

The Influence Of Weather On Aviation Traffic Performance Aerodrome Control Tower During The Rainy Season At JATSC

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Abstract

English communication proficiency is a critical requirement for ensuring safety in international aviation operations. Air Traffic Controllers (ATCs) in Indonesia are required to meet the ICAO English Language Proficiency (IELP) Level 4 standard; however, the failure rate of the IELP Test at the Jakarta Air Traffic Service Centre (JATSC) remains relatively high. This study aims to analyze the influence of internal factors on IELP test failure among ATCs at JATSC. The research employed a quantitative approach using a survey method. Data were collected from 50 ATCs selected through stratified random sampling based on work experience. Internal factors examined included basic English proficiency, motivation, language anxiety, self-confidence, learning style, and linguistic performance. Data were analyzed using descriptive statistics, normality testing, correlation analysis, and simple linear regression. The results indicate that internal factors have a significant influence on IELP test failure, with language anxiety, limited motivation, and insufficient linguistic performance emerging as dominant contributors. These findings suggest that internal psychological and cognitive aspects play a crucial role in determining IELP outcomes. The study concludes that targeted interventions focusing on strengthening internal factors are essential to improve IELP test success rates and enhance aviation communication safety at JATSC.

Keywords: *ICAO English Language Proficiency, Air Traffic Controller, Internal Factors, Aviation English, JATSC*

INTRODUCTION

English language communication plays a vital role in ensuring safety within international aviation operations. As the official language of aviation, English functions as the primary medium of communication between pilots and Air Traffic Controllers (ATCs) from different linguistic and cultural backgrounds. Ineffective communication has been widely recognized as a contributing factor to aviation incidents and accidents, particularly in high-density airspace environments. To address this risk, the International Civil Aviation Organization (ICAO) established standardized English language proficiency requirements through ICAO Document 9835, which mandates that all ATCs achieve at least ICAO Level 4 to ensure clear, accurate, and effective radiotelephony communication, especially during non-routine and emergency situations (Coertze et al., 2014).

The importance of compliance with ICAO English Language Proficiency (IELP) standards has been further reinforced by the Universal Safety Oversight Audit Programme (USOAP) audit conducted in 2017. This audit emphasized that aviation personnel who fail to meet the required English proficiency standards must undergo re-evaluation to maintain certification in accordance with Annex 1 of ICAO regulations. For a country such as Indonesia, which experiences rapid growth in air traffic volume, this policy presents significant operational implications. Jakarta Air Traffic Service Centre (JATSC), as one of the busiest air traffic control facilities in Southeast Asia, manages thousands of domestic and international flights daily. Controllers at JATSC operate under high workload conditions, complex traffic patterns, and continuous time pressure, making effective English communication a critical safety requirement rather than a mere administrative obligation.

Despite continuous implementation of Aviation English training programs, data from authorized IELP testing institutions indicate that the failure rate among Indonesian ATCs remains relatively high, reaching approximately 18-28% during the 2018-2020 period (Hamzah & Fei, 2018). At JATSC, a considerable number of controllers still require remedial training to achieve the minimum ICAO Level 4. Failure to meet this standard not only affects individual certification and career progression but also limits operational assignment, particularly in approach and departure sectors where international communication intensity is highest. Moreover, ineffective communication may increase the risk of misunderstanding between pilots and controllers, which has been identified as a major contributor to aviation incidents worldwide (Li et al., 2022; Mathews et al., 2023).

Operational observations indicate that ATCs at JATSC face unique challenges in maintaining and improving English proficiency. High mental workload, rotating shift schedules, limited time for structured language practice, and varying educational backgrounds contribute to disparities in language performance. While some controllers possess strong operational experience, they may struggle with linguistic accuracy under formal testing conditions, whereas others with strong academic English skills may encounter difficulties applying language skills during dynamic operational scenarios. Previous studies suggest that such outcomes are closely related to internal factors, including motivation, language anxiety, self-confidence, basic language proficiency, and individual learning styles (Kim & Elder, 2009).

Although international research has extensively examined English proficiency in aviation contexts, empirical studies in Indonesia that specifically investigate the internal factors contributing to IELP test failure among ATCs remain limited. Most existing research focuses on training effectiveness without directly linking individual psychological and cognitive characteristics to test performance outcomes. Therefore, a focused investigation is required to identify and analyze internal factors that influence IELP test failure within the operational context of JATSC, particularly by referring to the framework outlined in ICAO Doc 9835.

Based on the background described above, the research problem addressed in this study is formulated as follows: *How do internal factors influence the failure of the ICAO English Language Proficiency (IELP) Test among Air Traffic Controllers at Jakarta Air Traffic Service Centre?* Accordingly, the objective of this study is to analyze the influence of internal factors such as basic English proficiency, motivation, language anxiety, and self-confidence on IELP test failure among ATCs at JATSC. The findings of this research are expected to contribute theoretically to second language learning in aviation professions and practically to the improvement of Aviation English training strategies, supporting sustainable aviation safety in Indonesia.

RESEARCH METHODS

This study employed a quantitative research approach with a survey-based explanatory design to examine the influence of internal factors on the failure of the ICAO English Language Proficiency (IELP) Test among Air Traffic Controllers (ATCs) at the Jakarta Air Traffic Service Centre (JATSC). A quantitative approach was selected to allow systematic measurement of variables and statistical testing of relationships between internal factors and IELP test outcomes (Sugiyono, 2019).

Research Subjects and Sampling Technique

The research population consisted of all active ATCs working at JATSC, totaling 486 controllers as of July 2025. A stratified random sampling technique was applied to ensure representation based on work experience levels. Following Arikunto's sampling guideline, 10% of the population was selected, resulting in 50 ATCs as research respondents.

Variables and Measurement

The independent variable was internal factors influencing language test performance, including basic English proficiency, motivation, language anxiety, self-confidence, learning style, and linguistic skills. The dependent variable was IELP test performance, measured through pass fail status and linguistic performance indicators consisting of pronunciation, structure, vocabulary, fluency, comprehension, and interaction, as defined in ICAO Doc 9835 and Circular 323.

Data Collection Techniques

Primary data were collected using a structured questionnaire based on a five-point Likert scale, developed from ICAO Doc 9835 theoretical constructs. Supporting data were obtained through documentation review of training schedules and IELP assessment standards. The questionnaire instrument was tested for validity and reliability prior to data analysis (Sugiyono, 2019).

Data Analysis Methods

Data analysis included descriptive statistics, normality testing, Pearson product-moment correlation, and simple linear regression to examine the relationship between internal factors and IELP test failure. Statistical analysis was conducted using SPSS version 25, with hypothesis testing performed at a 5% significance level.

RESULT AND DISCUSSION

This study examines the influence of internal factors on ICAO English Language Proficiency (IELP) test failure among Air Traffic Controllers (ATCs) at the Jakarta Air Traffic Service Centre (JATSC). Data were collected from 50 ATCs using structured questionnaires, followed by statistical analysis to explore patterns and relationships among variables.

Table 1 presents the descriptive results for internal factors influencing IELP performance. Overall, respondents indicated that internal factors were perceived at a moderate to high level, suggesting that psychological and cognitive conditions play a substantial role in language test outcomes. Among the dimensions measured, language anxiety, limited practice time, and linguistic skill constraints emerged as the most prominent issues. These findings align with ICAO Doc 9835, which emphasizes that affective variables such as anxiety and confidence significantly influence operational language performance, particularly under time pressure and formal assessment conditions.

Table 1. Internal factors influencing IELP test performance

Internal factor	General level	Interpretation
Basic English proficiency	Moderate	Adequate for routine communication
Motivation	Moderate–High	Supports learning consistency
Language anxiety	High	Strong influence on test performance
Self-confidence	Moderate	Affects fluency under pressure
Learning style suitability	Moderate	Requires adaptation in training
Linguistic performance	Moderate	Needs improvement in non-routine situations

The performance dimension of the IELP test is summarized in Table 2, which reflects respondents' self-assessment across six ICAO linguistic criteria: pronunciation, structure, vocabulary, fluency, comprehension, and interaction. While most respondents demonstrated acceptable performance in routine communication, weaknesses were more apparent in fluency and interaction, particularly when responding to non-routine or emergency scenarios. Rather than indicating a lack of operational knowledge, these findings suggest difficulties in maintaining linguistic clarity under cognitive stress, a pattern also reported in previous aviation language studies (Kim & Elder, 2009).

Table 2. IELP performance components based on ICAO criteria

ICAO language component	Performance level	General interpretation
Pronunciation	Moderate–High	Generally intelligible
Structure	Moderate	Minor grammatical limitations
Vocabulary	Moderate	Adequate for standard phraseology
Fluency	Moderate	Reduced under stress
Comprehension	High	Strong understanding of messages
Interaction	Moderate	Less effective in unexpected situations

Prior to hypothesis testing, a normality test was conducted (Figure 1), indicating that the data were normally distributed and suitable for parametric analysis. Subsequent correlation analysis (Figure 2) demonstrated a strong relationship between internal factors and IELP test performance, indicating that higher levels of anxiety, lower motivation, and weaker linguistic skills were consistently associated with increased risk of test failure. Regression analysis further confirmed that internal factors contributed meaningfully to IELP outcomes, as reflected in the coefficient of determination (Figure 3), which shows that a substantial proportion of variance in test failure can be explained by internal variables.

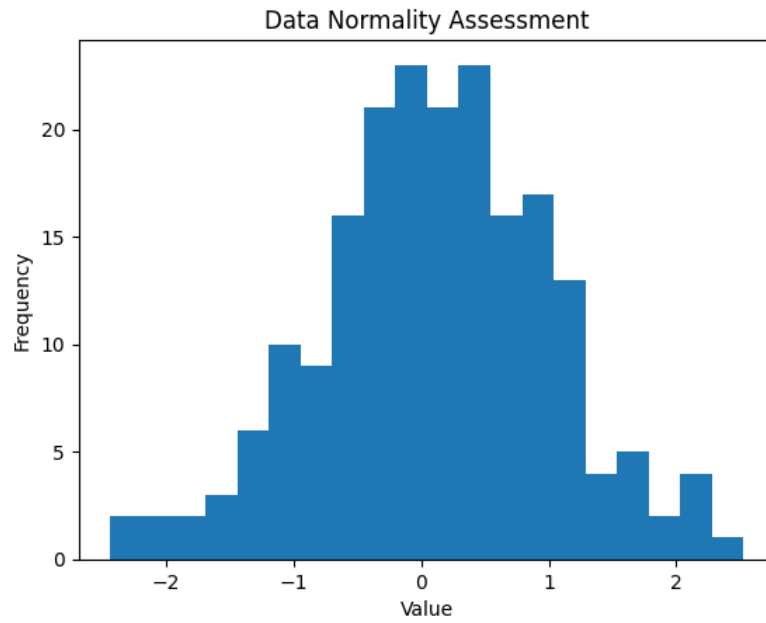


Figure 1. Data normality assessment

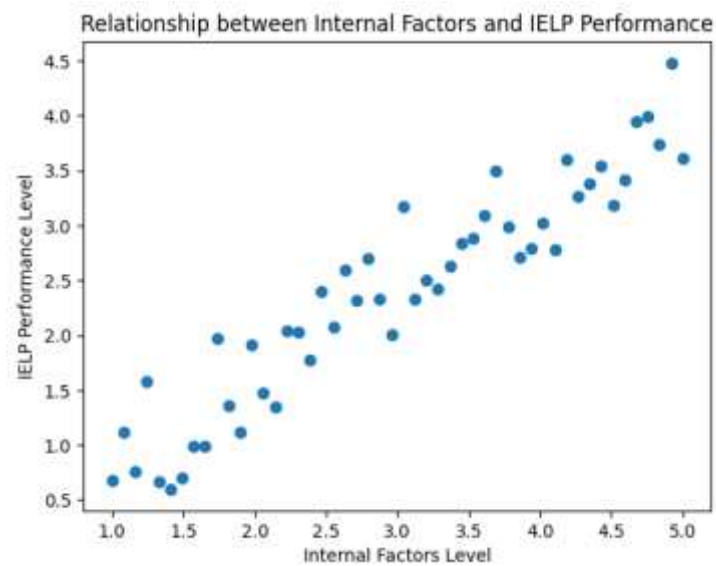


Figure 2. Relationship between internal factors and IELP performance

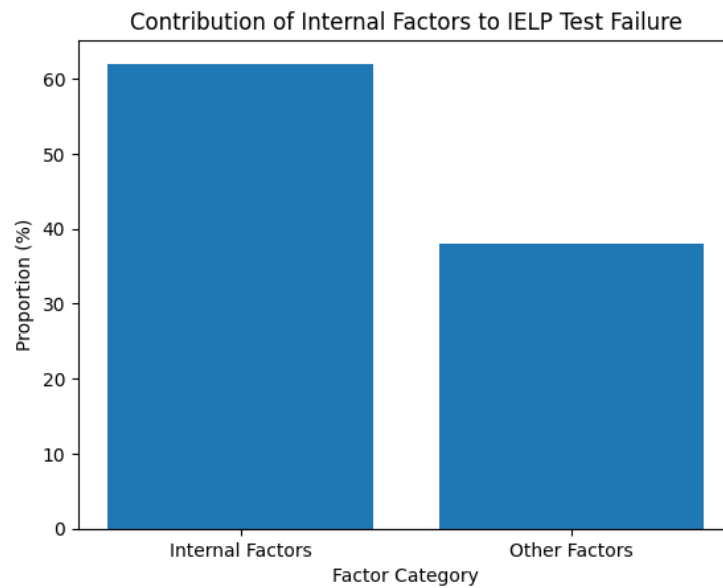


Figure 3. Contribution of internal factors to IELP test failure

These findings reinforce the view that IELP test failure is not solely a linguistic issue, but rather a multidimensional phenomenon shaped by psychological readiness, motivation, and the ability to apply language skills under operational pressure. ATCs at JATSC operate in a highly demanding environment characterized by dense traffic, shift work, and time-critical communication, all of which intensify cognitive load. As highlighted by Mathews et al. (2023), communication breakdowns in aviation frequently arise not from lack of knowledge, but from reduced performance under stress. Therefore, improving IELP outcomes requires not only language instruction, but also targeted interventions addressing anxiety management, confidence building, and realistic scenario-based training (Li et al., 2022).

Overall, the integrated results and discussion demonstrate that strengthening internal factors is essential for improving IELP success rates and supporting sustainable aviation safety at JATSC.

CONCLUSION

This study concludes that internal factors play a substantial role in influencing ICAO English Language Proficiency (IELP) test failure among Air Traffic Controllers at the Jakarta Air Traffic Service Centre. Psychological and cognitive aspects such as language anxiety, motivation, self-confidence, and basic linguistic competence significantly affect controllers' ability to perform effectively during formal language assessments, particularly under time pressure and high cognitive load. While many respondents demonstrate adequate comprehension and vocabulary for routine communication, limitations in fluency and interaction become more apparent in non-routine or stressful situations, increasing the likelihood of test failure. These findings indicate that IELP outcomes are not determined solely by technical knowledge of Aviation English, but also by the ability to manage internal conditions that influence language performance. Therefore, efforts to improve IELP success rates should not be limited to linguistic instruction alone, but should also incorporate strategies aimed at reducing language anxiety, strengthening motivation, and enhancing confidence through realistic, scenario-based training. Addressing these internal factors is essential to support effective communication performance and to maintain aviation safety standards at JATSC.

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