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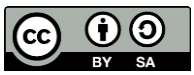

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Developing Assessment Instruments for Procedural Writing of Managing Flight Emergency and Urgency Situations: Examining Indonesian Aviation English Instructors' Perceptions

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Abstract

Despite the critical need for written communication and emergency management proficiency in aviation, existing research in aviation English education has primarily emphasized speaking and listening skills, neglecting cadets' writing abilities. This gap is particularly concerning given the International Civil Aviation Organization (ICAO) Annex 10 requirements, which demand accurate and coherent documentation in emergency scenarios. Addressing this void, the present study aimed to develop reliable and valid assessment instruments for assessing aviation cadets' procedural writing skills in managing flight emergency and urgency situations. This study also examined the Indonesian Aviation English instructors' perceptions on the developed assessment instruments. Employing a Research and Development (R&D) design using the ADDIE model—Analysis, Design, Development, Implementation, and Evaluation—the study constructed test instructions and an analytic scoring rubric based on learning indicators derived from ICAO Annex 10. The instruments underwent expert validation (CVI = 1.00) and were trialed with 24 third-semester aeronautical communication cadets. The inter-rater reliability test showed good consistency (ICC = 0.802–0.890), confirming the rubric's reliability in practical use. Results revealed that the instruments effectively assessed both linguistic skills and operational understanding. Aviation English instructors found the assessment instruments pedagogically valuable as they promoted integrated language

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learning and critical thinking skills through the application of a sequenced procedure in managing flight emergency and urgency situations. However, limitations include the small sample size and the absence of multimodal performance assessments. Future research should expand implementation across diverse aviation academies and explore integration with AI-driven tools or scenario-based simulations. This study contributes to English for Specific Purposes (ESP) pedagogy by providing a validated framework for enhancing and assessing domain-specific writing in high-stakes professional contexts.

Keywords: *Assessment instruments; aviation English; flight emergency and urgency; procedural writing.*

Introduction

In the world of Indonesian aviation education and training, cadets' writing skills and abilities in managing flight emergency and urgency situations have been crucial issues. First, some prior studies have focused solely on efforts to improve cadets' speaking and listening skills, as their future jobs tend to rely more on oral communication than written forms (Bjornestad et al., 2021; Kusumayati et al., 2023; Pichaiyutthakit & Tangkiengsirisin, 2023; Siraranghom, 2020). Consequently, some researchers find that aviation cadets' abilities to use proper grammar through written forms remain lacking (Kusumayati et al., 2023; Rochmawati et al., 2023). Tragically, this phenomenon contributed to the low achievement of the Test of English for International Communication (TOEIC), an official English proficiency test prerequisite by the Indonesian Ministry of Transportation (Fatmawati & Rochmawati, 2022). Second, many aviation training institutions expect their graduates to demonstrate abilities in managing emergency and urgency situations, as officially reflected in the International Civil Aviation Organization (ICAO) Annex 10 document (Keller et al., 2020).

This expectation stems from the critical role these professions play in maintaining aviation safety during high-stress scenarios. The evaluation of these abilities mostly involves unsystematic procedures, resulting in an unreliable depiction of the cadets' true comprehension of the materials (Fountoulakis, 2024). Additionally, very few studies discuss how to critically assess cadets' abilities in managing flight emergency and urgency situations (Hayes et al., 2021). By considering the importance of these two key skills, aviation training institutions are required to provide a pedagogical framework that accommodates them.

To align with effective pedagogical approaches, procedural writing serves as a valuable method for developing and accessing cadets' written communication skills and their ability to manage flight emergency and urgency situations. During the procedural writing activities, cadets can learn language use, including but not limited to sentence construction, grammar, vocabulary, and sentence organization (Rifenburg, 2022). In this case, they can also reflect their knowledge on general English competencies to help them devise effective written communication. At the

same time, procedural writing can measure cadets' comprehension of the materials on managing flight emergency and urgency situations based on ICAO Annex 10 (Sulistyorini, 2023).

In short, ICAO Annex 10 is a reference document consisting of information and procedures for managing flight emergency and urgency situations used by international civil aviation officers to conduct flights (Keller et al., 2020), involving how to handle pilot incapacitation and unpredictable weather condition (Pratama & Imaniar, 2024) Additionally, this procedural writing activity helps strengthen cadets' understanding and memorization of chronological emergency and urgency services during the field work (Tetiana, 2024). Of course, this multilayer of benefits can enhance the cadets' knowledge of general English materials (e.g., grammar), which can simultaneously foster aviation officers' specific purposes.

However, there is no study focusing on procedural writing implemented in aviation English classes to help enhance cadets' abilities in ICAO Annex 10. Inadequate information on the relevant topic can have several drawbacks for the advancement of the pedagogical mode. First, cadets get limited writing exposure that can affect their professional communication through written forms. According to Rochmawati et al. (2024) and Kusumayati et al. (2023), many large aviation companies regret that the graduate profiles of aviation training institutions demonstrate limited writing skills, hindering effective communication between companies and other key stakeholders, such as foreign investors and aviation companies. Second, cadets are solely exposed to technical vocabulary for aviation, which can deficit their mastery of frequently-used vocabulary for daily conversation or business correspondence.

This is relevant to Kusumayati et al. (2024) that aviation cadets' technical vocabularies reflected in writing are poor. Third, without the experience of procedural writing, cadets have no additional exposure to practically recall the comprehension of ICAO Annex 10 materials, for instance. They have no opportunities to practice written communication while maintaining the subtleties of managing flight emergency and urgency situations. Referring to these drawbacks, conducting both the teaching of procedural writing and the relevant assessment for Indonesian aviation cadets remains essential, not only advancing and fostering writing skills and the knowledge of managing flight emergency and urgency situations, but also ensuring that the graduates possess the required skills in the current aviation industry

Besides the absence of sufficient information on procedural writing activities in aviation English classes, reliable and valid assessment instruments for these activities are also lacking. This unavailability, indeed, affects the comprehensive pedagogy implementation of the procedural writing. In this case, teachers cannot obtain a reliable evaluation result of cadets' writing skills and abilities in managing flight emergency and urgency situations. Consequently, they cannot guarantee the large aviation companies that their graduates will be able to do written

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communication as well as master the profession's responsible job tasks. Therefore, this study aims to develop reliable and valid assessment instruments for procedural writing of managing flight emergency and urgency situations. To make clear what the present study does in response to the above research voids, there are two research question proposed as follows:

RQ1: How is the assessment instrument developed to measure cadets' procedural writing skills in managing flight emergency and urgency situations?
RQ2: What are the instructors' perceptions of the developed instrument?

Writing Assessment in Aviation English Class

Previous studies in the field of Aviation English have largely concentrated on listening and speaking competencies (Herasymenko et al., 2021; Kusumayati et al., 2024), especially in radiotelephony communication (Demirdöken & Atay, 2024), as mandated by the International Civil Aviation Organization (ICAO) through the Language Proficiency Requirements (LPRs). While effective oral communication is undeniably essential in aviation safety, this focus has led to a significant neglect of written language skills, particularly procedural writing. Most existing assessments evaluate general writing abilities or rely on conventional academic genres, such as essays or reports (Park, 2020; Sirikanjanawong & Wasanasomsithi, 2018), which do not accurately reflect the operational language functions required in aviation contexts.

As a result, procedural writing—defined as the ability to produce clear, concise, and standardized instructions or descriptions of procedures—remains underassessed, despite its critical role in managing in-flight emergencies and urgency situations. The emerging trend in Aviation English instruction reveals a growing recognition of the need to address multiple communicative modalities, including writing. However, despite this pedagogical shift, assessment instruments specific to procedural writing are still scarce or undeveloped. There is a lack of standardized, validated tools that can effectively measure aviation cadets' abilities to produce procedural texts aligned with operational scenarios. This gap is particularly concerning in light of ICAO Annex 10, which emphasizes the importance of unambiguous, standardized communication in aeronautical operations to prevent misunderstandings and ensure safety. Procedural writing in this context is not merely a linguistic skill but a critical component of decision-making and task management during abnormal or emergency situations (Reale et al., 2023).

Moreover, procedural writing serves as a medium for documenting non-voice communications, creating technical manuals, and reporting incidents—all of which are essential to modern cockpit resource management (CRM) and air traffic coordination (Robinson, 2019). Therefore, the development and implementation

of targeted procedural writing assessments are urgently needed in Aviation English training programs. Such instruments should evaluate not only linguistic accuracy but also operational appropriateness, coherence, and alignment with aviation-specific discourse conventions. Integrating these assessments into cadet training would provide more comprehensive insights into learners' readiness and help instructors tailor interventions to improve both language proficiency and operational performance under pressure.

Method

This study used research and development (R&D) design with analysis, design, development, implementation, and evaluation (ADDIE) stages (Molenda, 2003). In the analysis stage, the learning objectives were analyzed based on the basic course outline of Aviation English. Then, the ICAO Annex 10 document was also analyzed to reveal the abilities required to manage emergency and urgency situations (https://bit.ly/ICAO Annex 10). After obtaining the information on learning objectives, several indicators were determined to achieve the objectives. Then, at the design stage, the study aimed to develop a procedural writing test with the enclosed rubric to assess cadets' writing products. In the development stage, the study developed the procedural writing test prompt and its assessment rubric.

Before being used in a trial process, the assessment instruments were validated for content by five experts in aviation education and training. The five experts were chosen to meet the minimum eligibility of examining Content Validity Index (CVI) and Content Validity Ratio (CVR) to determine the degree of validation based on Lawshe (1975). The assessment instruments were also being revised according to the suggestions from the experts. In the implementation stage, the first draft of the assessment instruments was trialed on a small scale of participants (e.g., 24 participants). Then, in the evaluation stage, there were two raters involved to score the cadets' writing. This inter-rater reliability (IRR) approach was used to avoid scoring subjectivity, so the results of the study could be more reliable.

The agreement of the raters was revealed using the Intraclass Correlation Coefficient (ICC), assisted by IBM SPSS 25. The ICC score was categorized into three groups: ICC < 0.50 = poor reliability; 0.50 ≤ ICC < 0.75 = moderate reliability; 0.75 ≤ ICC ≤ 0.90 = good reliability; and ICC > 0.90 = excellent reliability (Koo and Li, 2016). The degree of the reliability scores also became proof of a well-developed scoring rubric. Table 1 recaps the source of data along with the instruments used to do the analysis.

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Table 1. Data Source, Collection, and Analysis Technique

Stages	Sources of Data	Instruments	Analysis Technique	Outputs
Analysis	Syllabus, ICAO Annex 10 document	Human instrument	Content analysis	Learning objectives and indicators
Design	Learning objectives and indicators obtained from the analysis stage	Human instrument	Content analysis	Procedural writing test instruction and specifications of assessment rubric
Development	Test instruction and specification of assessment rubric	Human instrument, validation sheet	Content analysis, CVI-CVR analysis	Writing test instruction, content validity scores
Implementation	Cadets' procedural texts	Writing test, rubric	ICC test	Degree of IRR when scoring
Evaluation	Results of cadets' writing, IRR, and aviation English educators' perceptions	Human instrument, interview	Content analysis, inductive thematic analysis	Final test instrument and its rubric, thematic perceptions

Table 1 shows that there was a human instrument to conduct content analysis. This instrument was chosen due to several considerations, including the ability to capture context and nuance, perform dynamic interpretations, exercise ecological validity, and make critical decisions. To avoid subjectivity in analysis, the present study used a forum group discussion undertaken by two researchers (the first and third authors) with two lecturers with expertise in aviation English. This method was believed to convey more objective decisions or results of content analysis.

Participants' Characteristics for the Trial Process

The present study involved twenty-four cadets majoring in Aeronautical Communication, all enrolled in the same third-semester class. Before this study, the

participants had been introduced to ICAO Annexes 1–19, which equipped them with foundational knowledge in managing flight emergency and urgency scenarios. Their English proficiency levels varied, ranging from Beginner (A1) to Intermediate (B1) on the CEFR scale. During their first and second semesters, they had received instruction in general English, covering essential grammatical concepts such as parts of speech, conjunctions, verb tenses, and subject-verb agreement. As a result, they were presumed to possess a basic understanding of sentence structure and composition.

Procedures in Implementing Procedural Writing Assessments

During the implementation phase, the first author of this paper served as the instructor in an aviation training institution in Indonesia, conducting procedural writing instruction over three 55-minute sessions structured into pre-, while-, and post-writing activities. In the initial session, the instructor emphasized the critical role of written communication in aviation, particularly for conveying precise flight instructions. The instructor introduced procedural writing models, elucidating their purpose and structural conventions.

To reinforce prior knowledge, the instructor prompted cadets to recall relevant content from ICAO Annex 10 concerning flight emergency and urgency management. Subsequently, the class collaboratively identified various emergency scenarios before the instructor demonstrated procedural composition using Engine Failure as a case study. This scaffolding strategy aimed to enhance cadets' preparedness before independent writing tasks. A brief question-and-answer session was undertaken to consolidate cognitive engagement. The second session facilitated autonomous practice, with cadets utilizing laptops and internet access to research and compose procedural texts on emergency management topics aligned with ICAO Annex 10.

The writing prompt directed them to: "*Compose a procedural text showing the chronological steps of managing flight emergency or urgency situations! Please write no more than 300 words using one of the following topics!*". The instructional session followed a structured three-phase sequence to optimize learning outcomes. Initially, a 10-minute brainstorming phase enabled cadets to explore relevant topics and compile supporting materials from available resources. This preparatory stage was followed by a 30-minute drafting period where cadets systematically constructed their procedural texts, applying the structural conventions and linguistic precision emphasized during instruction. The session culminated in a 15-minute peer review and revision phase, during which cadets engaged in reciprocal feedback to refine their written work.

This collaborative exercise served multiple pedagogical purposes: it fostered critical thinking as cadets evaluated procedural logic, encouraged reflective analysis of writing choices, promoted collaborative learning through knowledge exchange, and maintained active engagement with the material. The final session

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required cadets to meticulously revise their drafts, ensuring adherence to proper text structure and linguistic accuracy, logical sequencing of procedural steps, correct punctuation, and clarity of instructions. Upon submission, the instructor facilitated a reflective discussion to synthesize learning outcomes before concluding with an assurance of prompt assessment and feedback distribution.

Results

Development of Assessment Instruments

At the first stage, learning objectives were determined from the national syllabus and the learning indicators were determined based on both the syllabus and the ICAO Annex 10 document. Table 2 shows the learning objectives along with the learning indicators.

Table 2. Learning Objectives and Indicators for Procedural Writing

Learning Objectives	**Learning Indicators**	
	Procedural Writing Skills Indicators	**Abilities in Managing Emergency and Urgency Situations (ICAO Annex 10)**
Cadets are able to explain the flight service procedures in managing emergency and urgency situations in written communication	• Chronologically explain the procedures of managing flight emergency and urgency situations • Organize the sequence of managing steps • Make good sentences using appropriate grammar, tenses, and connection devices • Use punctuations correctly	• Chronologically explain the flight service procedures in managing **emergency situations** (e.g., pilot incapacitation) • Chronologically explain the flight service procedures in managing **urgency situations** (e.g., unpredictable weather conditions,) • Use aviation phraseology

At the first stage, learning objectives were determined from the national syllabus owned by the Human Resources Development Center for Air Transportation, the Indonesian Ministry of Transportation. Besides, the learning indicators were determined based on both the syllabus and the ICAO Annex 10 document. Table 2 shows the learning objectives along with the learning indicators.

Based on the results of the components of the learning objectives and indicators, the blueprint of the test instruction was developed along with the scoring rubric. The test was intended to be used as a summative assessment (assessment of learning). Since there were close similarities between indicators depicted in procedural writing skills and abilities in managing flight emergency

and urgency situations, the present study aimed to combine them into four key indicators for assessment, namely content, organization, language use, and mechanics. These four key assessment indicators were then used in developing a scoring rubric. Table 3 shows the test instructions and the specifications of the scoring rubric.

Table 3. Test Instruction and Scoring Rubric

Test Instruction	Indicators	Aims
Compose a procedural text showing the chronological steps of managing flight emergency or urgency situations! Please write no more than 300 words using one of the following topics: - *Managing pilot incapacitation* - *Managing unpredictable weather conditions*	Content	Assessing the relevance of the cadets' writing content about managing flight emergency and urgency with ICAO Annex 10 document
	Organization	Assessing the cadets' idea cohesiveness and coherence and the use of connection/transition devices to make a smooth logical linkage among sentences
	Language Use	Assessing the cadets' grammar, tenses, technical and non-technical vocabularies, language style, aviation phraseology
	Mechanics	Assessing the cadets' correct spelling and punctuations

In connection with Table 3, an analytic scoring rubric was developed to assess cadets' procedural writing in managing flight emergency and urgency situations. The use of the analytical approach was to depict clearer portraits regarding cadets' ability in English skills and mastering the content of managing flight emergency and urgency situations. Afterward, the designed test instruction and rubric were developed accordingly in order to be able to be used in a practical scheme. Table 4 shows the developed test instruction and scoring rubric.

Table 4. First Draft of Test Instruction (Writing Test Prompt) and Scoring Rubric

Procedural Writing Test Instruction
1. *Compose a procedural text showing the chronological steps of managing flight emergency or urgency situations! Please write no more than 300 words using one of the following topics:* - *Managing pilot incapacitation* - *Managing unpredictable weather conditions*
2. *Your procedural text will be assessed based on content (35%), organization (30%), language use (30%), and mechanics (5%).*

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Scoring Rubric					
Indicators	**Score Descriptors**				**Weight (%)**
	4	**3**	**2**	**1**	
Content (C)	- Steps are complete, clear, and logically sequenced. - Purpose is fully achieved. - Include specific details, materials, and/or examples as needed. - Very relevant to ICAO Annex 10	- Most steps are clear and logically ordered. - Purpose is mostly achieved. - Some supporting details are provided. - Partly relevant to ICAO Annex 10	- Some steps are missing or unclear. - Purpose is only partially achieved. - Limited supporting details. - Less relevant to ICAO Annex 10	- Many steps are missing, unclear, or disorganized. - Purpose is not achieved. - Lacks supporting details. - Irrelevant to ICAO Annex 10	35%
Organization (O)	- Clear and logical structure (e.g., introduction, step-by-step sequence, conclusion if applicable). - Smooth transitions guide the reader.	- Generally logical structure with minor lapses. - Some transitions present.	- Structure is inconsistent or loosely organized. - Transitions are limited or ineffective.	- Lacks a clear organizational structure. - No transitions between steps.	30%
Language Use (L)	- Precise, action-oriented, and appropriate vocabulary	- Mostly appropriate vocabulary and tone - Good use of aviation	- Basic or repetitive vocabulary - Moderate use of aviation	- Inappropriate or unclear word choices - Insufficient use of aviation phraseology	30%

	- Excellent use of aviation phraseology - Tone suits flight instruction. - Sentence structures are varied and effective. - Excellent use of grammar	phraseology - Some sentence variety - Good use of grammar	phraseology - Tone may be inconsistent - Limited sentence variety - Sufficient use of grammar	- Tone is ineffective for instructions. - Sentences are frequently incomplete or confusing. - Bad use of grammar	
Mechanics (M)	- No misspelling - Excellent use of punctuations	- Minor misspelling - Good use of punctuations	- Partly misspelling - Sufficient use of punctuations	- Many misspelling - Bad use of punctuations	5%

According to Table 4, the Procedural Writing Test Instruction/test prompt and Scoring Rubric offered a structured and relevant method for evaluating aviation cadets' written English proficiency and comprehension of emergency and urgency situations in flight. First, the task required cadets to write a procedure on "how to manage a flight emergency or urgency situation," which directly reflected real-world aviation responsibilities. Aviation cadets must be able to articulate procedural responses clearly and logically, especially during high-stakes situations.

The prompt ensured that cadets were not just practicing English, but were doing so in an aviation-specific context that reinforced their operational knowledge. Second, the nature of the task demanded the use of precise, technical language that was commonly used in aviation procedures (e.g., "divert," "declare emergency," "checklist," "secure the aircraft"). This helped assess the cadet's ability to use aviation terminology correctly in written English. The rubric, particularly in the "Language Use and Grammar" and "Mechanics" criteria, ensured that clarity, tone, and command of English were scrutinized — all critical in technical documentation. Third, procedural writing inherently measured the cadet's ability to think logically and structure their ideas sequentially, which was vital in emergency situations where miscommunication could lead to disaster.

The rubric's focus on "Organization" and "Content" ensured that responses were not just grammatically correct, but logically ordered and complete. A well-organized response mirrored the real-world structure of checklists and emergency protocols. Fourth, this test did not isolate English writing as a mere linguistic skill — it integrated comprehension, critical thinking, and decision-making. Cadets

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must interpret a scenario, recall appropriate responses, and communicate them effectively. This assessed both their aviation training and their ability to express that knowledge in English, which was the international language of aviation. Fifth, the scoring rubric provided clear, multi-faceted evaluation standards (Content, Organization, Language Use and Grammar, and Mechanics), ensuring a balanced assessment. This structure prevented over-reliance on superficial grammar checking and emphasized practical communication, exactly what was needed in aviation emergencies. At last, the rubric aligned well with ICAO's language proficiency descriptors (especially concerning structure, vocabulary, fluency, and comprehension). This alignment made the test a valuable preparatory tool for ICAO English assessments.

In addition to Table 4, there was a specific calculation formula to get a 100-point scale. The following equation was used to obtain the final score of the cadets' procedural writing.

$$Total\ score = \big((C\ x\ 25)\ x\ 35\%\big) + \big((O\ x\ 25)x\ 30\%\big) + \big((L\ x\ 25)\ x\ 30\%\big) + ((M\ x\ 25)x\ 5\% \quad \text{(Equation 1)}$$

For example, when a cadet got 4 for content, 4 for organization, 3 for language use, and 3 for mechanics, he or she obtained 91.25 for the total score. However, the categorization of passing and not passing the procedural writing remained dependent on teacher's and institutions' policy, which this point was extraneous to the present study.

After developing the test instruction and the scoring rubric, the researchers conducted a content validity test, which was undertaken by five experts in aviation English education and training. The five experts were chosen to meet the minimum eligibility of examining Content Validity Index (CVI) and Content Validity Ratio (CVR) to determine the degree of validation (Lawshe, 1975). Before the validators did their tasks, they were informed about the objectives of the test and the details of the scoring rubric. Table 5 reports the result of the content validity test of the test instruction and the scoring rubric.

Table 5. Results of Content Validity based on the Content Description in the Syllabus

Validation Aspects	Scores from Experts					CVR
	1	2	3	4	5	
Assessing procedural writing skills	4	4	4	4	4	+1.00
Assessing abilities in managing flight emergency and urgency situations	4	4	4	4	4	+1.00
Relevance of the test instruction with the	4	4	4	4	4	+1.00

Validation Aspects	Scores from Experts					CVR
	1	2	3	4	5	
procedural writing objectives						
Relevance of the test instruction with ICAO Annex 10 materials	4	4	4	4	4	+1.00
Clear and readable scoring rubric criteria and descriptors	4	4	4	4	4	+1.00
Relevance of the scoring rubric with the learning objectives	4	4	4	4	4	+1.00
Consistent scoring scale	4	4	4	4	4	+1.00
					CVI	1.00

Table 5 implies that the result of the content validity test was in a very valid category according to Lawshe (1975) (CVI = 1.00, CVR = +1.00). The experts stated that the test instructions and the scoring rubric were clear and measured the objectives, so that the assessment instruments could be used in the trial process. In connection with the implementation process, this study conducted a trial class with several instructional processes. After the cadets submitted their writing, two raters scored the cadets' procedural texts, and the obtained scores were tested for inter-rater reliability (IRR). IRR was essential to reveal to make sure that the developed rubric was practically applicable to assess procedural texts in managing flight emergency and urgency situations. The higher the ICC scores, the more applicable and reliable the rubric. Table 6 shows the result of the ICC test.

Table 6. Result of the ICC Test

Measurement Type	ICC	*F*	*df*	*p*
Single Measures	0.802	9.125	23	0.000
Average Measures	0.890	9.125	23	0.000

According to Table 6, the result of the ICC test was categorized as good reliability (ICC > 0.75, $p < 0.05$). The single measures explained that each rater scored the thirty procedural texts with 19.8% of differences, showing a consistent measure undertaken by each rater. Similarly, the average measures implied that both raters only showed 11% of differences, increasing reliability from 80.2% to 89%. As an implication, the raters were consistent in assigning scores for assessing similar procedural texts. This good reliability was important to ensure that both raters used the rubric almost similarly, or fostering no difference. Based on the above findings, the scoring rubric was considered valid and reliable to measure cadets' procedural writing in managing flight emergency and urgency situations.

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To look at whether the developed scoring rubric was tangibly beneficial for the pedagogical application in aviation English classes and how to manage flight emergency and urgency situations, the study portrayed perceptions obtained from the aviation English instructors.

Assisting in Assessing Both Writing Skills and Abilities Required in ICAO Annex 10

The developed assessment instruments for measuring cadets' procedural writing skills and abilities in managing flight emergency and urgency situations helped the aviation English instructors feel helped.

> "*The test instruments can help me assess our cadets' writing skills as well as their abilities to master the ICAO Annex 10 materials. At the same time, this test can measure the chronological thinking, which becomes an essential skill today*." (Instructor B, snippet 1)

> "*I am happy knowing that writing skills, logical thinking, and mastery of ICAO can be integrated in one assessment instrument. This helps us who become the instructor*." (Instructor B, snippet 2)

Based on Snippets 1 and 2, the developed test instruments were absolutely helpful for aviation English instructors in simultaneously measuring aviation cadets' skills in written communication, logical thinking, and managing flight emergency and urgency situations. Teacher A acknowledged that the assessment tools aligned with the ICAO Annex 10 standards, which were essential for ensuring cadets meet international aviation communication protocols. Moreover, the integration of writing, logical sequencing, and emergency response content in one comprehensive instrument minimized the need for separate evaluations, streamlining the instructional process. Both instructors valued how the test instruments encouraged cadets to think critically and respond methodically to real-life aviation scenarios, reinforcing both technical knowledge and practical application. Therefore, this integrated writing rubric helped the instructors assess both writing skills and abilities required in ICAO Annex 10.

Providing Fresh Writing Assessments for Aviation English Classes

The new writing assessment instruments, integrating writing skills and mastery of managing flight emergency and urgency situations, promoted fresh assessment scenarios in aviation English classes. All instructors stated that the assessment might refresh the assessment model in procedural writing.

> "*The concept of the writing assessments, along with the logical thinking, is absolutely new to us, practically. I believe that this innovative writing assessment instrument is able to portray our cadets' English writing skills and knowledge about ICAO Annex 10*." (Instructor A, snippet 3)

Snippet 3 highlights Instructor A's recognition of a significant shift in how cadet performance was assessed. The statement acknowledged that the structured procedural writing assessments were previously unfamiliar in practical application within Instructor A's instructional context. The instructor expressed optimism about the new assessment instrument, emphasizing its ability to capture not only English writing proficiency but also cadets' understanding of specialized aviation content—specifically, ICAO Annex 10 (which deals with managing flight emergency and urgency situations). The benefits of this newly developed assessment tool were clearly highlighted (see the following snippet).

> "*The new assessment instrument is an evidence-based tool to evaluate our cadets' writing skills, which simultaneously assess their abilities in managing flight emergency and urgency situations*." (Instructor A, snippet 4)

First, it introduced an evidence-based, structured way to evaluate cadets' writing, which was previously lacking. This aligns with international standards and brings objectivity to assessments. Second, it integrates domain-specific content (ICAO Annex 10), ensuring that cadets are evaluated on both language and professional knowledge simultaneously. This dual focus enhances the relevance and effectiveness of instruction, fostering better preparedness for real-world aviation communication demands. In essence, the snippet illustrates how the new instrument bridges the gap between general language proficiency and specific professional competence. It promotes a more comprehensive, meaningful evaluation process that supports both instructional goals and cadet development in aviation communication.

In addition, Instructor B also believed that the developed assessment instruments could be essential in giving an authentic and meaningful learning experience. Snippet 5 explains Instructor B's perception of the newly developed instrument.

> "*The developed assessment tools help us portray cadets' English skills and aviation materials. This information can help us maintain our guarantee to produce skillful aviation professionals*." (Instructor B, snippet 5).

Snippet 5 emphasizes the importance of structured assessment tools in evaluating cadets' English proficiency and aviation knowledge. Instructor B suggested that these tools provided clear insights into cadets' abilities, ensuring

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they met industry standards. The phrase "*maintain our guarantee*" implied a commitment to producing highly skilled aviation professionals, where strong English skills were crucial for safety and efficiency. By systematically measuring progress, instructors could identify gaps and tailor training effectively. Overall, the statement highlighted the role of assessment in upholding quality education, ensuring cadets are well-prepared for real-world aviation challenges.

Discussion

Procedural writing plays a pivotal role in managing flight emergency and urgency situations by providing standardized, unambiguous instructions that minimize human error during critical moments. In high-stress scenarios, such as engine failures or rapid decompression, pilots and air traffic controllers must rely on precise, well-structured procedures to ensure swift and accurate responses (Borkers, 2024). Studies in aviation human factors (e.g., Forcella, 2021) demonstrate that cognitive overload often leads to mistakes; however, procedural writing mitigates this risk by presenting information in a clear, sequential format.

For instance, emergency checklists used in commercial aviation follow strict linguistic conventions to eliminate ambiguity, ensuring that even under duress, crew members can execute protocols efficiently (Drayton, 2021). Historical accidents, such as the 1989 Kegworth air disaster, underscore the consequences of procedural miscommunication, where unclear instructions contributed to fatal outcomes. By embedding procedural writing within structured assessment instruments, aviation training programs can better assess and enhance cadets' ability to produce operationally sound documentation (Bechinie et al., 2024. This not only refines situational awareness and decision-making but also ensures that cadets demonstrate measurable competencies aligned with flight safety protocols.

The integration of procedural writing into Aviation English pedagogy—particularly through targeted assessment instruments—offers substantial benefits by bridging the gap between linguistic competence and operational proficiency. Traditional language training often emphasizes general fluency, overlooking the communicative demands of high-risk aviation contexts (Emery, 2025; Monteiro & Bullock, 2020). The development of specialized writing assessment tools allows educators to systematically evaluate how well learners can articulate procedural knowledge through exercises such as drafting emergency checklists, simulating radio transmissions, and analyzing incident narratives. These assessments are grounded in English for Specific Purposes (ESP) principles, prioritizing context-based language use (Hutchinson & Waters, 1987). Research by Estival et al. (2016) confirms that procedural writing training enhances retention and recall of critical terminology under pressure.

Additionally, scenario-based assessment tasks stimulate deeper cognitive engagement, helping cadets internalize and apply protocols more effectively (Zhang & Luo, 2021). For example, cadets assessed on their ability to write and execute engine failure procedures consistently demonstrate improved performance in simulations. By integrating such targeted assessments, Aviation English programs can produce graduates who not only meet ICAO Language Proficiency Requirements but also excel in operational readiness and safety-critical communication.

Developing reliable assessment instruments for procedural writing is essential to ensure that aviation professionals meet the rigorous demands of the industry. Unlike general language assessments, which evaluate broad communicative competence (Whyte, 2019), aviation-specific assessments must measure the ability to produce and interpret procedural texts accurately. Rubrics for evaluating procedural writing should focus on clarity, logical sequencing, adherence to regulatory standards, and situational appropriateness. For instance, an assessment task might require cadets to write an emergency descent checklist or transcribe a simulated ATC instruction, with evaluators scoring based on precision and compliance with ICAO phraseology. Research by Knoch (2014) highlights the importance of criterion-referenced assessments in ESP, as they provide actionable feedback tailored to learners' professional needs.

Moreover, standardized assessments help identify gaps in training, allowing instructors to refine curricula. For example, if cadets consistently struggle with conciseness in MAYDAY communications, targeted exercises can address this deficiency. By implementing robust assessment tools, aviation training programs can ensure that graduates possess the procedural writing skills necessary for safe and effective communication, ultimately enhancing global aviation safety.

The development of these assessment instruments has significantly enriched ESP knowledge by providing empirical insights into the intersection of language proficiency and technical competence. Traditional language assessments often overlook domain-specific demands, but aviation-focused tools highlight how procedural writing mediates between linguistic ability and operational performance (Fagbohun et al., 2024). For example, studies analyzing cadets' checklist-writing tasks reveal that errors in article usage or verb tense, though minor in general English, can lead to critical misunderstandings in aviation contexts (Barshi & Farris, 2016).

This finding underscores the need for ESP frameworks to prioritize precision over fluency in high-risk fields. Furthermore, data from procedural writing assessments have informed the design of competency-based training models (Brightwell & Grant, 2013; Chen et al., 2022), where language instruction is tightly integrated with technical skills. Such models are now being adapted in other ESP domains, such as maritime and medical English, where clarity and accuracy are equally vital. By advancing assessment methodologies, aviation research

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contributes to broader ESP pedagogy, demonstrating how discipline-specific writing tasks can enhance both language acquisition and professional readiness (Balaji & Venkadasalam, 2017; Helal, 2022; Suprapti, 2024).

Looking ahead, the continued refinement of procedural writing assessment instruments will play a crucial role in addressing emerging challenges in aviation communication. As air traffic grows and cockpit technologies evolve, the demand for standardized yet adaptable procedures will increase. Digital tools, such as AI-powered writing assistants and virtual reality simulations, offer opportunities to enhance assessment precision. For instance, natural language processing algorithms could analyze cadets' procedural writing in real time, providing instant feedback on adherence to regulatory phrasing. Similarly, big data analytics could identify recurring errors across training programs, enabling global standardization of best practices. These innovations not only improve training efficiency but also contribute to ESP research by generating large-scale data on language use in professional contexts. Ultimately, the synergy between procedural writing, reliable assessment, and ESP theory ensures that aviation professionals are equipped to handle emergencies with linguistic and operational competence, safeguarding the future of global aviation.

Conclusion

This study developed reliable and valid assessment instruments to evaluate aviation cadets' procedural writing skills in managing flight emergency and urgency situations, aligning with ICAO Annex 10 standards. The integration of content knowledge, language proficiency, and critical thinking into a single assessment framework represents a substantial advancement in aviation English pedagogy. Through the ADDIE development model, the test instruction and analytic scoring rubric demonstrated high content validity (CVI = 1.00) and good inter-rater reliability (ICC = 0.802–0.890), confirming the instruments' applicability in authentic instructional settings. Instructors affirmed the tools' utility in enhancing learning outcomes, facilitating more targeted instruction, and fostering cadets' operational readiness.

The assessment's multifaceted design not only evaluates linguistic accuracy but also reinforces cadets' understanding of emergency protocols, offering a holistic learning experience. However, this research is not without limitations. The study involved a relatively small sample size (24 cadets) from a single aviation training institution, which may limit the generalizability of findings across broader contexts. Furthermore, the rubric's implementation relied on instructors' consistent interpretation, which, despite good reliability scores, might vary with less-experienced raters. Additionally, the assessment focused solely on written outputs without integrating multimodal or performance-based evaluations that mirror real-life cockpit scenarios.

For future research, scholars are encouraged to apply the developed instruments across diverse aviation academies to examine cross-contextual effectiveness. Expanding the rubric to include oral and digital communication modes, integrating AI-driven feedback tools, or simulating real-time emergency tasks could further enrich cadet preparedness. Longitudinal studies could also investigate the sustained impact of procedural writing on cadets' professional performance post-training. Overall, this study lays foundational groundwork for innovation in ESP-based assessment design within aviation education.

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Conflict of Interest
The authors declare no conflict of interest.

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