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From Classroom to Cyberspace: Investigating the Role of Informal Digital Learning of English in Developing Speaking Proficiency Among EFL Learners

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Abstract

While Informal Digital Learning of English (IDLE)—the autonomous use of digital media outside the classroom—is widely practiced, the underlying mechanisms that translate raw informal exposure into oral proficiency remain insufficiently understood. To address this research gap, this study proposes and tests the Digital Language Acquisition Ecosystem (DLAE) framework among 624 EFL university students in Indonesia using structural equation modeling. The model explicitly distinguishes between IDLE (out-of-class digital exposure and activities) and Digital Engagement Quality (the cognitive, active, and reflective depth of interaction), while integrating learner autonomy and self-regulated learning. The findings demonstrate that while IDLE positively influences speaking proficiency, learner autonomy serves as the principal driver of self-regulation and digital participation. Importantly, Digital Engagement Quality significantly mediates the relationship between IDLE and speaking skills, confirming that oral proficiency depends far more on the depth and quality of digital interaction than on exposure duration or screen time alone. Interactive digital practices (such as YouTube and Discord) contribute more substantially to speaking gains than passive content consumption. Ultimately, this study advances second language acquisition and digital learning research by demonstrating that L2 speaking development in technology-mediated environments is governed by an integrated ecosystem where self-directed engagement quality bridges informal practice and communicative competence.

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1. Introduction

Being able to speak English fluently is widely recognized as a cornerstone of global communicative competence; however, a persistent instructional paradox remains in English as a Foreign Language (EFL) contexts: a significant disconnect exists between students' years of formal classroom instruction and their actual capacity for spontaneous oral production. While many learners spend years in formal language classes without acquiring speaking fluency, others attain high oral proficiency independently through informal avenues, even with modest classroom performance. This phenomenon highlights the growing influence of Informal Digital Learning of English (IDLE)—the voluntary, self-directed engagement with English through digital platforms such as YouTube, Netflix, Spotify, Discord, social media, and conversational Artificial Intelligence (AI) tools outside formal curricula.

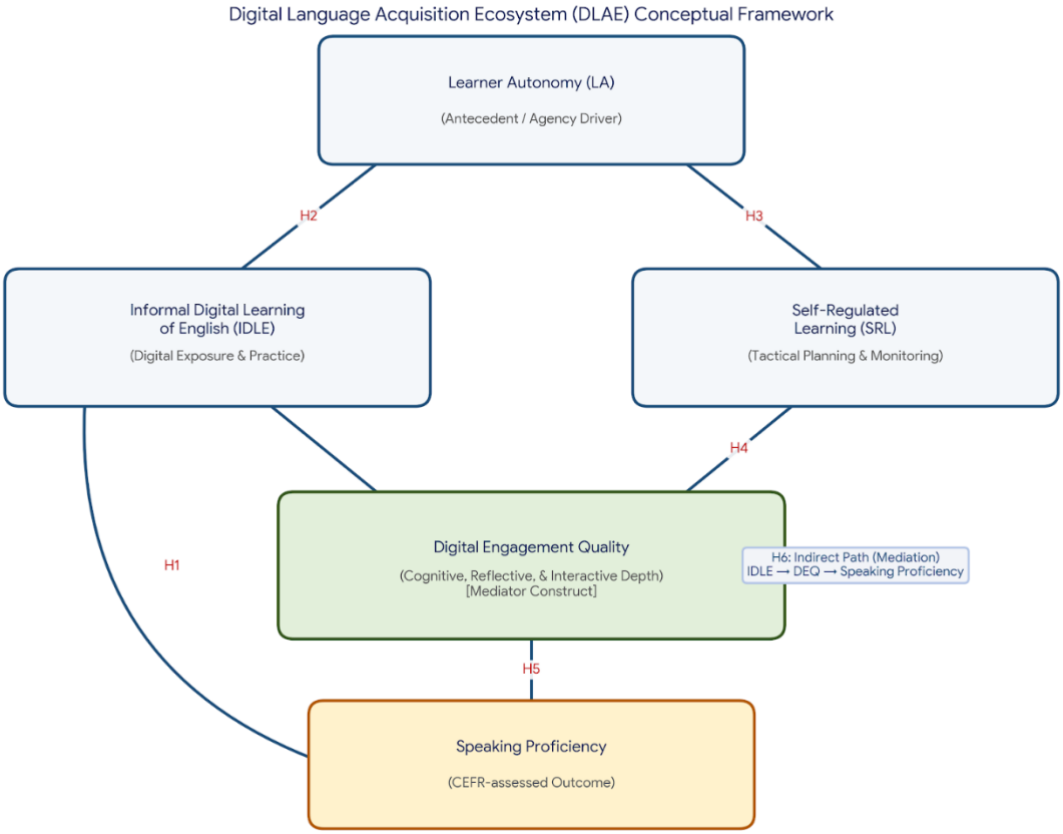
Although a growing body of IDLE research has established positive correlations between digital media exposure and general L2 outcomes (e.g., Lee, 2020; Soyoof et al., 2023), previous literature remains predominantly descriptive, focusing heavily on raw exposure duration and broad affective variables such as motivation or foreign language enjoyment. Current IDLE models suffer from three significant limitations:

1. The Exposure Duration Fallacy: Existing frameworks often assume a linear relationship between screen time and language proficiency, failing to account for *how* learners interact with digital content.
2. Fragmented Psychological Agency: Psychological constructs like Learner Autonomy (LA) and Self-Regulated Learning (SRL) are frequently treated as isolated background variables rather than primary drivers that dictate engagement depth.
3. Omitting Next-Generation Technologies: Earlier models do not adequately capture the emerging role of AI-assisted language learning platforms (e.g., generative AI chatbots and voice-based AI agents), which have altered interactive language practice between 2024 and 2026 (e.g., Kim & Lee, 2024; Zhang & Liu, 2024; Wang et al., 2025).

To resolve these limitations, this study proposes the Digital Language Acquisition Ecosystem (DLAE) framework. The DLAE framework shifts the analytical paradigm from a linear "exposure-to-outcome" model to an integrated, multidimensional ecosystem. It explicitly delineates the mechanism by which learner agency (LA and SRL) converts passive informal digital exposure into active Digital Engagement Quality (cognitive, reflective, and interactive depth), which in turn fosters authentic speaking proficiency.

Theoretically, the DLAE framework synthesizes three complementary Second Language Acquisition (SLA) theories within the digital space: Krashen's Input Hypothesis (comprehensible authentic input via streaming media), Swain's Output Hypothesis (active oral production and gap recognition), and Long's Interaction Hypothesis (real-time negotiation of meaning in online global communities).

Crucially, the activation of these theoretical mechanisms depends on learner agency. Rather than discussing LA and SRL redundantly, the DLAE conceptualizes Learner Autonomy as the macro-level capacity to control learning targets and resource selection, while Self-Regulated Learning (SRL) represents the micro-level tactical process of planning, monitoring, and reflecting on engagement. In an era where AI conversational tools offer instantaneous, low-stakes oral practice (Liu & Garcia, 2025), high-level self-regulation ensures that learners move beyond surface-level prompt interaction toward deep, communicative skill acquisition.



Research Questions and Hypotheses

To empirically test the DLAE framework, this study addresses the following research questions:

- **RQ1:** To what extent does Informal Digital Learning of English (IDLE) directly influence EFL learners' speaking proficiency?
- **RQ2:** How do Learner Autonomy and Self-Regulated Learning (SRL) drive IDLE engagement and Digital Engagement Quality?
- **RQ3:** Does Digital Engagement Quality mediate the relationship between IDLE exposure and speaking proficiency?

Based on these questions and the theoretical framework, the following structural hypotheses are formulated:

- **H1:** *IDLE significantly and positively predicts EFL learners' speaking proficiency.*
- **H2:** *Learner Autonomy significantly and positively influences engagement in IDLE.*
- **H3:** *Learner Autonomy significantly and positively predicts Self-Regulated Learning (SRL).*
- **H4:** *Self-Regulated Learning significantly and positively influences Digital Engagement Quality.*
- **H5:** *Digital Engagement Quality significantly and positively predicts speaking proficiency.*
- **H6:** *Digital Engagement Quality significantly mediates the path between IDLE and speaking proficiency.*

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2. Method

Research Design

This study adopted a quantitative post-positivistic explanatory survey design to test the hypothesized causal relationships within the proposed Digital Language Acquisition Ecosystem (DLAE) framework. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) executed via SmartPLS 4 and SPSS 29. PLS-SEM was selected as the optimal analytical method given its robust predictive capabilities for complex, multi-construct models undergoing exploratory theory development.

Sampling and University Selection

A multi-stage stratified random sampling technique was employed to select target institutions and participants. To ensure geographical and institutional representativeness across Indonesia, six universities were selected across three major administrative zones:

- Western Region (Sumatra & Java): Two public universities (*Perguruan Tinggi Negeri* / PTN) and one private university (*Perguruan Tinggi Swasta* / PTS).
- Central & Eastern Regions (Kalimantan, Sulawesi, & Nusa Tenggara): Two public universities and one private university.

Stratification was subsequently applied based on academic disciplines (English Language Education vs. non-English majors) and year of study to mitigate background bias. Inclusion criteria required participants to be active undergraduate students maintaining a minimum of two hours of daily internet use and having active experience with out-of-class digital English content within the preceding six months.

Participant Demographics

The final sample comprised $N = 624$ undergraduate EFL learners. Detailed demographic characteristics are summarized in **Table 1**.

Table 1. *Demographic Profile of Participants ($N = 624$)*

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	356	57.1%
Gender	Male	268	42.9%
Age (M = 20.7, SD = 1.4)	18–20 years	294	47.1%
Age (M = 20.7, SD = 1.4)	21–24 years	330	52.9%
Year of Study	1st Year (Freshmen)	153	24.5%
Year of Study	2nd Year (Sophomores)	195	31.2%
Year of Study	3rd Year (Juniors)	179	28.7%
Year of Study	4th Year (Seniors)	97	15.6%
Geographical Distribution	Western Indonesia (Java & Sumatra)	335	53.7%
Geographical Distribution	Central & Eastern Indonesia	289	46.3%
Academic Major	English Language Education	248	39.7%
Academic Major	Non-English Majors (STEM, Social Sciences)	376	60.3%
Baseline CEFR Level	A2 (Elementary)	138	22.1%
Baseline CEFR Level	B1 (Intermediate)	339	54.3%
Baseline CEFR Level	B2 (Upper-Intermediate)	147	23.6%

Instrument Development and Validation

Data were collected using five distinct instruments:

1. Informal Digital Learning of English (IDLE) Scale: A 22-item scale measuring receptive, productive, and interactive digital engagement.
2. Learner Autonomy Scale: An 18-item scale assessing self-direction and goal setting.
3. Self-Regulated Learning (SRL) Scale: A 16-item instrument capturing cognitive and metacognitive monitoring.
4. Digital Engagement Quality Scale (DEQ Scale - Newly Developed):
    - *Scale Development Process:* To capture the cognitive, reflective, and interactive *depth* of digital media use rather than mere screen time, a 4-step development framework was executed:
        1. *Item Generation:* 18 initial items were drafted based on cognitive engagement literature and digital SLA dynamics.
        2. *Expert Panel Evaluation:* A panel of five SLA and educational technology experts evaluated content validity, yielding a Content Validity Index (CVI) of 0.92.
        3. *Pilot Testing:* Administered to a pilot sample ($n = 120$).
        4. *Factor Refinement:* Exploratory and Confirmatory Factor Analysis (EFA/CFA) refined the scale to 15 items across three dimensions (Cognitive Processing, Reflective Adaptation, and Interactive Depth).
5. CEFR-Assessed Speaking Proficiency Measure: Oral performances were recorded via standardized 3-minute impromptu speaking tasks.

Rater Calibration and Standardization Procedure

To ensure objective scoring across the three independent raters:

- Raters underwent a mandatory 10-hour calibration workshop on the Common European Framework of Reference for Languages (CEFR) speaking rubric (evaluating Range, Accuracy, Fluency, Interaction, and Coherence).
- Raters independently scored a benchmark sample of 15 non-study recordings, achieving consensus calibration.
- Speech samples from the main study ($N = 624$) were anonymized and double-blind evaluated. Minor score variations (less than 1 band difference) were averaged, yielding excellent inter-rater reliability with an Intraclass Correlation Coefficient (ICC) of 0.91.

Pilot testing on $n = 120$ confirmed robust psychometric properties across all measurement scales: factor loadings > 0.70, Composite Reliability (CR) of 0.88–0.94, Cronbach's α of 0.85–0.92, and Average Variance Extracted (AVE) > 0.50.

Ethical Considerations and Informed Consent

This study was approved by the Institutional Review Board (IRB) of the coordinating university (Approval No. IRB-2025/08-042). Participation was entirely voluntary. Prior to data collection, participants received digital consent forms detailing the study objectives, data handling protocols, and their right to withdraw at any stage without consequence. All participant responses and audio recordings were anonymized using alphanumeric identification codes.

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Proposed Structural Model and Data Analysis

To systematically evaluate the direct and indirect path hypotheses (H_1–H_8), the structural model was specified prior to hypothesis testing. Structural evaluation was executed using PLS-SEM bootstrapping with 5,000 resamples at a significance threshold of $\alpha = 0.05$.

The proposed structural framework illustrating the direct, indirect, and overall predictive paths is presented in **Figure 2**.

Figure 2. *Proposed PLS-SEM Structural Model for the DLAE Framework (Hypotheses H_1–H_8)*

3. Result and Discussion

3.1 Student Digital Engagement Profile

Descriptive data reveals a significant level of IDLE engagement among students, with 78.4% accessing English-language content on a daily basis. YouTube emerges as the most prevalent platform, utilized by 91.8% of students, followed by TikTok at 73.6%, Netflix at 68.2%, Spotify and podcasts at 57.4%, AI-based applications at 42.8%, and Discord at 35.1%. Regarding daily usage intensity, 15.3% of students engage with English-language digital content for over four hours per day, 28.5% for 2–4 hours, 34.4% for 1–2 hours, and 21.8% for less than one hour.

Furthermore, 71.5% of students indicated that they acquire the majority of their new vocabulary from digital activities outside the classroom, while 67.9% reported that their speaking skills developed more rapidly through digital interactions than through traditional classroom assignments. This suggests a significant shift in the language learning environment beyond the confines of formal education.3.2 Measurement Model Quality

Prior to hypothesis testing, all constructs were evaluated for validity and reliability. The results indicated excellent psychometric quality across all constructs, as summarized in Table 1.

Construct	Cronbach's Alpha	Composite Reliability	AVE
IDLE	0,921	0,936	0,708
Learner Autonomy	0,904	0,926	0,682
Self-Regulated Learning	0,893	0,918	0,654
Digital Engagement Quality	0,932	0,944	0,738
Speaking Proficiency	0,901	0,925	0,711

Table 1. Summary of validity and reliability of research constructs

All Cronbach's Alpha and Composite Reliability values were above 0.80 (very good internal consistency), and all AVE values were above 0.50 (met convergent validity). Discriminant validity tests using the Fornell-Larcker and Heterotrait-Monotrait Ratio (HTMT) criteria also showed that the square root of the AVE for each construct was greater than the interconstruct correlations, indicating that all constructs had sufficient discrimination for further analysis in the structural model.

3.3 Structural Model and Hypothesis Testing

Bootstrapping results from 5,000 subsamples indicate that all main hypothesized paths (H1–H5) are accepted with very strong significance ($p < 0.001$), as presented in Table 2.

Correlation Inter-variable	β	t-value	p-value	Decision
IDLE → Speaking Proficiency	0,381	8,964	<0,001	Valid
Learner Autonomy → IDLE	0,612	16,738	<0,001	Valid
Learner Autonomy → SRL	0,674	18,211	<0,001	Valid
SRL → Digital Engagement Quality	0,591	14,987	<0,001	Valid
Digital Engagement Quality → Speaking Proficiency	0,472	11,862	<0,001	Valid

Table 2. Results of the Direct Path Hypothesis Test

An intriguing discovery is that the highest path coefficient does not arise from the direct relationship between IDLE and speaking proficiency (β = 0.381). Instead, it stems from learner autonomy to self-regulated learning (SRL) (β = 0.674) and learner autonomy to IDLE intensity (β = 0.612). This pattern suggests that learner autonomy acts as the principal "driving force" influencing the extent to which students can effectively engage with the digital environment, rather than the reverse.

The model's predictive ability was evaluated using the coefficient of determination (R^2), the results of which are presented in Table 3.

Endogen Variable	R^2	Catagory
IDLE	0,375	Moderat
Self-Regulated Learning	0,454	Moderat
Digital Engagement Quality	0,563	Moderat–Substansial
Speaking Proficiency	0,691	Substansial

Table 3. Coefficient of determination (R^2) values for each endogenous variable

The R^2 value of 0.691 for speaking proficiency means that 69.1% of the variation in students' speaking ability can be explained by the combination of variables in the DLAE model—a value that, according to Hair et al.'s (2022) criteria, is considered substantial for social and educational research. This provides strong evidence that the proposed conceptual model has explanatory power far exceeding conventional IDLE models, which generally involve only one or two predictor variables.

3.4 Mediation Effect

Mediation testing confirms that the relationships between the variables in this model are not entirely direct, but rather operate through theoretically meaningful indirect mechanisms (Table 4).

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Jalur Mediasi	β	t-value	p-value
IDLE → Digital Engagement → Speaking Proficiency	0,246	7,913	<0,001
Learner Autonomy → SRL → Digital Engagement	0,314	8,421	<0,001

Tabel 4. Hasil analisis mediasi

Table 4. Mediation analysis results

Digital Engagement Quality proved to be a significant mediator between IDLE and speaking proficiency. This means that digital exposure alone does not automatically improve speaking skills; the effect is only meaningful when students engage actively, reflectively, and productively—rather than simply passively watching or listening. Similarly, self-regulated learning mediated the relationship between learner autonomy and the quality of digital engagement, indicating that learning autonomy needs to be translated into concrete self-regulatory habits to produce quality digital engagement.

3.5 Differences in Speaking Ability Based on IDLE Intensity

A one-way ANOVA compared students' speaking scores based on their level of IDLE engagement (low, medium, high), with highly significant results ($F = 39.72$; $p < 0.001$).

IDLE Level	Speaking Average Score
Rendah	63,8
Sedang	74,2
Tinggi	86,9

Table 5. Mean speaking scores based on IDLE engagement level

Students with high IDLE levels scored an average of 23.1 points higher in speaking than those in the low IDLE group—a very large difference and practically much more significant than the effects typically reported for purely formal learning interventions in the EFL literature.

3.6 Digital Activities with the Highest Contribution

This study also maps the specific digital activities that contribute most to speaking proficiency (Table 6).

Digital Activity	Effect Coefficient
Watching English Youtube Video	0,621
Interaction Via Discord	0,574
English Podcast	0,521
Netflix with English Subtitle	0,497
Educative TikTok	0,441
AI Conversation Apps	0,436

Table 6. Contribution of digital activities to speaking proficiency

YouTube contributed the most, likely because it combines linguistic, visual, cultural, and pragmatic input, approximating the experience of real-time communication. Interestingly, Discord—a platform focused on real-time text-and-voice interaction—came in second place, surpassing both Netflix and TikTok. This pattern reinforces the indication that interactive and productive activities contribute more than purely receptive (passive consumption) activities.

3.7 Novel Findings: Language Acquisition Patterns Beyond the Classroom Paradigm

One of the most noteworthy findings is that students who achieve the highest speaking scores do not necessarily belong to the groups with the highest academic performance in English courses. Rather, they consistently exhibit five key characteristics: daily exposure to English-language content, active engagement in international digital communities, utilization of AI as a speaking practice partner, a strong sense of learner autonomy, and consistent self-regulated learning. The interplay of these five characteristics fosters a language acquisition pattern that functions independently of formal academic success in the classroom and serves as the foundational empirical basis for the proposed Digital Language Acquisition Ecosystem (DLAE) framework.3.8 Comparison with Previous Research Findings

In comparison to prior research on IDLE, the strength of the relationship identified in this study is notably robust. Lee and Sylvén (2021) documented a positive association between IDLE and both motivation and foreign language enjoyment; however, they did not regard speaking proficiency as the primary dependent variable, which was objectively assessed through performance tests. Likewise, the majority of the research reviewed in Soyoof et al.'s (2023) scoping study concentrated on the general correlation between digital activity and overall language competence, without distinctly addressing the mediating role of the quality of digital engagement.

By providing a direct assessment of speaking proficiency conducted by an independent evaluator based on the CEFR, and by conceptualizing digital engagement quality as a separate construct and mediator, this study offers more precise evidence regarding the mechanisms underlying the relationship between IDLE and speaking ability. It not only confirms the existence of this relationship but also elucidates the processes and pathways through which it develops.

A comparable pattern arises when these results are contrasted with a recent structural equation modeling study conducted by Zhang and Liu (2024), which similarly affirmed the significant role of learner psychological variables in elucidating the effectiveness of IDLE. The consistent direction of the relationship observed in both studies—within the Chinese and Indonesian contexts—suggests that the mechanisms underpinning IDLE, especially the roles of autonomy and self-regulation, are likely to be cross-contextual and not confined to a specific educational cultural setting. Nonetheless, further replication across different countries is necessary before such generalizations can be confidently established.

4. Discussion

Overall, the findings of this study deliver strong experimental mark that Informal Digital Learning of English (IDLE) has become one of the most vital factors of EFL students' speaking ability progress in the digital age. The R^2 value of 0.691 for speaking proficiency confirms that nearly 70% of the variation in students' speaking proficiency can no longer be explained solely by what happens in the classroom, but rather by a much broader network of learning experiences spread across various digital platforms. This finding

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strengthens the argument that the English language learning landscape has shifted from an institution-centered model to a learner-and-ecosystem-centered model.

Support for Krashen's Input Hypothesis is clear from the data: platforms like YouTube, Netflix, and podcasts provide comprehensible input in volumes far beyond the traditional classroom setting has its limits. At the time real-life English sounds more natural. This includes accents, tone and expressions that you do not often see in textbooks.

However this study also shows that just listening to English is not enough. * The influence of Discord (0.574) is similar to YouTube (0.621). * The path from IDLE to Digital Engagement to Speaking ($\beta = 0.246$; $p < 0.001$) is very important. This supports Swains Output Hypothesis and Longs Interaction Hypothesis. These theories help turn listening into speaking skills. They do not replace each other. Work well together in the digital world. The important finding in this study is the role of learner autonomy. Learner autonomy affects SRL ($\beta = 0.674$). Idle intensity ($\beta = 0.612$) a lot. These are the effects in all the models. This is more important than the direct effect of IDLE, on speaking skills. This changes the view that digital exposure is the main factor. Digital exposure matters when students take control of their learning. They need to set goals choose resources, track progress and evaluate their learning. Two students can have the digital exposure but get different results. It depends on how they manage their learning.

Learner autonomy makes a difference. This is closely related to the next finding, namely the role of digital engagement quality as a mediator between IDLE and speaking proficiency ($\beta = 0.472$ in the direct path to speaking, and significant as a mediator). This finding challenges the common assumption that the duration of technology use linearly links learning outcomes. The data suggests that it's not 'how long' but 'how' students engage that matters: whether they simply watch passively, or actively note down vocabulary, imitate pronunciation, discuss content, and produce language in real-life interactions. This implies that future language learning research and interventions need to shift from measuring 'screen time' to measuring the depth and quality of engagement—a methodological shift that aligns with growing criticisms in the recent literature on IDLE (Soyoof et al., 2023).

The role of artificial intelligence deserves particular attention among these findings. AI conversation applications were positively associated with speaking proficiency ($\beta = 0.436$), yet this contribution was consistently smaller than that observed for interactions grounded in human contact—Discord exchanges, for example—or exposure to authentic content such as YouTube and podcasts. Taken together, this pattern suggests that AI functions most effectively as a complement to authentic social interaction rather than a substitute for it. Its strengths are fairly specific: constant availability, immediate corrective feedback on pronunciation and grammar, and a low-stakes environment in which learners can experiment without fear of judgment. Pragmatic competence, cultural sensitivity, and the capacity to negotiate meaning under unpredictable conditions, however, appear to depend more heavily on engagement with actual English speakers, whether encountered locally or through the broader digital community.

Among the study's contributions, one of the more provocative is the observation that the students with the highest speaking scores were not necessarily those with the strongest academic grades. This finding lends considerable support to the Digital Language Acquisition Ecosystem (DLAE) framework proposed here. Language pedagogy has, for several decades, treated classroom instruction as the principal—if not sole—determinant of communicative competence.

The present data complicate that assumption. Speaking proficiency instead appears to emerge from sustained interaction across an interconnected set of digital resources: YouTube, podcasts, social media platforms, online communities, and AI-based tools. Rather

than functioning as isolated supplements to formal instruction, as much of the existing IDLE literature has assumed, these resources appear to operate collectively as an active and self-sustaining ecosystem of language development.

The explanatory strength of the DLAE model, indicated by an R^2 of 0.691, warrants a similarly measured interpretation. Approximately 30.9 percent of the variance in speaking proficiency remains unaccounted for, a gap likely attributable to factors outside the model's scope—language anxiety, the instrumental or integrative orientation of a learner's motivation, personality dimensions such as extraversion, or variation in the quality of formal instruction itself. The DLAE framework is therefore best understood not as a replacement for established theories of second language acquisition but as an extension of them—one that leaves ample room for the continued importance of formal instruction in establishing grammatical foundations and explicit communicative strategies.

The pedagogical implications of this finding are considerable. If learner autonomy indeed emerges as the strongest predictor of IDLE success, then speaking instruction in higher education may need to shift its emphasis—from the straightforward transfer of material toward the cultivation of independent learning capacity. In this reconfigured role, lecturers act less as transmitters of content and more as facilitators: helping students identify digital resources aligned with their interests, guiding them in setting realistic self-learning goals, and encouraging regular reflection on their own progress. This might take the form of digital learning journals or structured assignments that fold IDLE activities—following particular YouTube channels, listening to podcasts, or taking part in international discussion forums—directly into formal assessment. Such an approach affords informal learning a measure of pedagogical recognition without curtailing the autonomy that constitutes one of IDLE's central strengths.

Taken together, these findings support the broader claim that speaking ability among twenty-first-century EFL students is no longer attributable solely to formal classroom instruction. It emerges, rather, from an ongoing and often unpredictable interplay between learners and the digital ecosystems they inhabit on a daily basis. This represents a conceptual shift worth underscoring: from viewing the classroom as the sole site of learning to understanding it as one node within a much larger learning ecosystem. Reframing second language acquisition in these terms is among the principal contributions this study offers to the field in the digital age.

The dominance of YouTube and Discord as the two strongest contributors also invites reflection on the characteristics of Generation Z, the population at the center of this study. Having grown up immersed in digital environments from an early age, this generation tends to exhibit high technological literacy, relative comfort with cross-cultural interaction online, and media-multitasking habits that diverge markedly from those of earlier cohorts. These traits plausibly account for much of IDLE's effectiveness with current learners, yet they also raise an open question: will this effectiveness persist among future generations, whose patterns of digital media consumption are shifting rapidly—for instance, the ongoing migration from long-form video toward short-form content? This remains an important direction for subsequent IDLE research.

Finally, these findings carry meaningful implications for the evolving role of English language lecturers. Rather than being rendered obsolete by the abundance of freely available digital resources, the lecturer's position is arguably becoming more strategically significant, not less. Lecturers increasingly function as curators, helping students navigate and filter quality resources from an otherwise overwhelming volume of content; as coaches, fostering habits of self-regulation; and as facilitators of interaction, bridging informal online practice with the structure of formal classroom feedback and assessment. In this sense, the lecturer's distinctive contribution is shifting—from serving primarily as a source of

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information to functioning as a designer of learning ecosystems, a transformation broadly consistent with contemporary, learner-centered trends in language pedagogy.

It is also worth noting that the significant influence of Digital Engagement Quality as a mediator (Table 4) provides an important warning for education policies that tend to assess digital literacy solely in terms of accessibility or infrastructure availability. This research data shows that the mere availability of access—for example, ownership of a device or internet quota—does not automatically result in improved language competence. What's more crucial is digital literacy in a deeper sense, namely the ability to select, process, produce, and critically reflect on digital content. Consequently, digital literacy programs in higher education need to expand their scope, moving beyond technical training on device use to fostering more holistic independent learning strategies.

This study shows that informal digital learning of English has a positive and significant impact on EFL students' speaking ability, with learner autonomy as a fundamental factor and digital engagement quality as a key mediator determining the effectiveness of these digital activities. The proposed Digital Language Acquisition Ecosystem (DLAE) model explains 69.1% of the variation in students' speaking ability, confirming that language acquisition in the digital age occurs through complex interactions between learners, technology, the global community, and self-regulatory processes—transcending the boundaries of the formal classroom, while still requiring formal education as a foundation and essential complement.

5. Conclusion

This study investigated the motivational factors driving Thai students to learn Indonesian through BIPA programs in the Java region of Indonesia. Using a convergent mixed-methods design, the study combined quantitative measures of integrative and instrumental motivation with qualitative accounts of participants' learning experiences, cultural engagement, and reasons for studying Indonesian. The findings demonstrate that Thai BIPA learners possess a multidimensional motivational profile in which both integrative and instrumental orientations play important roles.

The quantitative findings showed that both motivational orientations were highly endorsed, with integrative motivation receiving a higher mean score ($M = 3.94$) than instrumental motivation ($M = 3.69$). The qualitative findings supported this pattern by showing that participants were strongly motivated by opportunities to understand Indonesian culture, communicate with Indonesian people, develop social relationships, and participate in everyday Indonesian life. At the same time, academic requirements, scholarship opportunities, future study, employment, and career development remained important instrumental motives. These findings indicate that Thai learners' motivation cannot be adequately explained by a single motivational orientation; rather, cultural, social, academic, and future-oriented motives coexist within the BIPA learning experience.

The relatively stronger integrative motivation is particularly noteworthy because previous research involving Asian language learners has frequently emphasized instrumental motives associated with academic achievement, employment, and educational advancement. The present findings suggest that the learning context may influence the relative strength of motivational orientations.

Thai students learning Indonesian while living and studying in Indonesia have opportunities for continuous interaction with Indonesian speakers and direct engagement with Indonesian cultural practices. Such cultural immersion may strengthen learners' interest in the target-language community and make Indonesian meaningful beyond its practical utility. However, this interpretation should be understood as a contextual

explanation rather than a causal conclusion because the present study did not experimentally examine the effects of cultural immersion.

The study also contributes theoretically by demonstrating the value of considering Gardner's socio-educational perspective and the L2 Motivational Self System as complementary perspectives for understanding Thai BIPA learners. Integrative and instrumental motivation help describe learners' orientations toward Indonesian language and culture, while the L2 Motivational Self System provides a useful perspective for understanding how these motivations may connect with learners' future-oriented identities and learning experiences. The findings therefore support a context-sensitive understanding of second-language motivation in which motivation is shaped not only by individual goals but also by cultural immersion, social interaction, and the immediate learning environment.

Pedagogically, the findings suggest that BIPA programs should integrate language instruction with meaningful cultural and communicative experiences. BIPA instructors can incorporate Indonesian cultural materials, authentic communication tasks, language-exchange activities, community-based learning, field activities, and opportunities to interact with Indonesian speakers. At the same time, academic and career-oriented tasks can be integrated into these activities so that instrumental and integrative motivations reinforce one another. Such an approach may help learners develop both communicative competence and a stronger sense of connection with Indonesian language and culture.

Despite these contributions, the study has several limitations. The use of purposive sampling and a sample of 101 Thai BIPA learners limits the generalizability of the findings. The cross-sectional design also does not allow conclusions about changes in motivation over time or causal relationships between cultural immersion and motivational development. In addition, qualitative coding was conducted by a single researcher, and the study did not directly measure participants' L2 Motivational Self System components or objective Indonesian-language proficiency.

Future research should therefore employ longitudinal designs to examine how Thai learners' motivation develops throughout their BIPA experience. Comparative research across different Indonesian regions, such as Java, Sumatra, and Bali, could further determine how regional cultural and educational contexts influence motivation. Studies comparing Thai learners from Southern Thailand with learners from other regions of Thailand would also help clarify whether linguistic and cultural proximity contributes to differences in integrative motivation. Finally, future research could directly measure the Ideal L2 Self, Ought-to L2 Self, L2 Learning Experience, and Indonesian-language proficiency to provide a more comprehensive empirical examination of the relationship between motivational identity, cultural immersion, and language development.

Overall, this study contributes to the growing literature on second-language motivation by highlighting the experiences of Thai BIPA learners in the Java region, a relatively underexplored Southeast Asian context. The findings suggest that Indonesian-language motivation among Thai learners is shaped by the interaction of cultural engagement, interpersonal communication, academic purposes, and future aspirations. By connecting motivational orientations with cultural immersion and learners' developing motivational identities, the study provides a more context-sensitive understanding of why Thai students learn Indonesian and offers practical directions for strengthening BIPA instruction in Indonesia.

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