Jurnal Penelitian Inovatif (JUPIN)
Vol. 5, No. 2, Mei 2025, Hal. 1185-1194
https://jurnal-id.com/index.php/jupin

DOI: https://doi.org/10.54082/jupin.1437
p-ISSN: 2808-148X
e-ISSN: 2808-1366

Exploring The Relationship Between Language Skills and Academic Performance of Indonesian Students Abroad: A Multigroup SEM-PLS Approach

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Abstract

Language barriers remain a critical challenge for Indonesian students pursuing higher education abroad, potentially hindering their academic success. This study aims to analyze the effect of language skills on academic performance using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with multigroup analysis. Data were collected through an online survey from 100 Indonesian STEM students studying in Asia and Europe, selected using probability sampling. The analysis confirmed a significant positive effect of language skills on academic performance (path coefficient = 0.464; $p < 0.001$). However, multigroup analysis showed no significant moderating effect of instruction language, study destination, or learning system ($p > 0.05$ for all groups). These findings highlight that language skills consistently influence academic outcomes across different contexts. The study provides empirical evidence to support the development of targeted language support programs and inclusive academic strategies for Indonesian students abroad.

Keywords: *Academic Performance, Indonesian Students, Language Skills, Multigroup SEM-PLS, Study Abroad*

1. INTRODUCTION

Language proficiency remains one of the key challenges for international students, including Indonesian students pursuing higher education abroad. Limited mastery of the language of instruction can hinder comprehension of course materials, reduce the quality of academic interaction, and ultimately impair academic performance. Language skills—including speaking, listening, reading, and writing—are essential for academic success, as they facilitate access to lectures, participation in discussions, and completion of assignments. Although previous studies have confirmed a positive relationship between language proficiency and academic achievement among international students (Martirosyan et al., 2015; Yang et al., 2024), the specific challenges faced by Indonesian students—most of whom are accustomed to studying in Bahasa Indonesia—remain underexplored in the literature.

Moreover, language proficiency does not operate in isolation. Contextual factors such as the language of instruction, the country of study destination, and the mode of learning (online or offline) may also influence the extent to which language skills affect academic outcomes. For example, students in Asia and Europe often encounter different academic cultures, expectations, and support systems (Shi, 2023). Likewise, students may experience varying degrees of stress and adjustment challenges depending on the academic setting and learning environment (RMRM & S, 2022; Yassin et al., 2020). The increasing adoption of online and hybrid learning further complicates this landscape, as reduced face-to-face interaction may exacerbate communication difficulties, especially for those lacking confidence in the language of instruction (Grain et al., 2022; Sun et al., 2022).

While several studies have examined the influence of English proficiency or cultural adaptation individually (Pranita Devi, 2023), few have comprehensively assessed how these multiple contextual variables jointly moderate the relationship between language skills and academic performance. Additionally, little attention has been given to the specific case of Indonesian students abroad, leaving a gap in the international education literature.

To address this gap, the present study employs a Structural Equation Modeling–Partial Least Squares (SEM-PLS) approach with multigroup analysis to examine the relationship between language skills and academic performance among Indonesian students studying abroad. The study draws on

DOI: https://doi.org/10.54082/jupin.1437
p-ISSN: 2808-148X
e-ISSN: 2808-1366

survey data from 100 Indonesian STEM students enrolled in universities across Asia and Europe, representing both English and non-English instruction contexts and varying learning systems. By incorporating instruction language, study destination, and learning system as moderating variables, this research offers original insights into a relatively understudied student population.

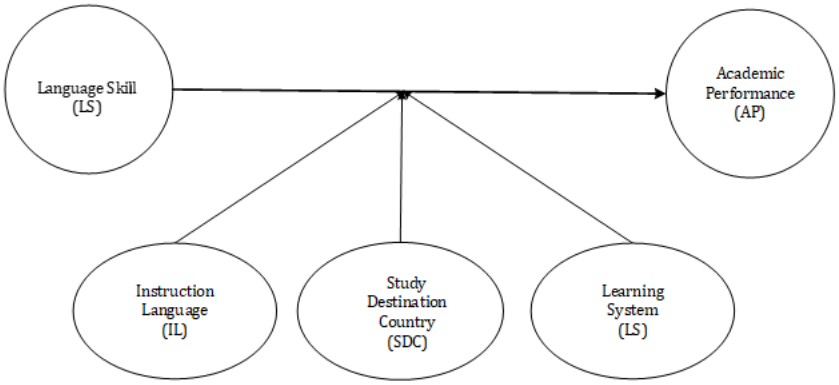

Figure 1. Research Framework

Accordingly, the study tests four hypotheses: that language skills positively influence academic performance (H1), and that the instruction language (H2), study destination (H3), and learning system (H4) each moderate this relationship.

2. RESEARCH METHOD

This study applied a quantitative approach to examine the relationship between independent (exogenous) and dependent (endogenous) variables. Independent variables are not influenced by others; the independent variable in this study is language skill. While the dependent variables are influenced by others, the dependent variable is academic performance. In this study, there are also moderating variables: the instruction languages, the study destination countries, and the learning systems. Moderating variables affect the strength of the relationship between independent and dependent variables (Hair et al., 2017). The research framework was developed to reflect the hypothesized relationships among these constructs, as shown in Figure 1.

2.1. Data Collection

The data were collected through an online questionnaire distributed to Indonesian students enrolled in STEM (Science, Technology, Engineering, and Mathematics) programs abroad. The questionnaire consisted of closed-ended items measured on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The measurement items were adapted from previously validated instruments, particularly those developed by Yassin et al. (2020) for language skill, and were contextualized to reflect the experience of Indonesian students studying overseas. Indicators for academic performance and contextual conditions (e.g., education system differences) were also adapted and refined from relevant prior studies. All constructs and their respective indicators are summarized in Table 1.

Table 1. Research Variables and Indicators

Variable	Code	Indicator	Reference
Language Skill (LS)	LS1	My proficiency in English or other learning languages is lacking	Yassin et al., 2020
	LS2	I had trouble understanding the lecturer's accents	
	LS3	My understanding of the lectures was hindered by the lecturers rapid speech pace	
	LS4	The lecturers employ acronyms that I'm not familiar with	

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e-ISSN: 2808-1366

	LS5	My vocabulary in English or other learning languages was limited
	LS6	I found it difficult to communicate in English or other learning languages
	LS7	My writing in English or other learning languages was weak
	LS8	My grammar background in English or other learning languages was inadequate
	LS9	My reading comprehension in English or other learning languages was poor
Academic Performance (AP)	AP1	The educational system in this country differs from that in my own
	AP2	I struggled in school
	AP3	My accomplishment was impacted by my academic struggles
	AP4	The educational approach used in this country differs from that in my own

A probability sampling technique was employed, allowing equal opportunity for Indonesian students currently studying overseas to participate. According to Hair et al., (2017), the minimum sample size for SEM-PLS should be at least 10 times the number of indicators measuring the most complex latent variable. Since the language skill variable had 9 indicators, a minimum of 90 respondents was required. This study successfully collected responses from 100 participants across Asia and Europe.

To enrich the interpretation of the results, participant characteristics were also documented. These included the level of study (bachelor's or master's), host country (grouped into Asia and Europe), language of instruction (English vs. non-English), learning system (online or offline), and duration of study (at least one completed semester abroad). These demographic variables not only ensured diversity within the sample but also served as grouping criteria for the multigroup analysis.

2.2. Data Analysis

The obtained data will be examined using the Multigroup SEM-PLS (Structural Equation Modeling-Partial Least Squares) method, which aims to determine the influence of moderating variables on the relationship between language skill and academic performance. SmartPLS 4.0 software was used to conduct the analysis. The Structural Equation Modeling (SEM) method is separated into two parts: measurement and structural model assessment.

The examination of measurement models includes determining convergent and discriminant validity, as well as construct reliability. Convergent validity was proved using the outer loading and Average Variance Extracted (AVE). Discriminant validity is determined using the square root of the Average Variance Extracted (AVE). Cronbach's alpha was used to determine construct reliability, as was composite reliability. The structural model test uses the bootstrapping technique to determine the model's level of relevance, with a 5% threshold. Furthermore, the moderation analysis in this study was performed using a multigroup analytical method. Multigroup analysis (MGA), or multi-sample analysis, compares data depending on sample characteristics (Hair Jr. et al., 2021). This study's MGA analysis is based on a sample of non-English and English instruction languages, study destination countries (Asia and Europe), and learning systems (online and offline). The MGA included PLS-MGA, parametric, and Welch-Satterthwaite tests to assess statistical differences across groups (Aji et al., 2020; Cheah et al., 2023).

3. RESULT AND DISCUSSION

The study successfully collected 100 sets of questionnaires. As mentioned in Table 2, 51% of the respondents to this study used non-English languages such as German, Turkish, Thai, Mandarin, Malay, Korean, Japanese, and French, and 49% of the respondents used English as their primary instruction language. The nearly even split between English and non-English instruction languages provides a

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p-ISSN: 2808-148X
e-ISSN: 2808-1366

balanced foundation for comparing linguistic contexts. This diversity allows for meaningful multigroup analysis, especially in testing whether instruction language moderates the language-performance relationship.

For the study destination countries, about 75% of respondents studied in Asia, such as Malaysia, Thailand, Taiwan, South Korea, China, and Japan, and the remaining 25% of respondents studied in Europe, such as France, Germany, the United Kingdom, Turkey, and Norway. This uneven distribution reflects a real-world trend of Indonesian students favoring closer or more culturally familiar destinations. Although this introduces a limitation in statistical balance for group comparison, it remains important for contextual interpretation, as educational systems and academic support structures in Asia differ in flexibility, cultural proximity, and accessibility compared to European institutions.

There were about 58% of respondents who used virtual learning (online) and 42% who used face-to-face learning (offline). The higher proportion of online learners reflects the lasting impact of digital learning modalities post-pandemic. This distinction is relevant, as digital learning environments might amplify the effect of language barriers due to reduced real-time interactions. These demographic variables provided the basis for grouping in the multigroup analysis to explore potential moderation effects across these dimensions and reflected a balanced representation of language and regional diversity.

Table 2. Demographic profiles of respondents

	Total
The Instruction Language	
non-English	51
English	49
The Study Destination Country	
Asia	75
Europe	25
The Learning System	
Online	58
Offline	42

3.1. Assessment of Measurement Model (Outer Model)

SEM-PLS's measuring model aims to establish the relationship between latent variables (language skills and academic success) and their indicators. This study's measurement approach is reflective, with indicators acting as expressions of underlying variables. Convergent validity testing requires an outer loading value of ≥ 0.6 for the indicator to be valid and an AVE value of ≥ 0.5 to indicate that the latent variable explains more than half of the indicator variation (Hair Jr. et al., 2021). In discriminant validity tests, the latent variable correlation value must be less than the square root of the AVE. Composite reliability and Cronbach's alpha values of at least 0.7 are required for reliability testing.

Table 3. Validity and Reliability Test Results

Variable	Indicator	Outer Loading	Composite Reliability	Cronbach's Alpha	AVE
Language Skill (LS)	LS1	0.694	0.921	0.903	0.565
	LS2	0.673			
	LS3	0.734			
	LS4	0.700			
	LS5	0.833			
	LS6	0.816			
	LS7	0.745			
	LS8	0.780			
	LS9	0.776			
Academic Performance (AP)	AP1	0.638	0.824	0.711	0.544
	AP2	0.829			
	AP3	0.826			
	AP4	0.630			

DOI: https://doi.org/10.54082/jupin.1437
p-ISSN: 2808-148X
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Table 3 presents the outer loading, composite reliability, Cronbach's alpha, and Average Variance Extracted (AVE) for each construct. All outer loading values for the Language Skill indicators ranged from 0.673 to 0.833, and for Academic Performance, from 0.630 to 0.829, exceeding the minimum threshold of 0.60 (Hair et al., 2017), thus indicating acceptable convergent validity. Notably, LS5 (vocabulary), LS6 (verbal communication), and LS8 (grammar) have among the highest loading scores, indicating that students perceive productive language skills (speaking and writing) as the most influential dimensions of language proficiency affecting their academic experience. Conversely, LS2 (understanding accents) and LS4 (acronyms) show relatively lower loadings, indicating that listening difficulties and language-specific academic jargon are also problematic, though to a slightly lesser degree.

The AVE for Language Skill was 0.565 and for Academic Performance 0.544, both above the 0.50 threshold, confirming that the constructs captured more than half of the variance from their indicators. Furthermore, the composite reliability values for Language Skill (0.921) and Academic Performance (0.824), along with their Cronbach's alpha values (0.903 and 0.711, respectively), exceed the 0.70 cut-off, indicating strong internal consistency, showing that the constructs are measured reliably across multiple items. These psychometric results justify the continued use of these indicators in future studies targeting similar populations.

Table 4. Latent Variable Correlation Value, AVE and Square Root of AVE

	Academic Performance	**Language Skill**	**AVE**	**Square Root of AVE**
Academic Performance	1.000	0.464	0.565	0.752
Language Skill	0.464	1.000	0.544	0.738

Table 4 shows the discriminant validity of the constructs based on the Fornell-Larcker criterion: the square roots of AVE for both constructs (0.738 for Language Skill and 0.752 for Academic Performance) are greater than the correlation between the constructs (0.464), which confirms that each construct is distinct from the other. This is critical, as it confirms that the measurement items do not overlap conceptually, enabling valid inferences about their relationship. Together, the results from Table 3 and Table 4 validate the measurement model's reliability and construct validity, ensuring that further structural analysis could be performed on a solid foundation.

3.2. Assessment of Structural Model (Inner Model)

After the measurement model test (outer model) is completed, both constructs and indicators are pronounced valid and reliable. The structural model test (inner model) was then applied to determine the model's level of significance.

Table 5. Structural Model Test Results

Path	**Path Coefficients**	**P-Values**	**Hypothesis**
LS → AP	0.464	0.000	accepted (**H1**)

Table 5 shows the results of the hypothesis testing for the direct relationship between Language Skill (LS) and Academic Performance (AP). The path coefficient is 0.464, and the p-value is 0.000 ($p < 0.05$), indicating a statistically significant positive relationship. This moderate-to-strong effect size implies that nearly half of the variation in academic performance can be explained by language skill alone. This finding reinforces the theoretical assertion that language is not merely a background variable but a central determinant of academic integration and achievement for international students.

This finding supports hypothesis 1 (H1), confirming that students with higher language proficiency tend to achieve better academic performance abroad. In practical terms, this means that students with higher proficiency, especially in productive and receptive academic tasks, are more likely to succeed,

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p-ISSN: 2808-148X
e-ISSN: 2808-1366

regardless of geographic or institutional context. The statistical significance and strength of this effect justify prioritizing language support services in student mobility programs. This is consistent with prior studies (Martirosyan et al., 2015; Yuksel et al., 2023), reinforcing the pivotal role of language competence in international academic contexts.

3.3. Multigroup Analysis (MGA)

Multigroup analysis (MGA), also known as multi-sample analysis, compares data analysis based on two or more sample characteristics (Ye et al., 2022). This study used multigroup analysis to compare the instruction language (non-English vs English), study destination country (Asia vs Europe), and learning system (Online vs Offline) samples.

Table 6. Multigroup Analysis Results

Group	Path	P-Values			Hypothesis
		PLS-MGA	Parametric Test	Welch-Satterthwaite Test	
The Instruction Language (non-English vs English)	LS → AP	0.906	0.914	0.914	rejected (**H2**)
The Study Destination Country (Asia vs Europe)		0.814	0.577	0.707	rejected (**H3**)
The Learning System (Online vs Offline)		0.764	0.792	0.783	rejected (**H4**)

Table 6 presents the PLS-MGA, parametric test, and Welch-Satterthwaite test results for each moderating variable: Instruction Language (English vs. non-English): The p-values across all three tests (0.906, 0.914, 0.914) are greater than 0.05, indicating no significant moderation effect. Thus, H2 is rejected, implying that the benefit of language proficiency is equally critical in both English and non-English academic settings. This contradicts assumptions that only English-medium instruction creates language pressure; students in non-English countries also struggle due to dual-language demands (e.g., local language for daily life, another for academics).

Study Destination (Asia vs. Europe): Similarly, p-values (0.814, 0.577, 0.707) suggest no significant differences between these regional groups. Therefore, H3 is also rejected, suggesting that regional context does not significantly alter how language skills affect academic outcomes. This could imply that academic expectations and challenges are converging globally or that Indonesian students face similar difficulties adapting to foreign academic systems, regardless of continent. However, this result might also be partially affected by sample imbalance (Asia = 75%; Europe = 25%).

Learning System (Online vs. Offline), the p-values (0.764, 0.792, 0.783) again exceed the 0.05 threshold, leading to rejection of H4. The findings suggest that the impact of language proficiency is equally relevant in both environments. However, this does not mean that learning systems have no role; rather, it indicates that language proficiency remains a dominant factor in academic performance, even when learning conditions vary.

These findings suggest that the relationship between language skills and academic performance is robust, regardless of instruction language, region, or learning mode. This implies that improving language proficiency benefits academic outcomes universally, not only in specific contexts. While support systems and instructional settings matter, language ability remains foundational to success in international education. However, the rejection of moderating hypotheses also points to the potential influence of other unobserved factors, such as learning motivation (Al-Krenawi et al., 2025), institutional support (Auschner & Jiang, 2025), or adaptation strategies (Supriatna, 2023), that may warrant exploration in future studies.

DOI: https://doi.org/10.54082/jupin.1437
p-ISSN: 2808-148X
e-ISSN: 2808-1366

3.4. Discussion

The results of this study confirm that language skill significantly and positively influences academic performance among Indonesian students studying abroad. This supports Hypothesis 1 (H1) and is consistent with a broad body of literature emphasizing the crucial role of language proficiency in academic adjustment and achievement (Martirosyan et al., 2015; Yuksel et al., 2023). According to Cummins' (2000) theory of academic language proficiency, the ability to process cognitively demanding, decontextualized academic tasks requires a higher level of language competence. This explains why students with better language skills are more successful in navigating foreign educational systems.

In this study, language skill was conceptualized not only in terms of basic communication but also academic literacy, including vocabulary mastery, listening comprehension, grammar, and academic writing. The strong path coefficient (0.464) indicates that proficiency in these domains substantially contributes to students' ability to understand lectures, complete coursework, and perform in assessments. These findings reinforce the call for universities to provide structured language support services as a critical element of internationalization strategies (Grain et al., 2022; Waluyo & Panmei, 2021). However, the study did not find significant moderating effects of instruction language, study destination, or learning system on the relationship between language skills and academic performance, resulting in the rejection of H2, H3, and H4.

The absence of a moderating effect of instruction language suggests that language proficiency has a uniformly strong influence regardless of whether students are studying in English or non-English environments. Students studying in non-English-speaking countries often still use English for academic purposes (e.g., in international programs), thus facing similar linguistic demands as those in English-speaking institutions (Altay et al., 2022). Additionally, these students also face a double language burden, having to learn both the local language for daily communication and English for academics, potentially neutralizing any perceived difference in learning difficulty across groups.

The rejection of H3 suggests that regional context (Asia vs. Europe) does not significantly alter the impact of language skills on academic performance. This indicates a convergence of academic standards and expectations across higher education systems, aligned with global trends in international curriculum design (Cabanillas, 2023; Shi, 2023). Alternatively, it could reflect the presence of homogeneous experiences among Indonesian students, who rely on similar coping strategies or support networks regardless of destination. Another possibility is that factors other than region, such as institutional support, self-efficacy, or cultural intelligence (Matiso, 2024), play a more decisive role, an area worth exploring in future studies.

The finding that the learning system (online vs. offline) does not moderate the relationship seems counterintuitive, given the different communication dynamics of both modalities (Son & Cvancara, 2024). However, it underscores the dominant role of language proficiency across instructional formats. In online learning, limitations in non-verbal cues and interaction might intensify the need for strong receptive skills (Sun et al., 2022), while offline learning demands real-time verbal fluency. The lack of moderating effect indicates that students with high language proficiency are able to adapt effectively in both contexts. Nonetheless, previous research suggests that digital literacy and self-regulation may mediate these dynamics (Zainuddin et al., 2018), which were not examined in this study.

These results collectively suggest that language proficiency is a stable and consistent predictor of academic performance across multiple learning contexts. The findings support Tinto's Student Integration Theory (1993), which posits that academic integration, including mastery of academic language, is essential to student persistence and success. The study also aligns with research by Anderson et al. (2018), who emphasize the importance of internal factors (e.g., motivation, language self-efficacy) in shaping academic outcomes over structural or external variables. From a practical perspective, the findings call for pre-departure language training for Indonesian outbound students, continuous academic literacy development during study abroad, and integration of language support into digital learning environments.

4. CONCLUSION

This study confirms that language proficiency plays a central role in shaping the academic performance of Indonesian students studying abroad. The results show a significant positive relationship between language skills and academic success, regardless of the language of instruction, study destination, or learning system. This indicates that language competence is a robust and consistent predictor across varying academic contexts.

Scientifically, this study contributes to the international education literature by focusing on an underexplored population, Indonesian students abroad, and by incorporating multigroup analysis to examine contextual factors often overlooked in similar research. The findings challenge assumptions that language-related academic difficulties are more prominent in English-speaking environments or Western institutions, highlighting instead the universal importance of language skills.

However, this study is not without limitations. The cross-sectional design restricts causal interpretation, and the sample distribution, particularly the dominance of Asian study destinations, may affect the generalizability of the findings. Future research should consider integrating mediating variables such as academic self-efficacy, learning motivation, or institutional support and exploring the longitudinal development of language skills over the course of students' academic journeys.

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Jurnal Penelitian Inovatif (JUPIN)
Vol. 5, No. 2, Mei 2025, Hal. 1185-1194
https://jurnal-id.com/index.php/jupin
DOI: https://doi.org/10.54082/jupin.1437
p-ISSN: 2808-148X
e-ISSN: 2808-1366

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