H4	Ownership has a positive effect on Motivation	Accepted	p = 0.042, significant positive effect
H5	Social Influence has a positive effect on Motivation	Rejected	p = 0.680, not significant
H6	Scarcity has a positive effect on Motivation	Accepted	p = 0.018, significant positive effect
H7	Unpredictability has a positive effect on Motivation	Accepted	p = 0.045, significant positive effect
H8	Loss Avoidance has a positive effect on Motivation	Rejected	p = 0.363, not significant

The findings of this study show that gamification features significantly influence user motivation in language learning applications. Several Octalysis core drives were found to have positive and significant effects on motivation, including Accomplishment ($\beta = 0.233$, $p = 0.001$), Empowerment ($\beta = 0.184$, $p = 0.002$), Ownership ($\beta = 0.139$, $p = 0.042$), Scarcity ($\beta = 0.146$, $p = 0.018$), and Unpredictability ($\beta = 0.126$, $p = 0.045$). These findings suggest that gamification elements emphasizing progress, user control, personal investment, limited challenges, and unexpected rewards play an important role in enhancing learner motivation (Shortt et al., 2023), (Loewen et al., 2019). Features such as points, levels, achievement indicators, personalized learning paths, and reward mechanisms help users recognize progress and sustain engagement.Among the tested drivers, Accomplishment emerged as the strongest predictor of motivation, followed by Empowerment, Scarcity, Ownership, and Unpredictability. This indicates that achievement- and autonomy-related features are the most effective motivational drivers in language learning applications. When users can track their progress and feel a sense of control over their learning process, their intrinsic motivation increases. These findings support the principles of the Octalysis Framework, which emphasizes intrinsic motivators such as competence, autonomy, and curiosity.

In contrast, Epic Meaning ($p = 0.628$), Social Influence ($p = 0.680$), and Avoidance ($p = 0.363$) did not show significant effects, suggesting that meaning-based narratives, social comparison, and fear-based mechanisms are less influential in motivating users. Overall, the results highlight the importance of designing gamified language learning applications that prioritize progress tracking, autonomy, and meaningful rewards to sustain user motivation.

3.3 Discussion

The findings indicate that several gamification elements play an important role in motivating users in language learning applications. Accomplishment emerged as the most influential factor, suggesting that features highlighting progress, achievements, and rewards strongly encourage continued engagement. In contrast, Epic Meaning, Social Influence, and Loss Avoidance showed no significant influence, implying that learners respond more positively to intrinsic motivators related to personal progress and autonomy rather than external pressures such as social comparison or fear of loss. Overall, these results suggest that effective gamified language learning environments should emphasize progress, autonomy, and engaging experiences to sustain user motivation.

This finding aligns with findings from previous studies who observed similar motivational patterns in gamified digital contexts which confirmed the Octalysis model's applicability in technology-based environments (Yeo & Oktavia, 2024). Furthermore, the results support the Octalysis framework's core assumption that achievement- and autonomy-based drivers are essential for strengthening user motivation. Overall, this study confirms that well-designed gamification can function as an effective mechanism for increasing user motivation in educational technology.By fostering sustained motivation and active learning behavior, gamified language learning applications can help learners remain consistent and self-directed over time (Zainuddin et al., 2020) . Sustained motivation is essential in language learning, as skill development requires regular practice and long-term commitment. When learners are motivated to continue using educational applications, they are more likely to achieve meaningful learning outcomes, regardless of time and location constraints (Kukulska-Hulme, 2020). In this context, gamification-supported mobile learning contributes to more inclusive, flexible, and accessible education, supporting the principles of Quality Education as outlined in the United Nations Sustainable Development Goal 4 (Bond et al., 2021) . These findings highlight the potential of well-designed digital learning tools to enhance lifelong learning opportunities and improve educational participation at scale.

4. Conclusion

This study concludes that gamification features play a significant role in strengthening user motivation in language learning applications when they are designed to support meaningful learning experiences. Gamification elements that provide clear progress tracking, achievement recognition, empowerment, and a sense of ownership are proven to enhance users' internal drive to continue learning. These findings indicate that motivation in language learning apps is primarily influenced by intrinsic factors such as personal growth, accomplishment, and autonomy, rather than external rewards alone. This suggests that application developers should prioritize gamification designs that foster users' sense of competence, control, and personal development to sustain motivation over time.

Furthermore, the results confirm that the Octalysis Framework is valid and effective in explaining user motivation in digital language learning contexts. The research model enables a focused analysis of motivational drivers, highlighting that user motivation can be directly explained through specific Octalysis core drives. These findings reinforce the relevance of the Octalysis Framework as a structured and reliable model for analyzing and optimizing motivational design in language learning applications.

Despite these insights, the study has limitations. The data were drawn from Indonesian users and relied on self-reported perceptions rather than behavioral analytics, which may limit generalizability. Additionally, focusing exclusively on the Octalysis framework excluded other motivational models that could provide complementary perspectives.

Future research should include participants from different cultural background and integrate behavioral engagement metrics such as learning streaks, completion rates, and session duration. Combining Octalysis with other frameworks, such as Self-Determination Theory, could also help reveal how intrinsic and extrinsic motivation interact over time in digital learning environments.

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