

The Impact of Radiotelephony Practice on Developing Communication Skills in Aviation for Initial Student Pilots

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Abstract

This study examines the impact of radiotelephony practice on the speaking and listening skills of initial student pilots at the Lombok Institute of Flight Technology, emphasizing its role in developing essential communication competencies. Employing a pre-experimental design with pretest and posttest assessments, the research involved a sample of seven students. Standardized speaking and listening tests were used to collect data, which was analyzed using the paired T-test in SPSS software. The results demonstrated significant improvements in both speaking and listening skills, with T-test scores confirming statistical significance ($p < 0.05$). Speaking scores improved notably, with four students achieving fair scores and three attaining good scores in the posttest, compared to predominantly poor scores in the pretest. Listening skills also improved by an average of 20 points, although they remained within the poor classification, highlighting a critical area for further intervention. This study's focus on initial student pilots offers a novel perspective, showcasing the potential of targeted radiotelephony practice in building foundational communication skills necessary for professional aviation roles. The findings underscore the need for continued practice and tailored strategies to address listening skill gaps, ensuring comprehensive communication proficiency for aspiring pilots.

Keywords: Speaking Skills: Listening Skills: Radiotelephony

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Introduction

Effective communication in aviation is crucial for ensuring safety and operational efficiency. According to the International Civil Aviation Organization (ICAO), communication errors account for approximately 70% of aviation incidents, underlining the importance of clear and precise communication between pilots and air traffic controllers (ICAO, 2019). At the Lombok Institute of Flight Technology (LIFT), the training of student pilots involves not only developing technical proficiency but also mastering effective communication skills, particularly in radiotelephony. However, challenges persist, especially in the speaking and listening abilities of initial student pilots, which hinder their progress in mastering aviation communication. This study seeks to investigate the impact of radiotelephony practice on improving these essential communication skills among LIFT students.

Previous studies have addressed various aspects of communication in aviation, particularly focusing on operational outcomes and safety. However, research on the specific communication challenges faced by initial student pilots remains sparse. Studies by Kanki et al. (2019) and Kim (2023) emphasize that non-native English speakers and early-stage pilots often struggle with the rapid pace and specific terminology used in radiotelephony communication. These challenges are compounded by cultural factors, such as fear of making mistakes, which lead to reluctance in speaking, as well as difficulties in understanding rapid, jargon-heavy instructions from air traffic control. Notably, Kurniawati (2023) highlighted that students often struggle with pronunciation and comprehension during their initial training, which significantly impacts their overall

performance. Unlike previous studies, which primarily focus on established pilots or air traffic control efficiency, this study contributes to the literature by examining how targeted radiotelephony practice can address these specific challenges faced by student pilots.

The research at LIFT identifies two critical problems in speaking and listening skills among initial student pilots. First, students exhibit reluctance to speak due to fear of making errors, compounded by a culture that discourages mistakes rather than viewing them as opportunities for learning. Secondly, students often find it difficult to understand English instructions and engage in listening conversations, particularly under pressure. These challenges are especially significant for student pilots in the early stages of training when clear communication with air traffic controllers is essential for flight safety. This study's focus on the initial phase of pilot training is a unique contribution, as most research on aviation communication has concentrated on more advanced stages or the broader context of air traffic control efficiency (Wilson, 2019; Wei & Wiles, 2020).

To address these challenges, the research proposes the implementation of structured radiotelephony training for speaking and listening skills. Students will first receive foundational instruction in aviation phraseology and communication protocols. These sessions will emphasize clarity and pronunciation, with a focus on building confidence in verbal communication. Role-playing exercises, based on real-world aviation scenarios, will be introduced to allow students to practice in a safe environment and gain practical experience. For listening skills, the study will introduce modules that progressively expose students to more complex instructions, using recorded air traffic communication to simulate real-life listening scenarios. These exercises will gradually increase in complexity, incorporating diverse accents and different speech rates, in line with the findings of Clark and Williams (2020), who emphasized the importance of familiarizing pilots with various accents and speaking speeds to improve their comprehension in real-world situations.

The novelty of this study lies in its focus on initial student pilots, addressing the specific communication difficulties they face during their early training. While previous studies like those by Borowska (2018) and Reznitskaya et al. (2019) focus on general aviation communication, this study uniquely targets the foundational stages of pilot training. It aims to bridge the gap in existing literature by providing practical, evidence-based interventions that specifically cater to the developmental needs of novice pilots. The study's findings will offer insights into how structured radiotelephony practice can be used to overcome these barriers, improving both speaking and listening skills in a way that aligns with the ICAO's language proficiency standards for pilots.

In conclusion, this research at LIFT aims to explore the influence of radiotelephony practice on the speaking and listening skills of initial student pilots. By identifying and addressing the specific challenges faced by students through structured interventions, the study intends to empower students with the communication skills necessary for effective and safe aviation practices. Furthermore, it contributes to the ongoing discussion of enhancing pilot training through targeted, evidence-based practices that prioritize clear, effective communication in aviation.

Literature Review

Importance of Speaking and Listening Skills in Pilot Training

Speaking and listening skills are critical components of pilot training, especially for initial student pilots. Radiotelephony, the standardized communication method in aviation, relies heavily on clear, concise, and accurate verbal exchanges to ensure safety and efficiency (International Civil Aviation Organization [ICAO], 2019). Effective

communication reduces misunderstandings between pilots and air traffic controllers, which are often cited as contributing factors in aviation incidents (Kanki et al., 2019). Listening skills, meanwhile, are equally vital for pilots to comprehend instructions, process critical information, and respond appropriately in high-pressure environments (Mathews et al., 2021).

Radiotelephony as a Communication Tool

Radiotelephony training exposes student pilots to the specific language, format, and procedures used in aviation communication. Research by Cardosi and Murphy (2020) emphasizes the structured nature of radiotelephony, where pilots must adhere to phraseology standards and operational protocols. This structured communication style not only improves clarity but also helps develop students' linguistic precision and confidence. Studies have shown that regular practice in radiotelephony increases students' familiarity with aviation-specific terminology and reduces response times, which are essential for effective decision-making in dynamic situations (Borowska, 2021).

Impact on Speaking Skills

The structured nature of radiotelephony provides student pilots with an excellent platform to develop their speaking skills. According to Borowska (2021), practicing standard aviation phraseology enhances fluency, reduces hesitation, and minimizes language-related errors. This is particularly beneficial for non-native English-speaking pilots, who often face challenges in mastering aviation English. Radiotelephony practice helps students internalize correct phraseology, improving their ability to deliver concise and accurate messages under time constraints. ICAO's (2019) emphasis on language proficiency underscores the significance of these speaking skills, particularly in ensuring seamless communication in international airspace.

Impact on Listening Skills

Listening skills are equally developed through radiotelephony practice, as student pilots must accurately interpret complex instructions delivered in real-time. Research by Kanki et al. (2019) highlights the cognitive demands placed on pilots during radio communication, where they must process auditory information, identify key details, and respond accordingly. Studies indicate that radiotelephony training improves auditory processing abilities, enabling students to distinguish critical messages from background noise (Mathews et al., 2021). Additionally, exposure to diverse accents and varying speech rates in radiotelephony practice prepares student pilots for real-world scenarios, enhancing their adaptability and situational awareness.

Integration of Technology in Radiotelephony Training

Advances in simulation technology have significantly enhanced the effectiveness of radiotelephony training. Virtual reality (VR) and flight simulation tools provide immersive environments where students can practice realistic communication scenarios without the risks associated with actual flight operations (Jou & Wu, 2020). These tools offer opportunities for repeated practice, feedback, and exposure to diverse situations, enabling students to refine both speaking and listening skills. For instance, voice recognition technology integrated into simulators can evaluate students' adherence to standard phraseology and provide corrective feedback, further accelerating their skill development (Smith & Lane, 2021).

Methodology

This study employed a pre-experimental design with a pretest-posttest approach to investigate the impact of radiotelephony practice on enhancing speaking and listening skills among initial student pilots at the Lombok Institute of Flight Technology (LIFT). Seven male students from the eighteenth batch of LIFT were selected through purposive sampling, ensuring relevance to the study by choosing students who were at the beginning stages of their flight training. This approach allowed for a targeted examination of the specific challenges faced by novice pilots in radiotelephony communication. The participants were selected based on their enrollment in the course and their availability for the duration of the study, ensuring that they were actively engaging in training and could benefit from the intervention.

The study utilized two instruments to measure performance: a speaking test, which focused on clarity, grammar, vocabulary, fluency, and comprehension in aviation-specific contexts, and a listening test, which evaluated students' ability to comprehend air traffic control communications and aviation dialogues. The study consisted of six sessions: a pretest to establish baseline skills, four radiotelephony-based instructional sessions incorporating role-playing and listening exercises, and a posttest to measure improvement in speaking and listening skills. The instructional sessions focused on introducing aviation phraseology, simulating real-world communication scenarios, and practicing pronunciation and comprehension in a structured format.

Data were analyzed using paired sample t-tests to determine the statistical significance of differences between pretest and posttest scores, with normality tests conducted to ensure the validity of the results. Ethical considerations were rigorously followed throughout the study. Participants provided informed consent, agreeing to take part in the study and understanding the purpose of the research, the methods involved, and their right to confidentiality. All personal data were anonymized, and participants were assured that their information would be kept confidential and used solely for research purposes. This methodology provided a systematic approach to examining the effectiveness of radiotelephony practice in developing essential communication skills for student pilots, while ensuring that ethical standards were maintained throughout the research process.

Result

The Students' Listening Skill

After undergoing radiotelephony practice, the students were given a 23-item listening test. The results, shown in Table 1, illustrate the shift in scores from the pretest to the posttest. Initially, all students scored in the "very poor" category in the pretest, with 100% of the students falling into this range. However, following the radiotelephony intervention, all students improved to the "poor" category, with 100% in this range. Although there was an improvement, it still reflects a lower classification of listening skills.

Table 1. *The Students Listening Score in Pretest and Posttest*

No	Classification	Range	Pretest		Posttest	
			F	P	F	P
1	Very Good	90-100	0	0	0	0
2	Good	70-89	0	0	0	0
3	Fair	50-69	0	0	0	0
4	Poor	30-49	0	0	7	100
5	Very Poor	10-29	7	100	0	0
Total			7	100	7	100

The analysis of the students' mean scores for the listening test shows a notable improvement. Table 2 illustrates that the mean score in the pretest was 19.57, with a standard deviation of 5.473. The posttest mean score increased to 44, with a standard deviation of 5.323, showing an average improvement of 24.43 points.

Table 2. *The Students Listening Mean Score*

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	19.57	7	5.473	2.069
	Posttest	44.00	7	5.323	2.012

The statistical analysis, as shown in Table 3, confirms that the difference between pretest and posttest scores is significant, with a p-value of 0.000, which is smaller than the alpha value of 0.05. This indicates that the radiotelephony practice significantly improved the listening skills of the students.

Table 3. *The Listening Skill T-test*

	Paired Differences				t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference			
				Lower Upper			
Pair 1 Pretest - Posttest	-24.429	5.798	2.192	-29.791 -19.066	-11.147	6	.000

While the improvement in listening skills is statistically significant, it is important to note that the posttest results still fall under the "poor" classification, indicating that further improvements are needed. The improvement in listening comprehension, although meaningful, highlights a need for additional interventions to reach higher proficiency levels.

The Students' Speaking Skill

The impact of radiotelephony practice was also assessed in terms of students' speaking skills. Table 4 presents the distribution of student scores in both the pretest and posttest. In the pretest, 72% of students scored "poor," 14% scored "fair," and another 14% scored "good." In contrast, in the posttest, no students were classified as "poor." The majority, 57%, scored "fair," and 43% achieved "good" scores, demonstrating substantial improvement after the intervention.

Table 4. *The Students Speaking Score in Pretest and Posttest*

No	Classification	Range	Pretest		Posttest	
			F	P	F	P
1	Very Good	90-100	0	0	0	0
2	Good	70-89	1	14	3	43
3	Fair	50-69	1	14	4	57
4	Poor	30-49	5	72	0	0
5	Very Poor	10-29	0	0	0	0
Total			7	100	7	100

In terms of mean scores, Table 5 shows that the pretest mean score was 49.14, with a standard deviation of 14.736. The posttest mean score increased to 69.14, with a standard deviation of 8.552, indicating an improvement of 20 points.

Table 5. *The Students Speaking Skills Mean Score*

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	49.14	7	14.736	5.570
	Posttest	69.14	7	8.552	3.232

The statistical analysis of the speaking scores, shown in Table 6, reveals a significant difference between the pretest and posttest results. The paired sample t-test yielded a p-value of 0.023, which is below the threshold of 0.05, indicating a statistically significant improvement in speaking skills.

Table 6. *The Speaking Skill T-test*

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pretest - Posttest	-20.000	17.436	6.590	-36.125	-3.875	-3.035	6	.023

Upon reviewing the data, no significant outliers were observed in the listening or speaking score distributions. The results showed a consistent pattern of improvement across all participants. However, it is important to note that the improvement in listening skills was not as pronounced as that in speaking skills, which may indicate that further focus on listening comprehension is required in future training sessions.

Discussion

This study, conducted at the Lombok Institute of Flight Technology (LIFT), explored the impact of radiotelephony practice on the speaking and listening abilities of initial pilot trainees. Using a pretest-posttest approach and statistical analysis with a paired sample t-test, the study demonstrated significant improvements in both speaking and listening skills, with p-values below the 0.05 threshold. However, while improvements in speaking were evident, listening scores remained comparatively low. The students' listening scores improved from "very poor" in the pretest to "poor" in the posttest, which indicates progress but falls short of the expected "good" or "very good" proficiency levels. Despite a 20-point average improvement in listening scores, the outcome suggests that further instructional methods or additional interventions are necessary to reach the desired level of proficiency in listening skills.

The students' speaking skills exhibited more considerable progress. In the pretest, a majority of the students were categorized as "poor," with only a few achieving "fair" or "good" scores. By the posttest, there was a notable shift, with four students moving into the "fair" category and three achieving "good" scores. This significant improvement in speaking skills highlights the positive impact of radiotelephony practice, demonstrating how repeated exposure to aviation-specific communication practices enhances students'

fluency, vocabulary, and confidence. These findings corroborate those from other studies in aviation communication, such as Kurniawati (2023) and Wei & Wiles (2020), which emphasized the benefits of targeted language interventions for novice pilots.

The findings from this study can provide valuable insights into enhancing aviation training programs, especially for pilot students at the initial stage of their training. The results show that while speaking skills were successfully improved, listening skills remained a significant challenge. Listening skills are crucial for ensuring clear communication between pilots and air traffic controllers, particularly in real-time, high-pressure situations. As noted by Kanki et al. (2019), the ability to process and understand rapid, jargon-heavy communication is essential for aviation professionals. Therefore, it is critical to continue refining the curriculum to focus on listening comprehension, possibly through more targeted listening exercises or technology-supported simulation environments that expose students to various accents, speech rates, and communication contexts.

In addition to enhancing pilot training, the findings from this study have broader implications for training air traffic controllers (ATCs) and other aviation professionals. Air traffic controllers, like pilots, face high demands in terms of both speaking and listening skills, particularly in environments that require the quick exchange of information under stressful conditions. According to Clark and Williams (2020), improving listening comprehension and communication efficiency for ATCs can be achieved through targeted training programs similar to those employed in this study. Future research should explore the use of radiotelephony practice in the training of ATCs and other aviation professionals to create more comprehensive communication skills training programs that can benefit the entire aviation industry.

While the study successfully highlights the impact of radiotelephony practice, there are limitations to the findings that need to be addressed in future research. One key limitation is the small sample size, which restricts the generalizability of the findings to a broader population. The study's sample of only seven students may not fully capture the variability in performance across a larger group of initial pilot trainees. Additionally, future studies could consider expanding the intervention period to assess long-term effects on both speaking and listening skills, as language proficiency development in aviation communication may require sustained practice over time. As suggested by Borowska (2018), integrating radiotelephony practice over a more extended period, alongside other communication exercises, may yield more significant results. Moreover, future research could investigate how additional interventions, such as using speech recognition technology or incorporating peer feedback, could further enhance students' communication skills in aviation contexts.

Furthermore, it would be valuable to explore whether differences in student characteristics, such as their prior exposure to aviation-related language or their English language proficiency, influence the effectiveness of radiotelephony practice. As suggested by Kim (2023), understanding the relationship between individual learner characteristics and the outcomes of communication training can help tailor interventions to better meet the needs of different students. In addition, future studies could involve larger and more diverse participant pools to examine the impact of radiotelephony practice on various groups of aviation trainees, including students from non-English-speaking backgrounds or those in different aviation training programs.

In conclusion, this study demonstrates that radiotelephony practice significantly enhances the speaking and listening skills of initial pilot students at LIFT, with particularly notable improvements in speaking. However, the listening skills of the students still need further development, as indicated by their low posttest scores. To address this, future

interventions should focus on providing more advanced listening practice, using varied communication scenarios, and implementing additional support for students' listening comprehension. The study's findings contribute to the broader discourse on improving aviation communication training and highlight the need for further research to refine training methods for both pilot students and other aviation professionals. By incorporating these findings into curriculum development and training programs, aviation training institutions like LIFT can enhance their effectiveness in producing skilled communicators capable of performing safely and efficiently in high-stakes environments.

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