

## Article

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### Identifying Aircraft Maintenance Trainees' English Language Learning Needs

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#### ABSTRACT

In the quest to develop an exceptional Aviation English (AE) module for aircraft maintenance engineers (AMEs), it is imperative to determine the specific English language learning needs of those majoring in aircraft maintenance. This study aimed to identify the English language skills AMEs use in their workplace. Meanwhile, the findings allowed module developers and language instructors to tailor a content-specific module that met future AMEs' language needs and helped improve their language proficiency. The qualitative study was performed at the University Kuala Lumpur Malaysian Institute of Aviation Technology (UniKL MIAT). Data were collected using three types of instruments, namely i) interviews; ii) interaction analysis, and iii) text analysis. Based on data collected from six respondents, the findings showed that AMEs require special attention in improving their writing and technical writing ability. Besides, reading is another skill that needs special attention. Those involved in aircraft maintenance must read technical manuals, give instructions, and have good comprehension ability to minimise miscommunication and misinterpretation. Furthermore, although listening and speaking skills are exceptional skills, maintenance engineers' need to master reading comprehension and writing is more than other engineering-related positions. The investigation revealed that aircraft maintenance trainees must be equipped with relevant language skills. The findings would help course module developers and language instructors produce modules that meet the aviation trainees' needs.

**KEYWORDS: Aviation English, English Language Needs, Aircraft Maintenance Trainees, Aircraft Maintenance Engineers.**

#### INTRODUCTION

English is the lingua franca of the aviation industry (Coertze et al., 2014; Estival & Farris, 2016). It has also become the language used by academics and technical experts to communicate and share views on common global issues, narrowing the language gap (Abbas et al., 2018). The 1944 Chicago Convention on International Aviation proposed that implementing English as the industry's working language would help standardise the language used by international aviators. In the past, the design and mechanics of aviation were dominated by native English speakers;

naturally, English became the chosen language. Moreover, Wu et al. (2019) stated that using an official language in an industry as large as aviation could prevent miscommunication and misinterpretation. However, miscommunication could still occur as most aviation communities comprised non-native speakers who use English as a second or foreign language. Although English proficiency is supposedly an essential skill, proficiency levels differ significantly among non-native speakers (Barbieri, 2014; Fleckenstein et al., 2016). Therefore, miscommunicating ideas could happen, which could detrimentally affect aviation safety (Tetiana, 2015)

According to Hamzah and Wong (2018), English for aviation or AE is a language used within the aviation circle and context-dependent. AE is a part of English for Specific Purposes (ESP), where learners acquire specific information and develop their language skills. Moreover, AE has a standard non-conversational phraseology where, when used within a particular context, the register is coded and abbreviated using specific jargon and numerical descriptors. On top of that, AE is unique, where it was initially derived from post-war radiotelephony (Trippe & Baese-Berk, 2018) and deciphered without needing direct contact. Notably, aviation personnel, such as pilots, air traffic controllers (ATC), and ground operations, such as aircraft maintenance engineers and technicians, use English in professional communication and preparation of technical reports. Thus, pilots and ATC are obliged to communicate using AE based on the International Civil Aviation Organisation (ICAO), which enforced language proficiency assessment among pilots and ATC to ensure their ability to communicate accurately using AE. Consequently, the regulation led to the conception of several AE programmes taught and evaluated based on English language teaching.

Despite that, there is still a significant lack of AE programmes tailored to meet the needs of aircraft maintenance personnel. The demand for efficient aviation and service calls for each airline ensures the reliability and functionality of their aircraft. Ren et al. (2017) submitted that aircraft maintenance personnel are equally important in the aviation industry as they are responsible for ensuring that each aircraft is fit-to-fly and safe. Furthermore, their feedback and reports on each aircraft ensure that it is well-maintained, flight schedules are on time, and passengers safely reach their destinations. Also, maintaining aircraft is as delicate as flying. Any form of miscommunication between the flight crew and the maintenance personnel could cause confusion, affecting the quality of operations and services (Fisher, 2016).

White (2018) submitted that areas of aircraft maintenance use English in their manuals and technical documents. Besides, aircraft maintenance personnel are responsible for accurately informing the officials of the aircraft's safety and efficiency. However, there are still instances where flight crews (pilot and cabin crews) and maintenance personnel fail to communicate well. Unlike pilots and ATCs who communicate verbally to update their current location and situation, aircraft maintenance personnel communicate with the flight crews via written reports (Tetiana, 2015). Written communication is considered ambiguous and lacks clarity when the reader fails to understand the report's gist. Maintenance personnel with poor English proficiency could fail to comprehend the severity of the situation, and a poorly written report could confuse the pilot, causing misinterpretation and human-related errors. Such mishaps could happen, primarily when non-native speaking maintenance personnel communicates with native English speakers.

Hence, poor English proficiency in the aviation industry could be a severe issue as AE is mainly for pilots and ATC. Individuals opting to become aircraft maintenance personnel are typically exposed to General and Academic English, which are not required once they join the workforce

(Embryany & Ratmanida, 2019). On top of that, it is imperative to establish aircraft maintenance personnel's English language requirements as part of their academic qualification when they join vocational or aviation colleges. Therefore, future aircraft maintenance personnel must undergo proper proficiency training or have a minimum level of English proficiency. Besides, the language needs of prospective aircraft maintenance personnel must be investigated to determine their basic language requirements accurately. For this purpose, the study was conducted at UniKL MIAT, investigating the maintenance aircraft and maintenance trainees' English language needs (listening, speaking, reading, and writing) to equip them with the industry's proficiency graduation.

## **LITERATURE REVIEW**

With a particular focus on the English language needs of aircraft maintenance trainees to enhance their English proficiency for the workplace, literature consisting of studies on the needs analysis of aviation majors in vocational colleges and higher institutions is elaborated in the following sections.

### *Needs Analysis for Listening and speaking*

It is vital to equip trainees majoring in technical fields with functional language skills as higher learning institutions are responsible for ensuring their employability upon graduation (Darmi & Albion, 2013; Karimi & Sanavi, 2014; Pertiwi, 2016). Moreover, the trainees have prior knowledge of the field they enrolled in but face challenges when expressing their expertise and views in English. Hidayat (2018) stated that these trainees would consider communicating and interacting with others in English complex because they lack the vocabulary and language structure to express themselves clearly. This view corroborated with Rahmat and Al As'ary (2017), who highlighted the significance of teaching aviation trainees' good communicators and listeners, regardless of their majors and roles.

Aircraft engineers and the maintenance team work collectively and must be able to communicate effectively. Most importantly, communication is crucial in their expertise area. Besides, communication is highly regarded in maintenance, as mentioned in JAR66, Module 9 of Human Factors. Additionally, considering CAP 715 Introduction to Aircraft Maintenance Engineering Human Factors, failure to communicate clearly and effectively contributes to accidents and unfavourable incidents in the aviation industry. Furthermore, they must interact with others outside their team to relay information, give instructions, guidance, and advice to their aviation colleagues. Listening and communicating ability is critical in the aviation industry, especially for pilots and ATC (Douglas, 2014). Both skills are equally vital for aircraft maintenance personnel as they need to communicate and interact actively with aviation staff. They must also report any damages and address them accordingly before informing others of the situation. Nevertheless, aviation language is confined to pilots and air traffic controllers (ATC), but it also generally refers to English in aeronautical and aviation maintenance. Furthermore, aviation language includes the use of English relating to any aspect of aviation – for example, the language needed by pilots for briefings, announcements, and flight deck communication, or the language used by maintenance technicians, flight attendants, dispatchers, managers, and officials within the aviation industry. Therefore, failure to communicate and understand two-way communication could be disastrous as inaccurate assessment of damages could put their colleagues and passengers at risk.

### Needs Analysis for Reading

The ability to read effectively in English is an essential skill for aircraft maintenance personnel. So naturally, the trainees are taught to read technical manuals and task cards as aviation maintenance and engineering students in technical schools need help with their reading skills (Embryany & Ratmanida, 2019). Apart from requiring support in the other three skills, the students think mastering reading skills would help them understand work materials in English upon entering the workforce. Sukma et al. (2019) stated that focusing on reading would help these trainees comprehend specific jargon and vocabulary unique to AE and increase their ability to understand what is read, minimising the possibility of misunderstanding and misinterpretation. Rahmat and Al-As'ary (2017) also proposed that teaching reading in an ESP context allows the trainees to use the language functionally. In ESP, learners are taught skills to use the language based on its functions; thus, teaching them the words used during communication is insufficient. They should know when to use specific terminologies accurately.

### Needs Analysis for Writing

Lin et al. (2014) stated that students majoring in engineering need help improve their technical writing ability. Engineers and those involved in technical operations are usually expected and required to write specific documentation of any procedures or repairs conducted before informing other relevant parties of current updates. In the aviation field, writing a technical document is more challenging than writing an essay. According to Rus (2015), when writing a technical document, the writer should know the document's purpose, who the readers are, and why the issue must be reported. In short, the writer must present the incident in words clearly to allow readers to understand what happened and the action taken. For non-native speakers of English, writing a technical piece is very challenging as cross-cultural communication (Abugre & Debrah, 2020; Jenifer & Raman, 2015). First, language interference could prevent them from putting their technical knowledge precisely on paper.

The importance of writing is often overlooked, as most English learners tend to focus on improving their spoken form of the language (Leong & Ahmadi, 2017). On top of that, learners often associate proficiency with eloquence and verbal abilities. However, in a study by Vahdany and Gerivani (2016), they discovered that EFL medical students and practising physicians view mastering writing as important as mastering reading and thus ranked speaking as the least essential skill to improve. On the same note, Youngyuensin (2015) revealed that staff from a Thai-based freight and logistics company regarded writing as an important skill in their work line. Consequently, the company's officials were advised to provide specific business writing classes for their employees.

## **RESEARCH QUESTIONS**

The questions addressed in this study are as follows:

1. What are the writing needs of AMEs?
2. What are the reading needs of AMEs?
3. What is the listening and speaking needs of AMEs?

## **METHODOLOGY**

This study was performed qualitatively, where data were collected through interviews. To obtain a clearer picture of English used in the aviation industry, the researcher included AMEs, pilots, and flight crew members, whose interactions were analysed. The study used authentic material collection involving oral communication between AMEs, pilots and cabin crew members and

written documents by AMEs, primarily reports, task cards and inspection report cards (IRC). The oral communication discourse involved 40 minutes of talk, and eleven (11) written documents were collected. In relation to writing, samples from AMEs were also analysed to determine the form of writing practice that aviation trainees must be exposed to. Finally, an interview was used to triangulate the findings from the discourse analysis of the authentic materials. For the interview, six respondents were selected based on their involvement with the aviation industry. For example, one respondent had served an airline company and joined a local aviation institution as a lecturer. His views were crucial to this study from an academic's perspective, which allowed the researcher to identify the language issue that required the most attention.

Meanwhile, the other respondents were still serving airline companies, and their views provide insight into the language used in an actual work environment. Four interviews were carried out at the respondents' workplace whilst an interview was conducted in a restaurant and via video conferencing (Skype). During these interviews, the researcher played the role of a non-participant observer, where she recorded the conversation without interrupting the active interaction between the personnel. For the interview, questions were formulated based on Hutchinson and Waters' (1992) target situation analysis (TSA) framework. This framework is also preferred as it would help the research identify what the aviation personnel need to do to learn. The framework was used to develop interview questions using the recommended "why", "how", "what", "who", "where", and "when" questions. The interview questions are shown in the following table (Table 1).

**Table 1**

*Interview Questions*

|      |  |
|------|--|
| i.   | Which one of the skills you need to master, listening, speaking, reading and writing, and how well do you need to master it? |
| ii.  | What do you need to write in English?  |
| iii. | What type of reports do you write in English?  |
| iv.  | What do you need to read in English?   |
| v.   | What form of text do you need to read in English?  |
| vi.  | Who do you speak to in English at the workplace, and for what purpose?   |
| vii. | Why do you need to use English at your workplace?  |

Data collected from the interviews and oral communication were transcribed and analysed for language functions. In this paper, the Mell and Godmet (2002) language function in Aviation and ICAO DOC 9835 "Communicative Language Functions, Events, Domains and Tasks Associated with Aviation" was used to classify the language functions identified from the oral communication. For text analysis, the AMEs' written documents were examined to determine the use of communicative language. Then, the findings were triangulated with data from the interviews and analysed documents based on the recurrences of information.

## **RESULTS AND DISCUSSION**

The finding showed that those involved in the aviation industry must be proficient in English. However, English is extensively used in aviation, and all staff, regardless of their ranks, must use English to communicate with colleagues, especially pilots and flight crew members. Table 2 summarises the reasons for the use of English at the workplace by AMEs.

**Table 2***Reasons for the use of English at the workplace by AMEs*

|      |  |
|------|--|
| i.   | The official language for aviation                         |
| ii.  | To communicate with pilots and other aviation personnel    |
| iii. | Manuals and documents are all written in English           |
| iv.  | All terms on components of the aircraft are in English     |
| v.   | The official or standard language for the airline industry |
| vi.  | For written and spoken communication                       |

The respondents explained that despite the importance of mastering all four language skills, they expect aircraft maintenance trainees to master the art of technical writing. Moreover, AMEs and the whole maintenance team are responsible for preparing documentation and reports. Tables 3 and 4 summarise AMEs' writing needs and the reports they need to prepare in English.

**Table 3***AMEs Writing Needs*

| No. | Types of Written Document | Purpose and importance   |
|-----|---------------------------|--|
| 1   | Report                    | To report on the action or job that has been performed on an aircraft, such as inspection, defect rectification, modification, maintenance review, and release.                      |
| 2   | Memos                     | To inform managers about a flight delay. Also, to inform other foreign stations about any problem involving an aircraft about to land at their airport (previously, Telex was used). |
| 3   | Task Cards                | To clearly state that the task assigned has been performed as instructed.  |

**Table 4***Types of Reports prepared by AMEs*

| No. | Types of Written Report       | Purpose and importance   |
|-----|-------------------------------|--|
| 1   | Inspection Report Cards (IRC) | A document used in logging identified defects and corresponding rectification actions arising from a hangar check. The IRC is also used to control non-routine activities (component removal/refit) to enable the routine card to be auctioned. IRC is also raised when a detailed inspection needs to be carried out on the aircraft. |
| 2   | Technical Log                 | The technical log includes the defect log and cabin log. <ul style="list-style-type: none"> <li>The cabin Log is either filled up by the pilot of the leading cabin crew of a flight to complain about a problem in the cabin. The AMEs will troubleshoot and report the performed inspection in the action column.</li> </ul>         |

|   |                                      |  |
|---|--------------------------------------|--|
|   |                                      | <ul style="list-style-type: none"> <li>The defect log is for the pilot to complain about any defect found during the walk-around check. For example, if the pilot sees the aircraft's tyres are worn out during the walk-around check, he will fill up the defect log to report the tyres' conditions. The line maintenance engineer's task is to report the action taken in the technical log under the action column. The pilot will not turn the aircraft around until the AMEs have written the action taken to resolve the aircraft's problem.</li> </ul> |
| 3 | Defect/Incident Investigation Report | If any accident or incident occurs anywhere around the work area, a full report must describe the incident. This report is also used to document an investigation related to an aircraft/component's defect or incident arising from a maintenance activity. The result of the investigation is used to identify and recommend corrective and preventive measures.   |
| 4 | Task Hand Over Report                | As AMEs work in shifts, the task handover report is used by the head AMEs to report what their team had done during their shift. The report focuses mainly on aircraft defects and which areas require continuous monitoring, inspection, or repairs. The task handover logs are also used to record subjects/topics to ensure effective communication between the outgoing and incoming aircraft maintenance personnel.   |
| 5 | Fuel and Oil log                     | The fuel and oil log records fuel uplift, engine oil uplift, and hydraulic uplift. This report must be written clearly as AMEs of other countries will read it during aircraft stopover.   |

In aviation maintenance, written documents are critical as they are documented for a certain period, usually for about two years. Additionally, the document is used for tracking the aircraft's history if any problem arises. All reports should be written in capital letters to avoid ambiguity, and certain airlines obligate reports to be written using a black pen. Since AMEs must write reports using simple technical language, these documents should be short and straightforward, including memos. However, sentence structure with grammatical errors must be avoided. The findings are consistent with Lin et al. (2014) and Rus (2015), who stated that technical writing is a skill that engineering majors, especially those playing key roles in aviation technical operations, must master. The skill is crucial as they would be responsible for reporting and communicative functions precisely to avoid misunderstanding and enable other personnel, such as the pilot, planner, or head AME, to understand what was reported and what actions must be reported taken. Hence, in terms of writing skills, AMEs should have a good grasp of basic English grammar. Technical writing, especially in

reports, is usually written in the passive or past tense, and thus AMEs must be able to utilise technical terms accurately in their writing.

Regarding reading skills, the respondents' view is that AMEs must have good reading comprehension abilities to help them read specific information and follow instructions in manuals and engineering courseware (refer to Table 5). The findings align with Embryany and Ratmanida (2019), who posited that the personnel must possess strong reading skills to cope with their assigned tasks. Furthermore, the AMEs must ensure that in their technical logs, the report should i) inform, ii) describe, iii) explain, and iv) announce. The report's accuracy is also dependent on how well the personnel describes the situation; therefore, the findings corroborate Rahmat and Al-As'ary (2017) and Sukma et al. (2019), who believe that good comprehension abilities would minimise the possibilities of the AMEs misunderstanding and misinterpreting important information.

Therefore, reading is a crucial skill in aviation, as all aviation-related materials are written in English. Also, reading in aviation is vital as several skills are involved in making the reading process meaningful. Therefore, the reader must interpret the reading texts, such as announcements or procedures, for various purposes, such as information, suggesting action, or following directives. Furthermore, as the language is kept short and straightforward in reports, the AMEs should infer the text accurately.

Moreover, equipping AMEs before they become part of the industry with solid comprehension ability would prepare them for their examinations before attaining the License without Type Rating (LWTR) and License with Type Rating (LTR). The licenses are crucial to their professional development and assure the aviation regulatory bodies (Malaysian Aviation Commission (MAVCOM) in Malaysia) that the AMEs are competent in performing aircraft inspection and are certified to oversee different aviation protocols. The AMEs must write, speak, interpret manuals and technical reports, and carry out technical discussions in English to be certified.

**Table 5**

*Reading Materials for AMEs' Work Purposes*

| No | Reading materials    | Functional Language                  |
|----|----------------------|--------------------------------------|
| 1  | Maintenance Manuals  | Instructions/ Procedures/Precautions |
| 2  | Manufacturers Report | Announcements/Warnings/Compliance    |
| 3  | Memo/Telex           | Description/Announcements            |
| 4  | Circulars            | Announcements/Rules and Regulations  |
| 5  | Task Card/Task Sheet | Instructions/Procedures/Precautions  |

The respondents view that other necessary skills that should be highlighted early were listening and speaking. They also reiterated that those involved in maintenance are expected to communicate, especially those holding line maintenance engineers. Hence, AMEs must use communicative functions accurately to prevent miscommunication and misinterpretation. Furthermore, AMEs must understand what is being reported in English to accurately interpret the problem and discuss possible solutions or actions. Tables 6 and 7 show the situations where Based and Line maintenance AMEs must communicate with other aviation personnel.



**Table 6**  
*Aviation Personnel who interacts with Base Maintenance AMEs*

| No | Aviation Personnel                    | Purpose  |
|----|---------------------------------------|--|
| 1  | Head LAE (Licensed Aircraft Engineer) | <ul style="list-style-type: none"> <li>To discuss the maintenance task that needs to be performed on aircraft.</li> <li>To ask for clarification or extra mechanics.</li> <li>To ask for the allocation of mechanics.</li> </ul> |
| 2  | Planners                              | <ul style="list-style-type: none"> <li>To discuss aircraft-related problems.</li> <li>To raise inspection report card so that aircraft are inspected and repaired.</li> </ul>  |
| 3  | Managers                              | <ul style="list-style-type: none"> <li>To discuss arising engineering-related issues during meetings.</li> </ul>   |

**Table 7**  
*Aviation Personnel who interacts with Line Maintenance AMEs*

| No | Aviation Personnel | Purpose   | Actual dialogues  |
|----|--------------------|---|---|
| 1  | Pilot              | <ul style="list-style-type: none"> <li>To discuss and clarify defects found in the aircraft.</li> <li>To describe the problem, explain the actions taken by AMEs to troubleshoot the problem (Aircraft delay).</li> </ul> | <p>Pilot: Good Morning, Mr Salleh; how are you today?</p> <p>Engineer: Good morning, Captain. I'm fine, thank you, and hope the same with you. I heard through the radio that you are having some problems with your air conditioning system.</p> <p>Engineer: Captain, I have found the cause of the problem, and I have rectified it, and I hope you can monitor this situation further and please log it in if possible.</p> <p>Pilot: Thank you, and I will monitor this situation further.</p> |
| 2  | Head AMEs          | <ul style="list-style-type: none"> <li>To accept the tasks of the day.</li> <li>To discuss significant problems encountered by aircraft that could cause a delay in</li> </ul>  | <p>Engineer: I just want to ask you a few questions before I begin my troubleshooting for this door I left hissing sound. Captain, can I know exactly which phase of flight did the hissing sound became apparent?</p> <p>Pilot: I actually realised the sound started becoming very loud when</p>  |

|   |            |  |  |
|---|------------|--|--|
|   |            | flight time due to repair work.  | the aircraft levelled off at 35,000 feet.  |
| 4 | Cabin Crew | <ul style="list-style-type: none"> <li>To discuss problems or situations in the cabin or galley and suggest alternatives.</li> </ul> | <p><b>Situation 1</b><br/>                     AME: Good morning, Mr Lim, just want to find out from you... is the water pressure slow all the time?</p> <p>Mr Lim: Yes, it's very difficult for us to do our work and we have full passengers on board, and I hope you can rectify this problem for us.</p> <p>AME: We will try our best and have one more question. Is the water dirty when it comes out of the tap?</p> <p><b>Situation 2</b><br/>                     AME: Well, Miss Suraya, as I have suspected, the ground staff did not service the lavatory in Medan, which has caused the lavatory to overflow. For your information, the aircraft will be delayed for 2 hours because we need to call the cabin interior cleaning crew to carry out cleaning and as soon as I give my thumbs up, the passenger can begin boarding.</p> <p>Miss Suraya: Ok, you are in charge here, and I will adhere to your instruction.</p> |

Listening and speaking are as important as reading and writing for AMEs, especially if foreign expatriates work in the airline. The AMEs, when communicating with foreign pilots or cabin crew members, will face problems if they have weak English language proficiency. These findings are in line with Rahmat and Al As'ary (2017), who believed that those in the aviation sectors, regardless of roles, should be trained to communicate effectively using Aviation language. These findings substantiated views by Embryany and Ratmanida (2019), Fisher (2016), and Trippe and Baese-Berk (2018), who contended that AE is different from other ESP as it unique and tailored to ensure clear oral and written communication between aviation personnel.

Overall, the respondents' input helps determine the English language needs to be taught to aircraft maintenance trainees before joining the industry after graduation. Besides, the data established the learning content incorporated in the AE module for aircraft engineering trainees.

## CONCLUSION

The study has helped identify AMEs' English language needs, which reflect the typical skills deemed important to the industry and content appropriate for the aviation maintenance engineering training. Communication is the most important factor in human error in aviation maintenance engineering. Language testing or assessment for AMEs should be compulsory when the aircraft maintenance engineering trainee joins the aviation industry. Unlike the ICAO language proficiency and testing requirements made compulsory for pilots and controllers, AMEs' language proficiency assessments should also be developed to ensure that they demonstrate satisfactory language proficiency for safe and efficient communication. The assessment should also be evaluated to provide a standard for AMEs language training.

Providing language training modules that allow aircraft maintenance trainees to acquire functional skills will help them cope with occupational demands. Most importantly, there should be a different form of AE module specifically taught to engineering majors. Assuming that engineering majors do not use English at their workplace would not help the trainees as aviation is an international industry. With English as the official language, failing to prepare them to adapt to an environment where English is used extensively would deprive them of mastering the skills required for career progression. In short, enhancing their language proficiency would improve the airline's credibility and reliability in providing safe and world-class service.

## REFERENCES

- Abbas, N., Ashiq, U., & Abrar ul haq, M. (2018). Gap between acquired and required English learning objectives for the primary school students: Empirical evidence from Sargodha (Pakistan). *Cogent Social Sciences*, 4(1), 1457421 <https://doi.org/10.1080/23311886.2018.1457421>
- Abugre, J. B., & Debrah, Y. A. (2019). Assessing the impact of cross-cultural communication competence on expatriate business operations in multinational corporations of a Sub-Saharan African context. *International Journal of Cross-Cultural Management*, 19(1), 85–104. <https://doi.org/10.1177/1470595819839739>
- Barbieri, B. (2014). Aviation English: History and Pedagogy. *The Journal of Teaching English for Specific and Academic Purposes*, 2(4), 615–623.
- Coertze, S., Conradie, S., Burger, C. R., & Huddleston, K. (2014). Aviation English in South African airspace. *Stellenbosch Papers in Linguistics Plus*, 42(1), 41-62. <https://doi.org/10.5842/42-0-167>
- Darmi, R., & Albion, P. (2013). English Language in the Malaysian Education System. *Proc. of the Second Malaysian Postgraduate Conference. Australia: University of Southern Queensland.*, (July 2015), pp. 3–4.
- Douglas, D. (2014). Nobody seems to speak English here today: Enhancing assessment and training in aviation English. *Iranian Journal of Language Teaching Research*, 2(2), 1–12.
- Embryany, F., & Ratmanida. (2019). A Need Analysis of English Learning for the Aircraft Maintenance Students. *Advances in Social Science, Education and Humanities Research*, 405(Iclles 2019), 35–39. <https://doi.org/10.2991/assehr.k.200217.008>
- Estival, D., & Estival, D. (2019). Aviation English Training for Native English Speakers : Challenges and Suggestions. *International Civil Aviation English Association*. Chiba, Tokyo: Embry-Riddle Aeronautical University Scholarly Commons (December)..
- Fisher, T. (2017). Cleared to disconnect? A study of the interaction between airline pilots and line

- maintenance engineers. *International Air Safety Seminar Proceedings, 2017-October*, 123–139.
- Fleckenstein, J., Leucht, M., Pant, H. A., & Köller, O. (2016). Proficient beyond borders: assessing non-native speakers in a native speakers' framework. *Large-Scale Assessments in Education*, 4(1), 1-19. <https://doi.org/10.1186/s40536-016-0034-2>
- Hamzah, H., & Fei, W. F. (2018). Miscommunication in Pilot-controller interaction. *3L: Language, Linguistics, Literature*, 24(4), 199–213. <https://doi.org/10.17576/3L-2018-2404-15>
- Hidayat, R. (2018). A Needs Analysis in Learning English for Airline Staff Program. *English Education Journal*, 9(4), 589–613.
- Jenifer, D., & Raman, G. . (2015). Cross Cultural Communication Barriers in Workplace. *Internation Journal of Managerment (IJM)*, 6(1), 348-351.
- Karimi, P., & Sanavi, R. V. (2014). Analysing English Language Learning Needs among Students in Aviation Training Program. *Procedia - Social and Behavioral Sciences*, 98(May), 852–858. <https://doi.org/10.1016/j.sbspro.2014.03.491>
- Leong, L.-M., & Ahmadi, S. M. (2017). An Analysis of Factors Influencing Learners' English Speaking Skill. *International Journal of Research in English Education*, 2(1), 34–41. <https://doi.org/10.18869/acadpub.ijree.2.1.34>
- Lin, J., Wang, A., & Zhang, C. (2014). Integrating Curriculum Design Theory into ESP Course Construction: Aviation English for Aircraft Engineering. *Open Journal of Modern Linguistics*, 04(02), 219–227. <https://doi.org/10.4236/ojml.2014.42017>
- Mell, J., & Godmet, C. (2002). Communicative functions in language for aviation radiotelephony. *Direction de la Navigation Aérienne: DNA8 (F)*.
- Pertiwi, D. R. (2016). Needs Analysis of English for Aeronautical Engineering Purposes at STT Adisutjipto Yogyakarta. *Language and Language Teaching Journal*, 19(2), 105–114. <https://doi.org/10.24071/llt.2016.190205>
- Rahmat, A., & Al As'ary, M. (2017). The Application of Egp Materials to Atc Students of Casea Makassar. *LEKSEMA: Jurnal Bahasa Dan Sastra*, 2(1), 65-75. <https://doi.org/10.22515/ljbs.v2i1.630>
- Ren, H., Chen, X., & Chen, Y. (2017). Chapter 3 - Aircraft Reliability and Maintainability Analysis and Design. In H. Ren, X. Chen, & Y. B. T.-R. B. A. M. O. and A. Chen (Eds.), *Aerospace Engineering* (pp. 37–78). <https://doi.org/https://doi.org/10.1016/B978-0-12-812668-4.00003-4>
- Rus, D. (2015). Developing Technical Writing Skills to Engineering Students. *Procedia Technology*, 19, 1109–1114. <https://doi.org/10.1016/j.protcy.2015.02.158>
- Sukma, M. M., Rochmawati, L., & Fatmawati. (2019). The Methods and Learning Design of English for Specific Purpose for Maintenance Engineering Subject in Aviation English. *Jurnal Penelitian*, 4(2), 60–69.
- Tetiana, K. (2015). The role of Technical English in Aviation Maintenance. *UDC331.546:656.7.071.13(045)*
- Trippe, J. (2018). A Prosodic Profile Of Aviation English A Prosodic Profile of Aviation English. *English for Specific Purposes*, 53, 30-46.
- White, A. R. (2018). *A review of an aircraft maintenance related English writing course* (Issue 3).
- Wu, Q., Molesworth, B. R. C., & Estival, D. (2019). An Investigation into the Factors that Affect Miscommunication between Pilots and Air Traffic Controllers in Commercial Aviation. *International Journal of Aerospace Psychology*, 29(1–2), 53–63.

<https://doi.org/10.1080/24721840.2019.1604138>

- Vahdany, F., & Gerivani, L. (2016). An analysis of the English language needs of medical students and general practitioners: a case study of Guilan University of Medical Sciences. *International Journal of English Language and Literature Studies*, 5(2), 104-110.
- Youngyuensin, N. (2015). Needs Analysis in English Communication Skills among Thai Employees of Yusen Logistics (Thailand) Co., Ltd. *Unpublished master's research paper, Thammasat University, Language Institute, English for Careers.*