Unit of Study Teaching Report

1. Executive Summary

This unit of study is designed to teach Aviation English (AE) to intermediate non-native English speaking trainees at a Flight Training Organization (FTO) in South Korea. The main purpose of this study is to design an effective curriculum and analyze the linguistic features and structures based on Air Traffic Control Communication (ATC) genre for targeting level 4 on the International Civil Aviation Organization's (ICAO) standardized test. Aviation English, as a Language for Specific Purposes (LSP), aligns with specific discourse terminology and structured patterns to ensure safety and clarity in Air Traffic Control (ATC) communication (Gollin-Kie et al., 2015). The primary purpose of this genre is flight safety. Using structured sentences and repeating nouns ensures clarity and eliminates ambiguity (Kim & Elder, 2009). Tajima (2004) highlights that brevity and clarity take a critical role in high-risk aviation because communication failures cause significant incidents. Therefore, it is essential to improve communication competency with practical and standardized English.

This unit is grounded in the SFL (Systemic Functional Linguistics) model of genre-based learning (Martin & Rose, 2008) and is designed to understand the specific structures and linguistic practices and utilize them in actual situations. It focuses on meeting the criteria; pronunciation, structure, terminology, fluency, comprehension, and interaction at the level 4. This unit will maximize the motivation and participation of learners, offering them task-based materials such as role plays, scenarios, and project activities.

Trainees at this school are in their early 20s, even though they are educated in general

English, and they lack exposure to the structured, high-stakes language required in ATC communication. They lack experiences in operating and controlling the actual airplanes. Therefore, it is crucial to meet the requirements to be an international pilot and to prevent accidents caused by misunderstandings and breakdowns in communication.

The structure sequences include: 1) call-up and identification, 2) request/permission and clearance, 3) readback and acknowledgement, and 4) emergency call signs ((International Civil Aviation Organization [ICAO], 2016, Chapter 11-12). The unit of study follows the Teaching and Learning Cycle (Rothery, 1996), combining authentic audio transcripts and a manual defined by the ICAO.

In order to tailor this unit effectively for trainee pilots comprising a Language for Specific Purposes (LSP) group, a comprehensive needs analysis was conducted, incorporating a literature review and task analysis of authentic ATC communication. The review of ICAO documentation and relevant research (Kim & Elder, 2009; Basturkmen, 2010) highlights that aviation English, particularly in ATC contexts, necessitates proficiency of standardized phraseology, concise and succinct communication, and rapid information processing under high-pressure conditions. Furthermore, a comprehensive analysis of real ATC transcripts illustrates that distinct communicative stages, including call-up and identification, request and clearance, readback and acknowledgement, and emergency procedures are crucial for ensuring the safety and efficiency of operation in the aviation discourse community. This study affirms that the ATC genre, with its regulated structure, specialized terminology, and strict adherence to international guidelines, reflects the communicative practices and safety-related language skills essential for pilots. Therefore, the ATC communication genre was selected as the primary focus of this unit, as it directly aligns with the professional needs and

real world demands of this discourse community.

2. Unit of Study: Radio Communication Genre

2-1. Building the Context

The purpose of this stage is to foster leaners' comprehension of social purposes, practical contexts, and the necessity of standardized phraseology and terminology within the genre of aviation radio communication.

Field Activity:

(1) Provide an actual script and share them in the class. If it is possible to listen or watch actual recordings, give opportunities to listen through like Live ATC or YouTube to have students familiar with actual situations with various pronunciations and intonations.

https://youtu.be/hSlQSa60nts?si=qN3JdYZYoLimQ36V

(2) Ask students to identify the difference between general English and AE (Aviation English) and discuss about it.

(3) Introduce the accident, Avianca 52, occurred in 1990 to aware the importance of structured communication.

Pilot: "We're running out of fuel" Air-Traffic-Control: "Okay". A mini CA-based analysis of the final moments of Avianca flight 52

12/10/2021 by Sofia Navarro Beck

On January 25th,1990 Avianca flight 52 flying from Medellín, Colombia to New York crashed around 30 km from John F. Kennedy airport, killing 73 of the 158 people aboard. The official Aircraft Accident Report subsequently concluded that the main causes of the accident were "the failure of the flight crew to adequately manage the airplane's fuel load, and their *failure to communicate an emergency fuel situation to air traffic control before fuel exhaustion occurred*" (National Transportation Safety Board: v). Here, I offer a mini conversation analysis (CA) based analysis of some of the final Pilot-Air Traffic Control (ATC) interactions from Avianca flight 52. The audio was recorded on the Cockpit Voice Recorder aka the *black box* of the aircraft. The transcriptions in this article follow Gail Jefferson's transcription conventions.

Interactions between pilots and ATC take place in a challenging environment and, contrary to everyday life, misunderstandings or miscommunications can have deadly consequences. The discursive space of Pilot-ATC interactions differs from everyday conversations mainly in four ways: **1)** it is highly mediated, i.e., both ATC and the flight crew function as information go-betweens; **2)** it is highly regulated, i.e., communications contain a high amount of scripted language (Garcia 2016: 58); **3)** it is a

[Figure 1] Avianca Flight 52

If you want to read further article, click the link above.

Listening to or watching an authentic ATC communication support students to be familiar with real situation they may encounter for the future.

Genre Structure:

(1) Listen the audio recording with the script, [Appendix 1], again and ask students to analyze the purpose and situation of speech.

(2) Ask students to discuss the purpose of ATC. Example questions are:

1) What are the main concerns in this communication?

2) Why standardized pharology and terminology are important?

3) What risks may arise without communication?

(3) After reading or listening to the ATC script, guide students to analyze the communication by:

- Dividing the script into distinct stages on the board or worksheet (e.g., call-up, request/clearance, readback, emergency).

- Prompting students with targeted questions to help them identify the function of each part, such as:
    - "Who starts the conversation here and what is their purpose?" (call-up and identification)
    - "What is being requested or permitted in this exchange?" (request/permission and clearance)
    - "Is there a section where information is repeated? Why is this important?" (readback and acknowledgement)
    - "Are any special words or codes used in an emergency?" (emergency call signs)

This approach helps students recognize and name each stage by its communicative function, deepening their understanding of the structured nature of ATC communication.

2-2. Deconstruction and Modelling

After studying the context and the importance of structured communication, the following step will analyze the linguistic features and patterns of ATC communication.

Ask students to review the ATC script and, based on the flow of the conversation, try to identify and divide the communication into four main stages. Guide them with prompts such as:

- "Where does the conversation start? Who identifies themselves first?"
- "Is there a request or clearance being made?"
- "Is any information repeated or confirmed?"

- "Are there any emergency-related messages?"

  Explain that the typical stages in ATC communication are:

1. Call-up and identification,
2. Request/permission and clearance,
3. Readback and acknowledgement,
4. Emergency call signs

Encourage students to match each part of the script to one of these stages and discuss what lexical-grammatical features are present in each phase.

1) Call up and Identification

The main purpose of this stage is to ensure clear communication through identification. Teaching students structured phraseology always involves identifying the flight's number and its current location, followed by requests and additional information.

a) What information we can guess from the text.

Philippines 113 heavy, wind 100 at 4, runway 25R. RNAV DCKRR, cleared for takeoff.

Answer) We can distinguish the name of airline, flight number, and large airplane from the call sign. Moreover, the terminology 'heavy' means large aircraft, so it provides caution regarding rear flow of airplanes.

b) How can we read phonetic code? Teacher provides phonetic code structured by ICAO (ICAO, 2010) to students and asks them to memorize it. [Appendix 2]

c) Ask students to read DCK with phonetic code: Delta, Charlie, Kilo.

d) Find the language features together; passive voice and ask students the purpose of using it.

The use of passive voice sentences blocks the possibility of misinterpretation. Riley and Cushing (1995) mentioned that the use of passive voice in ATC communication, such as 'cleared for takeoff' reduces ambiguity by eliminating subject-agent confusion. In addition, the omission of subjective and modal verbs strengthens brevity and clarity, allowing messages to be delivered concisely in a short period of time.

e)

Pilot: Lancaster Ground, *Cherokee 8121K*, west ramp, VFR, 4,500 to Frederick with [information] Sierra.

Controller: *Cherokee 8121K*, Lancaster Ground, taxi to Runway 26.

Pilot: Taxi to Runway 26, *Cherokee 8121K*.

Ask students to analyze the sample script above by *call sign*, phonetic code, and the language features used in the text.

2) Request and Permission

C: Philippines 113 heavy, Socal Departure, radar contact. Maintain 5000, and which runway do you want?

P: 5000, fly heading 180, expect vectors back around to runway 25L. Philippines 113.

a) What are the main functions in the above text? To request and get permission by adjusting the communication.

b) This stage is for requests and permissions, in which pilots make requests for

specific actions.

c) What language features are used? Think about the reason why imperative sentences are used in ATC.

d) Ask students how to read the numbers and learn phonetic code with numbering.

e) Provide activity to complete and compare to a partner.

“Philippines 113 heavy, _____"
"Qantas 81, contact tower at _____"
"Korean Air 204, descend and maintain _____"

After completing the sentences above, students compare their responses with a partner, discussing any differences and clarifying the correct ATC phraseology together.

The activity above shows a dictogloss. It is a collaborative listening and reconstruction activity. The teacher reads or plays an ATC script at normal speed while students take notes. Then, students work in pairs or groups to reconstruct the sentences as closely as possible to the original. Dictogloss can help trainees practice structures with accuracy under the time limit, aligns with ICAO guidelines for standardized structure and comprehension.

3) Readback and Acknowledge

a) What is readback? And why is it important in ATC?

Pilots should repeat controllers’ instructions, known as readback, to instantly identify and correct any miscommunications. "The readback, or hear-back process, serves as a fundamental mechanism to detect and correct communication errors between pilots

and air traffic controllers" (Tajima, 2004, p.460).

b)

> "Departure, *confirm* it was right heading, climb 5000?"
>
> "Left heading 090, climb 5000, Philippines 113."

Which part is clarification in the above text? "*Confirm*" is for double check for request. Pilot shows the comprehension of the request by repeating it as readback.

c) Ask students to find and mark the readback and clarification (Stage 3) in [Appendix 1] text.

d) What language features can you find in this stage? Discuss with the class the importance of repetition.

e) Role-play activity in pairs to improve the ability to catch the mistake and reconstruct with correct readback. One student acts as a controller and the other student acts as a pilot. The teacher will give intended wrong instructions to the student pretending a pilot. If the pilot gives wrong readback, the ATC must promptly correct the mistake and provide the correct readback. For example:

ATC: "Maintain 5000, turn left heading 090."

Piliot: "Maintain 5000, turn right heading 090. HL123."

ATC must correct the mistake and give the correct one: "Negative, turn left heading 090. HL123."

4) Emergency Signs

a) Ask students to find the emergency sings in the [Appendix 1] text and find detailed information such as "How many passengers?", "what happened to this airplane?", "What is the request for assistance?"

b) Explain terminology and code which are used in actual situation and the

meanings in the contexts including roger, soul, FOD, stand by, and taxi.

- Stan by means wait.
- Roger refers to an approval.
- Soul refers to all living individuals, including pilots, passengers, and crew.
- Foreign Object Debris causes potential incidents.
- Taxi refers to the movement of an aircraft on the ground, before and after flight. Contrary to deceased individuals, inquiring about the quantity of 'living persons' presently.

c) Identify the call signs and discuss why?

A passenger collapsed and lost consciousness onboard.
Crash risk due to fuel shortage if landing is delayed within 10 minutes.
Full of smoke and lack of oxygen in the aircraft.
Radio malfunction.

2-3. Joint Construction

We have learned the key stages and language features used in ATC; now we can practice them by creating a scenario together in the class. The example situation is experiencing engine failure during the flight and request immediate landing. Example script will be:

- Stage 1: "Sydney Departure, Macquarie 123 heavy."
- Stage 2: "Mayday, Mayday, Mayday. Macquarie 123. We have an engine failure. Request immediate landing."
- Stage 3: "Maintain 6000, fly heading 190, expect vectors back around to runway 25L."
- Stage 4: "Do you need any further assistance?"

"We have 342 passengers and require assistance on landing."

1) Why requires the use of the term "Mayday" instead of using "Pan-Pan" in this context?

2) Why is it crucial to use repetition and standardized pharology?

2-4. Individual Construction

Make groups of three and conduct live simulation role-play. One plays a pilot, another plays a controller, and the other is an observer who gives feedback in each group. A group picks a scenario that is offered by the teacher in advance, and a student who is acting as the pilot performs emergency communication. The controller is involved in giving appropriate responses. The observer notes feedback and errors to improve.

Scenario: Korean air 123/ Location-Sydney airport 300 miles south. Requesting priority landing due to an emergency involving a passenger. Example: “PAN-PAN, PAN-PAN, PAN-PAN. Korean air 123. We have a medical emergency on board. A passenger is unconscious. Request priority landing at Sydney airport and need an ambulance standby.

3. Assessment and Feedback

The goal is to evaluate if leaners meet ATC communication skills aligned with ICAO standards and to foster improvement through repetitive feedback.

- Self-reflection
  - ① Did I use clear and appropriate language features, terms, and signals?
  - ② Was the message brief without unnecessary details?
- Peer-feedback
  - ① Were there any errors with vocabulary or expressions?
  - ② Was my interaction with the controller clear and coherent?

③ Was my speaking natural and appropriate?

4. Conclusion

ATC radio communication has demonstrated that ATC communication adheres to a firmly structured genre to guarantee safety, clarity, and efficiency. The linguistic features discussed above, including passive voice, imperative sentences, and phonetic code, play a critical role in reducing miscommunication and preventing ambiguity and confusion between pilots and controllers. Basturkmen (2010) insists that ESP courses should align with the authentic communicative needs of professionals in the field and focus on linguistic features that contribute to effective and unambiguous communication. Due to the inherent risk involved in aviation, it is crucial to provide non-native English pilots with thorough practice and training programs to guarantee precise and clear communication under time-sensitive situations.

[Appendix 1]

1	Philippines 113 heavy, wind 100 at 4, runway 25R. RVAV DCKRR, Cleared for takeoff.
2	Runway 25R, RVAV DCKRR, Cleared for takeoff, Philippines 113.
3	Philippines 113 heavy, contact Socal Departure, good day.
4	Socal Departure, Philippines 113 heavy.
5	Socal Departure, MAYDAY, MAYDAY, MAYDAY. Philippines 113. We have an engine surge on the right engine. Request immediate landing.
6	Philippines 113 heavy, Socal Departure, radar contact. Maintain 5000, and which runway do you want?
7	5000, fly heading 180, expect vectors back around to runway 25L.
8	25L, Philippines 113.
9	Departure, confirm it was right heading, climb 5000?
10	Philippines 113 heavy, again. Maintain 5000 and continue left hand turn heading 090.
11	Left heading 090, climb 5000, Philippines 113.
12	Philippines 113 heavy, say again the nature of the emergency, please?
13	We had surge on the right engine, Philippines 113.
14	We have 342… Stand by. Philippines 113.
15	Roger, and what kind of equipment are you gonna need at the runway, Philippines 113?
16	…. Right engine, Philippines 113, and.. say again?
17	Philippines 113 heavy, how many soul onboard? and do you need any emergency equipment standing by?
18	342 passengers and require assistance on landing.
19	There's no chance of FOD on 25R, is it?
20	None was reported, Ma'am.
21	Roger.
22	Most likely, it was on the upwind.
23	Roger.
24	American 181 heavy, RNAV DCKRR, runway 25R, cleared for takeoff.
25	RNAV DCKRR, 25R, cleared for takeoff, American 181 heavy.
26	128.9, Philippines 113.
27	Philippines 113 heavy, just confirm you said 13.9 fuel remaining?
28	128.7 fuel remaining, Philippines 113.

29	Sheriff 7, you know what? For about the next 3 minutes, remain outside of the area 2. Traffic 5miles east of your present position descending out of 2600, it's a heavy B777.
30	They're an emergency with an engine out, so just remain outside of the area for now, and I'll call you back.
31	Philippines 113 heavy, Los Angeles Tower. Wind 120 at 3, runway 25L, cleared to land.
32	Tower, American 225 coming up on HUNDA, 25L.
33	American 255, Los Angeles Tower, continue inbound. Caution wake turbulence, heavy B777 short final.
34	Philippines 113 heavy, say intentions.
35	Philippines 113 heavy, turn right at the end, cross runway 25R.
36	Philippines 113 heavy, do you need any further assistance?
37	Philippines 113 heavy, LA Ground. It'll be gate 418 available. Taxi left on BRAVO, hold short ALPHA-ALPHA.

[Appendix 2] Phonetic Code

[Appendix 3] Full script of ATC communication with the video

Stage	Function	Text
Stage 1: Call up	Identification and Information exchange	Philippines ***113*** heavy, wind 100 at 4, runway ***25R***. RVAV DCKRR, Cleared for takeoff.
		Runway 25R, RVAV DCKRR, Cleared for takeoff, Philippines 113.
		Philippines 113 heavy, contact Socal Departure, good day.
		Socal Departure, Philippines 113 heavy.
Stage 2: Request / Permission and ***Clearance*** ***Stage 4: Emergency sign***	Immediate alert, request for urgent assistance.	Socal Departure, MAYDAY, MAYDAY, MAYDAY. Philippines 113. We have an engine surge on the right engine. Request immediate landing.
	Safety, Sequencing, Efficiency, and Situational awareness	Philippines 113 heavy, Socal Departure, radar contact. Maintain 5000, and which runway do you want?
		5000, fly heading 180, expect vectors back around to runway 25L.
		25L, Philippines 113.
Stage 3: Acknowledgement & Readback	Verify and confirm instructions	Departure, confirm it was right heading, climb 5000?
		Philippines 113 heavy, again. Maintain 5000 and continue left hand turn heading ***090***.
		Left heading 090, climb 5000, Philippines 113.
		Philippines 113 heavy, say again the nature of the emergency, please?
		We had surge on the right engine, Philippines 113.

		We have 342… Stand by. Philippines 113.
		Roger, and what kind of equipment are you gonna need at the runway, Philippines 113?
		…. Right engine, Philippines 113, and.. say again?
		Philippines 113 heavy, how many soul onboard? and do you need any emergency equipment standing by?
		342 passengers and require assistance on landing.
		There's no chance of FOD on 25R, is it?
		None was reported, Ma'am.
		Roger
		Most likely, it was on the upwind.
		Roger.
Stage 1: Call up		American 181 heavy, RNAV DCKRR, runway 25R, cleared for takeoff.
Stage 2: Request / Permission		RNAV DCKRR, 25R, cleared for takeoff, American 181 heavy.
Stage 3: Acknowledgement & Readback		128.9, Philippines 113.
		Philippines 113 heavy, just confirm you said 13.9 fuel remaining?
		128.7 fuel remaining, Philippines 113.
Stage 2: Request / Permission		Sheriff 7, *you know what*? For about the next 3 minutes, remain outside of the area 2. Traffic 5miles east of your present position descending out of 2600, it's a heavy B777.
		They're an emergency with an engine out, so just remain outside of the area for now, and I'll call you back.
Stage 2: Request / Permission		Philippines 113 heavy, Los Angeles Tower. Wind 120 at 3, runway 25L, cleared to land.
		Tower, American 225 coming up on HUNDA, 25L.

		American 255, Los Angeles Tower, continue inbound. Caution wake turbulence, heavy B777 short final.
Stage 3 **or possibly** ***Stage 4***		Philippines 113 heavy, say intentions.
Stage 2		Philippines 113 heavy, turn right at the end, cross runway 25R.
Stage 4		Philippines 113 heavy, do you need any further assistance?
Stage 2		Philippines 113 heavy, LA Ground. It'll be gate 418 available. Taxi left on ***BRAVO***, hold short ***ALPHA***-***ALPHA***.

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