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DEEP LEARNING ENGAGEMENT AS A PREDICTOR OF ACADEMIC SELF-EFFICACY AND LANGUAGE PERFORMANCE

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Abstract

This study investigates how deep learning engagement influences academic self-efficacy and language performance among English majors in Indonesia. Deep learning is an active and reflective process that involves critical thinking, conceptual integration, and self-regulated learning. Using a person-centred quantitative design, data were collected from 300 English majors across three universities and analysed through Latent Profile Analysis (LPA). This study applies LPA in English as Foreign Language (EFL) higher education and examines how learner diversity can be observed in a Muslim-majority population. The analysis identified three distinct learner profiles: reflective analysts, strategic learners, and passive processors. Reflective Analysts achieved the highest levels of academic self-efficacy and language performance, as measured by GPA in writing and speaking. In contrast, Passive Processors recorded the lowest scores. Profile membership was significantly influenced by academic year with clear developmental trend, whereas gender had no effect. Overall, the findings confirm that deep learning engagement is a strong predictor of EFL achievement. Theoretically, the study advances understanding of learner diversity of deep learning within Southeast Asian higher education. Practically, The study underscores the need for differentiated instruction (e.g., reflective writing and scaffolding) to help less engaged learners strengthen their critical reflection and self-regulation.

Keywords: deep learning engagement; latent profile analysis; academic self-efficacy; self-regulated learning

Abstrak

Penelitian ini bertujuan mengungkapkan bagaimana keterlibatan dalam pembelajaran mendalam memengaruhi efikasi diri akademik dan kinerja bahasa di kalangan mahasiswa jurusan Bahasa Inggris di Indonesia. Pembelajaran mendalam merupakan proses aktif dan reflektif yang melibatkan berpikir kritis, integrasi konseptual, dan pembelajaran yang diatur sendiri. Dengan menggunakan desain kuantitatif berpusat pada individu, data dikumpulkan dari 300 mahasiswa jurusan Bahasa Inggris di tiga universitas dan dianalisis melalui Latent Profile Analysis (LPA). Studi ini menerapkan LPA dalam konteks pendidikan tinggi Bahasa Inggris sebagai bahasa asing (EFL) dan menelaah bagaimana keragaman pembelajar dapat diamati pada populasi mayoritas Muslim. Analisis mengidentifikasi tiga profil pembelajar yang berbeda: reflective analysts, strategic learners, dan passive processors. Reflective Analysts mencapai tingkat efikasi diri akademik dan kinerja bahasa tertinggi, diukur berdasarkan IPK dalam keterampilan menulis dan berbicara. Sebaliknya, Passive Processors mencatat skor terendah. Keanggotaan profil dipengaruhi secara signifikan oleh tahun akademik dengan tren perkembangan yang jelas, sedangkan jenis kelamin tidak berpengaruh. Secara keseluruhan, temuan ini menegaskan bahwa keterlibatan dalam pembelajaran mendalam merupakan prediktor kuat terhadap pencapaian EFL. Secara teoretis, penelitian ini memperluas pemahaman tentang keragaman pembelajar dalam konteks pembelajaran mendalam di pendidikan tinggi Asia Tenggara. Secara praktis, penelitian ini menekankan perlunya pembelajaran berdiferensiasi (misalnya, penulisan reflektif dan scaffolding) untuk membantu pembelajar yang kurang terlibat dalam memperkuat refleksi kritis dan pengaturan diri mereka.

***Kata kunci**: keterlibatan pembelajaran mendalam; analisis profil laten; efikasi diri akademik; pembelajaran yang diatur sendiri*

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Introduction

This distinction is consistent with constructivist theories proposed by Piaget and Vygotsky, and also aligns with Zimmerman's self-regulated learning model and Deci and Ryan's self-determination theory (Ryan & Deci, 2020). From this perspective, deep learning is strongly associated with autonomy, motivation, and metacognitive strategies. These qualities enable students to transfer knowledge more effectively and achieve long-term academic (F. Li & Zhang, 2025; L. Li et al., 2025). Empirical research further supports this perspective by showing that deep learning fosters academic persistence, critical thinking, and improved language learning outcomes (Hong et al., 2020; Muwonge et al., 2020).

Deep learning is particularly important in English as a Foreign Language (EFL) education becausestudents must develop both language skills and academic literacy. Strategies like reflective writing, inferential reading, and dialogic speaking not only support language proficiency but also strengthen critical thinking (R. Jiang, 2022; Khong & Tanner, 2024). However, many Indonesian classrooms remain dominated by teacher-centred methods, rote memorization, and exam-driven practices. Although *Merdeka Belajar* promotes autonomy, the program implementation is limited by large classes, exam-driven tests, and rote learning traditions in Islamic universities. This gap between policy and practice is more apparent in Islamic higher education. Traditions of authority and emphasis on text memorization coexist with reflection *(tafakkur, muhasabah),* which is given significant importance. This tension creates unique challenges for Indonesian students in developing reflective and self-regulated learning (Huda & Lubis, 2019).

Most studies on deep learning have relied on variable-centred methods, which examine correlations between motivation, strategies, GPA, and outcomes. These methods are useful, but they do not capture differences across subgroups of students. By comparison, person-centred methods like Latent Profile Analysis (LPA) can identify distinct learner profiles with different engagement patterns (Jiao et al., 2025; Zhan & Zhong, 2025). Previous LPA studies in EFL education have revealed profiles related to writing, motivation, and anxiety (Hong et al., 2020; Muwonge et al., 2020). For this reason, investigating profiles of deep learning engagement in this region is crucial. As interdependent of culture and exam-driven traditions create distinctive challenges, making this research valuable for both theoretical understanding and practical application.

In addition, self-efficacy is also key in linking engagement and performance. Self-efficacy refers to learners' belief in their ability to succeed and is widely recognized as a predictor of persistence, risk-taking, and achievement (Benight & Bandura, 2004; Liu & Oga-Baldwin, 2022). In EFL settings, students with higher self-efficacy are more willing to tackle difficult tasks, regulate their strategies, and reach higher levels of proficiency (Hosseinpour Kharrazi & Ghanizadeh, 2024; Yang & Lay, 2025). Feedback and interaction can further increase both engagement and self-efficacy (Cai & Xing, 2025). However, cultural and institutional factors can shape how these factors operate (Korhonen et al., 2024). Only a few studies have explored the connection between self-efficacy and latent profiles of deep learning engagement, and this gap is particularly evident in Muslim-majority population where reflection carries unique cultural meanings.

Based on this background, the present study applies Latent Profile Analysis to examine deep learning engagement among undergraduate English majors in Lampung, Indonesia. The study aims

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to identify learner profiles, connect them with self-efficacy and language performance, and explore demographic predictors (e.g., academic year and gender). This research makes three contributions. Theoretically, the study advances understanding of learner diversity. By providing new evidence from Indonesia. Practically, the study offers strategies for differentiated instruction (e.g., reflective writing and scaffolding), that can foster reflection, self-regulation, and stronger academic outcomes (F. Li & Zhang, 2025; Rose et al., 2025; Sun et al., 2025).

Method

Research Design

This study used a person centred quantitative design to examine how deep learning engagement predicts academic self-efficacy and language performance. A person-centred approach was chosen because variable-centred methods often fail to capture learner diversity. In contrast, Latent Profile Analysis (LPA) enables researchers to identify subgroups of students with distinct engagement profiles (Sun et al., 2025; Zhan & Zhong, 2025). LPA has been widely applied in educational psychology and EFL research to investigate motivation, strategy use, and self-regulation (Hong et al., 2020; Muwonge et al., 2020).

Participants and Sampling

The study involved 300 undergraduate English majors from three universities in Lampung, Indonesia. The sample consisted of 192 females and 108 males, representing students across all four academic years. Participants were recruited through convenience sampling, that is, commonly used in educational research. This approach is practical for identifying subgroup differences in large-scale EFL studies (Jiao et al., 2025), albeit limiting representativeness and external validity (Hong et al., 2020). Eligibility criteria required the To have completed at least one semester of English program and gave consent to participate after being informed about the study.

Instruments and Data Collection

Three instruments were used to answer the research questions. Each instrument was selected to capture a different dimension of the study, that are deep learning engagement as the core construct, academic self-efficacy as a psychological predictor, and language performance as the outcome variable. Together, these instruments provide a comprehensive picture of how engagement relates to learners' beliefs and academic results. The details of each instrument are presented below.

1. The DLES, adapted from the Revised Study Process Questionnaire (R-SPQ-2F), consisted of 20 items measuring three dimensions that are, conceptual integration, critical reflection, and metacognitive regulation. The adaptation process followed forward–backward translation and expert review to ensure linguistic and cultural validity. Special attention was given to *critical reflection* as Indonesian Muslim culture resonates with *tafakkur* (deep contemplation) and *muhasabah* (self-evaluation). Cultural adaptation is essential when applying Western-developed instruments in Asian and Muslim-majority culture (Hosseinpour Kharrazi & Ghanizadeh, 2024; Hwang & Cabell, 2021). The DLES

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demonstrated strong internal consistency (Cronbach's α = .89; McDonald's ω = .88), and exploratory factor analysis confirmed the three-factor structure (Xu & Corno, 2022).

2. The Academic Self-Efficacy Scale is an 8-item scale that is adapted from Schunk and Pajares, assessed students' confidence in performing reading, writing, speaking, and listening tasks. Reliability was high (α = .87; ω = .86), consistent with evidence that self-efficacy is a robust predictor of academic learning and performance (Yang & Lay, 2025).
3. Language performance was assessed through self-reported GPA in Academic Writing and Speaking courses, converted to a 4.0 scale. Although self-reports may introduce bias, prior research shows that when equivalence tables and attention checks are applied, self-reported GPA strongly correlates with official records (Hong et al., 2020; Muwonge et al., 2020).

The survey was administered via online bilingual (English–Bahasa Indonesia) Google Forms over a period of two months to maximize accessibility and was distributed through faculty announcements, WhatsApp groups, and institutional mailing lists. Out of 314 initial responses, 14 were excluded due to incompleteness or failed attention checks, resulting in 300 valid cases. Ethical approval was obtained from the relevant institutional review boards. Participation was voluntary, anonymous, and aligned with accepted moral standards. Online survey methods have been widely and successfully applied in Southeast Asian engagement studies (Dinh & Phuong, 2025).

A structured framework was developed to show each step of data collection, from participant recruitment to the formation of the final dataset. This framework helps clarify the logic of the methodology and demonstrates how data quality was maintained throughout the study. Figure 1 presents the framework of data collection, outlining the flow from participant recruitment to the final dataset.

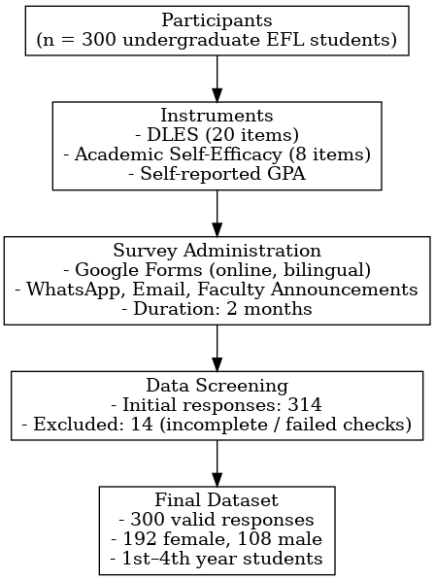

Figure 1. Data Collection Framework

Based on Figure 1 above, the framework shows that the operational process of data collection. Beginning with 314 respondents, the survey is comprised of three instruments and was distributed in online bilingual form (English–Bahasa Indonesia). After data screening, which excluded 14 incomplete or invalid responses, the final dataset is consisted of 300 valid cases. This procedure ensured data quality and reliability for subsequent analysis.

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Data Analysis

Data analysis followed a structured sequence of procedures to meet the research objectives. This phased approach ensured that the findings were both valid and reliable, beginning with a general overview of the dataset and progressing to more advanced statistical techniques. The analysis followed four sequential stages, each designed to test assumptions, confirm measurement validity, and examine relationships among the key variables.

The first stage is analysis of descriptive statistics summarized the demographic distribution and variable means. The second step is Exploratory Factor Analysis (EFA) to validate the construct structure of the DLES. The three-factor model of conceptual integration, critical reflection, and metacognitive regulation was supported by strong fit indices (KMO = .89, Bartlett's $\chi^2 = 2183.6$, $p < .001$), consistent with previous applications (Khong & Tanner, 2024; Xu & Corno, 2022). The reliability and validity results of the instruments are summarized in Table 1, as shown table 1.

Table 1. Reliability and Validity of Instruments

Instrument	Dimension	Items	Cronbach's α	McDonald's ω	KMO	Bartlett's Test (χ^2, p)
DLES	Conceptual Integration	7	0.87	0.86		
	Critical Reflection	6	0.83	0.82	0.89	$\chi^2 = 2183.6$, $p < .001$
	Metacognitive Regulation	7	0.88	0.87		
ASE Scale	Global Score	8	0.87	0.86	–	–

As presented in Table 1, all scales demonstrated strong internal consistency ($\alpha > .80$) and adequate construct validity. These results confirm that the instruments are reliable and valid for subsequent LPA.

The third stage is a Latent Profile Analysis that was conducted using the *tidyLPA* package in R (v4.3.3). Models with one to four profiles were estimated, and model selection was guided by standard fit indices (AIC, BIC, SABIC, entropy) and the Lo–Mendell–Rubin likelihood ratio test (LMR-LRT). Following established criteria, the three-profile solution was retained because The solution offered the most favourable balance of statistical fit, classification accuracy, and theoretical interpretability. Importantly, this solution also aligned with Biggs' (1978) framework of deep, strategic, and surface learning, thereby strengthening the conceptual rationale for selecting this model.

Finally, inferential analyses were performed to examine predictors and outcomes across the identified profiles. Chi-square tests were used to assess demographic variables like gender and academic year. In addition, one-way ANOVA with Scheffé post hoc tests compared self-efficacy and GPA among the profiles. Effect sizes were reported using eta squared (η^2) to improve interpretability (Gebauer et al., 2020). To aid understanding, the latent profiles and outcome differences were visualized using *ggplot2* in R.

To provide a visual overview, the research design framework is summarized in Figure 2. The diagram clarifies the logical sequence of procedures, starting from research objectives through data collection, analysis, and interpretation.

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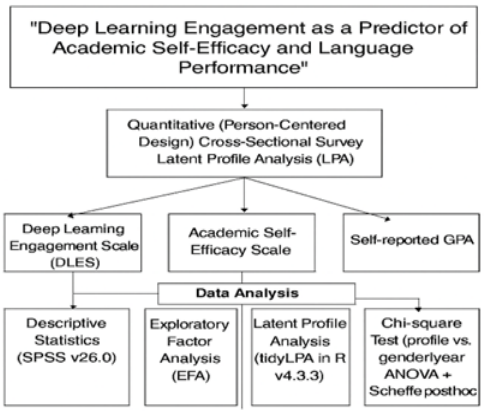

Figure 2. Research Design Framework

As shown in Figure 2, the methodological flow from participant recruitment to statistical analysis provides a clear overview that ensures transparency and replicability of the research process. Overall, the methodology combined validated and culturally adapted instruments, a rigorous person-centred analytical approach, and visual frameworks to strengthen transparency. Reliability and validity analyses confirmed the appropriateness of the instruments, while Latent Profile Analysis (LPA) offered both statistical robustness and theoretical alignment. In addition, potential limitations related to convenience sampling and self-reported GPA were acknowledged, reinforcing the study's methodological rigor. Taken together, these procedures demonstrate a research design consistency with best practices in educational and psychological research (Hosseinpour Kharrazi & Ghanizadeh, 2024; Yang & Lay, 2025).

Results and Discussion

Aligned with the study's aim to examine learner diversity in deep learning engagement and its predictive relationship with academic self-efficacy and language performance, this section presents results using both descriptive and interpretive analyses. The discussion answered three guiding questions. The first one, what profiles of deep learning engagement can be identified?. Second, How do demographic characteristics predict these profiles?. Lastly, How are profiles associated with self-efficacy and language performance? In answering these questions, the analysis integrates global learning theories, compares regional and international evidence, and situates findings within Indonesian higher education and the *Merdeka Belajar* policy framework.

Learner Profiles Based on Deep Learning Engagement (DLES)

Descriptive statistics showed that Indonesian EFL students reported moderately high deep learning engagement (M = 3.56, SD = 0.64). Conceptual integration (M = 3.74) and metacognitive regulation (M = 3.61) were higher than critical reflection (M = 3.32). This imbalance suggests that while students can connect knowledge and regulate learning, they are less engaged in evaluative thinking. This patterns reflect classroom traditions where rote learning and exam preparation dominate, limiting opportunities for reflective practice. Similar findings have been reported in Asian EFL education, where hierarchical teacher–student relations constrain dialogic learning (Feng et al., 2025).

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Using Latent Profile Analysis (LPA), three distinct engagement profiles were identified that are, Reflective Analysts (31.3%), Strategic Learners (42.3%), and Passive Processors (26.3%). To complement this analysis, Table 2 presents a summary of the learner profile distribution and their corresponding self-efficacy and language performance scores.

Table 2. Descriptive Summary of Learner Profile

Learner Profile	Proportion (%)	Self-Efficacy Mean	Language Performance Mean (GPA)
Reflective Analysts	31.3	4.21	3.61
Strategic Learners	42.3	3.88	3.26
Passive Processors	26.3	3.47	2.91

As shown in Table 2, Reflective Analysts consistently outperformed other groups in both academic self-efficacy and GPA, while Passive Processors had the lowest scores. These profiles correspond closely with Biggs' (1978) taxonomy of learning approaches, that comprise of deep (Reflective Analysts), strategic (performance-driven), and surface (Passive Processors). Reflective Analysts emphasize reflection and critical thinking, consistent with constructivist perspectives (Piaget; Vygotsky) and self-regulated learning theory. Strategic Learners mirror exam-driven students regulate effort but lack reflective depth (Ryan & Deci, 2020). Passive Processors represent surface learners shaped by rote practices.

Internationally, similar clusters have been reported by Hong et al. (2020) in the U.S., Xu & Corno (2022) in China, and Cano et al. (2024) in Spain. Yet, the 26.3% share of Passive Processors in Indonesian higher education is higher than most European samples. Importantly, the construct of *critical reflection* resonates with Islamic notions of *tafakkur* and *muhasabah*, suggesting that explicitly integrating these practices into coursework could legitimize reflective engagement in culturally meaningful ways.

Demographic Predictors of Profile Membership

Chi-square tests showed that academic year significantly predicted profile membership ($p = .016$), while gender did not ($p = .258$). Senior students were more likely to be Reflective Analysts, whereas first-years were predominantly Passive Processors. This developmental progression suggests that engagement matures with exposure to advanced coursework (e.g., academic writing and thesis preparation which require integration and reflection (Zare et al., 2025). Entwistle (2001) highlight the non-significant gender effect, indicating that learning strategies are shaped more by academic experience than by demographics. Consistent results have been reported. Liu et al. (2025) in China and Almayez et al. (2025) in Saudi Arabia both found gender to have minimal impact once learning environments were considered.

From a critical pedagogy perspective, Indonesian classrooms that give privilege to authority and textual reproduction resemble Freire's "banking model" of education, which discourages dialogic engagement. Embedding reflective and co-assessment practices could counter these dynamics by redistributing epistemic agency to students. Statistically, the robustness of the three-profile solution was supported by fit indices (AIC, BIC, entropy > .80), confirming that learner diversity represents consistent subgroups rather than random variation

Academic Self-Efficacy and Language Performance Across Profiles

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To examine differences in academic confidence, a one-way ANOVA was conducted. Results indicated a statistically significant difference among groups ($F(2, 297) = 28.47$, $p < .001$, $\eta^2 = 0.16$). Figure 3 illustrates the mean self-efficacy scores by profile.

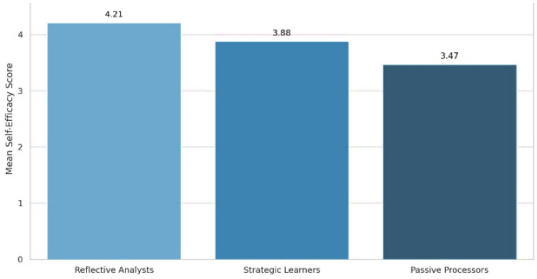

Figure 3. Mean Academic Self-Efficacy by Learner Profile

As shown in Figure 3, reflective Analysts reported the highest self-efficacy (M = 4.21), followed by Strategic Learners (M = 3.88), and Passive Processors (M = 3.47). These findings support Bandura's (1997) argument that mastery experiences are central to building efficacy beliefs. Deep engagement enhances confidence by enabling students to persist in challenging tasks (Benight & Bandura, 2004), whereas reliance on rote strategies weakens efficacy and undermines persistence.

Cross-national evidence shows similar dynamics. L. Jiang et al. (2025) reported higher self-efficacy among reflective Chinese EFL learners, while Antonietti et al. (2025) found that metacognitive strategies enhanced confidence in Europe. Cai & Xing (2025) also confirmed that students with deeper learning orientations sustained stronger self-beliefs. Together, these findings suggest that the engagement–efficacy link is robust across Groups of learners, though Indonesia's challenge lies in helping first-year students transition from rote-based schooling into reflective university learning.

Language Performance Across Profiles

ANOVA results also showed significant differences in GPA ($F(2, 297) = 31.10$, $p < .001$, $\eta^2 = 0.17$). Figure 4 displays mean GPA scores by profile.

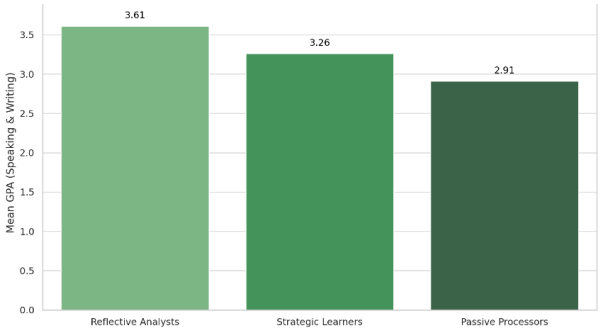

Figure 4. Mean Language Performance (GPA) by Learner Profile

As shown in Figure 4, reflective Analysts achieved the highest GPA (M = 3.61), followed by Strategic Learners (M = 3.26), and Passive Processors (M = 2.91). These results demonstrate that deep engagement translates into stronger academic performance. Reflective Analysts combined with metacognitive strategies and motivation, yielding higher outcomes (Ryan & Deci, 2020). Strategic Learners' moderate GPA suggests that performance-driven effort without deep reflection

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is consistent with Cano et al. (2024). Passive Processors' low GPA indicate the limitations of rote memorization for long-term retention (Khong & Tanner, 2024).

Comparative studies reinforce this pattern. Wang et al. (2025) in China and Alrashidi & Alshammari (2025) in the Middle East found that reflective learners consistently outperformed rote learners. However, the relatively large proportion of Passive Processors in Indonesia points to systemic barriers like oversized classes, exam-driven assessments, and limited use of formative feedback.

Collectively, the The study found that engagement, self-efficacy, and performance are interdependence. Reflective Analysts exemplify the virtuous cycle of high engagement leading to high efficacy and, in turn, higher achievement. Strategic Learners sustain moderate performance through regulation but plateau due to shallow reflection. Passive Processors remain at risk, particularly in early academic years.

Metacognitive regulation is a plausible mechanism to foster mastery experiences, which strengthen self-efficacy and ultimately improve performance. In contrast, exam-oriented motivation sustains regulation without reflective depth, capping achievement gains. This interpretation aligns with Zimmerman's (2002) self-regulated learning model where reflection strengthens both efficacy and outcomes, as well as with Ryan & Deci's (2020) self-determination theory, which emphasizes intrinsic motivation. Yet, despite *Merdeka Belajar*'s emphasis on student-centred learning, its implementation remains constrained. Teacher-centred traditions, hierarchical structures, and exam-driven practices hinder reflective engagement, particularly in Islamic higher education (Huda & Lubis, 2019). Future research should examine mediated pathways (engagement → self-efficacy → GPA) using SEM or longitudinal designs to validate this mechanism.

Conclusion

This study demonstrates that deep learning engagement significantly predicts both academic self-efficacy and language performance among Indonesian EFL undergraduates. Using Latent Profile Analysis, three distinct learner profiles were identified that are Reflective Analysts, Strategic Learners, and Passive Processors. Reflective Analysts consistently reported the highest levels of self-efficacy and language achievement, while Passive Processors performed the lowest. These findings extend global theories of learning engagement that are Biggs' deep–surface approaches, Bandura's self-efficacy, Zimmerman's self-regulated learning, and Deci and Ryan's motivation theory to the Indonesia education, where teacher-centred traditions and exam-driven curricula remain influential despite the student-centred aspirations of the *Merdeka Belajar* reform.

The study provides theoretical contributions by highlighting the value of person-centred approaches such as LPA in revealing heterogeneity in learner engagement that is often overlooked in variable-centred analyses. The study also shows how culturally embedded concepts, such as critical reflection paralleling *tafakkur* and *muhasabah*, can enrich the interpretation of deep learning in Muslim higher education, emphasizing the need to integrate global theories with local epistemologies.

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At the same time, several limitations must be recognized. The use of convenience sampling from three universities in Lampung reduces representativeness. Reliance on self-reported GPA introduces potential bias. The focus on a single region limits generalizability across Indonesia and Southeast Asia. In addition, the cross-sectional design restricts causal inference, leaving developmental trajectories of deep learning engagement only theoretically suggested.

Future research should therefore explore longitudinal designs to examine how engagement and self-efficacy develop across academic years, conduct multi-site comparisons involving PTKIN and non-PTKIN institutions to identify institutional variation, and integrate mixed methods that combine quantitative profiling with qualitative interviews to better understand cultural, institutional, and motivational influences. Further work should also test mediated pathways, for example examining whether engagement influences GPA through the mediating role of self-efficacy, using structural equation modelling or cross-lagged panel analysis to establish stronger causal evidence.

Overall, this study offers both practical and theoretical implications. At the classroom level, reflective practices can be scaffolded for Strategic Learners, while Passive Processors may benefit from explicit training in learning strategies and regulation. At the curriculum level, deep learning should be integrated from the first year to strengthen reflective habits. At the policy level, reforms are needed to support more student-centred approaches and embed reflective pedagogy within higher education. By situating Indonesian EFL students within global debates while foregrounding local cultural and policy factors, the research strengthens.

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