

T.C.
BAHCESEHIR UNIVERSITY
GRADUATE SCHOOL OF EDUCATION
THE DEPARTMENT OF AVIATION MANAGEMENT

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**BREAKING COMMUNICATION BARRIERS FOR A SAFER SKY: A
SAFETY-FOCUSED INVESTIGATION INTO CHALLENGES AND
PERCEPTIONS OF AVIATION ENGLISH COMPETENCY AMONG
AB- INITIO PILOTS IN TURKEY**

MASTER'S THESIS

PETEK ŞİRİN

BAU 2023

ISTANBUL 2023

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

BREAKING COMMUNICATION BARRIERS FOR A SAFER SKY: A SAFETY- FOCUSED INVESTIGATION INTO CHALLENGES AND PERCEPTIONS OF AVIATION ENGLISH COMPETENCY AMONG AB- INITIO PILOTS IN TURKEY

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The linguistic, communicative, and interactional competence of ab-initio pilots in Aviation English presents a critical concern in the aviation industry, necessitating comprehensive research to delve into the underlying issues, causes, and effects. This study focuses on the competency of ab-initio pilots in Aviation English at a Turkish foundation university, employing a mixed-methods sequential explanatory design. Findings from the adapted 'Competency in Aviation English' questionnaire, with responses from 90 student pilots, and focus group interviews, involving 45 participants, reveal significant concerns, particularly in speaking and listening skills, with a substantial number falling below the B2 level. The study identifies potential gaps in proficiency exams, emphasizing the need for a more comprehensive assessment of speaking skills and a reevaluation of the curriculum. Participants highlight challenges in maintaining fluent speech during emergency situations, understanding different accents, and coping with workload and noise. Root causes include language proficiency, cultural factors, fear of making mistakes, teaching style, and lack of practice materials. Negative consequences encompass stress, impaired flight performance, and safety concerns. The study calls for tailored pedagogical approaches, suggesting improvements in proficiency exams, custom programs for ab-initio pilots, and better alignment of flight and language training. Emphasis on realistic fluency goals, stress management, and technology integration is crucial for effective

training. From a safety management perspective, strategic investments, standardized admission protocols and SMS trainings, stress management, and continuous program updates are underscored as vital for maintaining safety standards in the aviation industry.

Key Words: Aviation English, Ab-Initio Pilots, Pilot Training, Safety Management



ÖZ

DAHA GÜVENLİ BİR GÖKYÜZÜ İÇİN İLETİŞİM ENGELLERİNİ KALDIRMA: TÜRKİYE'DEKİ ÖĞRENCİ PİLOTLAR ARASINDA HAVACILIK İNGİLİZCESİ YETKİNLİĞİNE DAİR ZORLUKLAR VE ALGILARINA YÖNELİK EMNİYET ODAKLI BİR ARAŞTIRMA

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Havacılık endüstrisinde, öğrenci pilotların Havacılık İngilizcesindeki dil, iletişim ve etkileşim yetkinliği önemli bir husustur ve bu konuda derinlemesine araştırma yapılmasını gerektirmektedir. Bu çalışma, Türkiye'deki bir vakıf üniversitesinde öğrenci pilotların Havacılık İngilizcesindeki yetkinliklerine odaklanarak, karma yöntemlerle gerçekleştirilen bir araştırmayı içermektedir. 90 öğrenci pilotun yanıtladığı başka bir çalışmadan uyarlanmış 'Havacılık İngilizcesi Yetkinliği' anketinden ve 45 katılımcının yer aldığı odak grup görüşmelerinden elde edilen bulgular, özellikle konuşma ve dinleme becerilerinde önemli endişeleri ortaya koymaktadır ve bu konuda B2 seviyesinin altında kalan büyük bir öğrenci sayısını göstermektedir. Çalışma, konuşma becerilerinin daha kapsamlı bir şekilde değerlendirilmesi ve müfredatın gözden geçirilmesi ihtiyacını vurgulayarak dil becerisi sınavlarında potansiyel problemleri ortaya koymaktadır. Katılımcılar, acil durumlarda akıcı konuşmayı sürdürme, farklı aksanları anlama, iş yükü ve gürültü ile başa çıkma konularında zorlukları vurgulamaktadır. Bu problemlerin kök nedenleri yetersiz dil yetkinliği, kültürel faktörler, hata yapma korkusu, öğretim tarzı ve pratik materyal eksikliği olarak belirlenmiştir. Olumsuz sonuçlar arasında stres, düşük uçuş performansı ve güvenlik endişeleri bulunmaktadır. Çalışma, öğrenci pilotlar için özel programlar, dil eğitimi ve uçuş eğitiminin daha iyi bir şekilde uyumlanması konularında pedagojik yaklaşımların geliştirilmesini önermektedir. Etkili eğitim için

gerçekçi akıcılık hedeflerine, stres yönetimine ve teknoloji entegrasyonuna vurgu yapmaktadır. Güvenlik yönetimi açısından, havacılık endüstrisinde güvenlik standartlarını sürdürmek için stratejik yatırımlar, standartlaştırılmış kabul protokolleri ve emniyet eğitimleri, stres yönetimi ve sürekli program güncellemeleri vurgulanmaktadır.

Anahtar Kelimeler: Havacılık İngilizcesi, Öğrenci Pilotlar, Pilot Eğitimi, Havacılıkta Emniyet Yönetimi





To My Mother and All Baby Pilots....

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“Let's make sure our ideas of success are our own, that we are truly the authors of our own ambitions.”

Alain de Botton

Embarking on this academic journey has brought me to the crossroads of curiosity and knowledge, clutching a thesis that represents not just the result of tireless research but also a testament to the support and inspiration that have fueled this journey.

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LIST OF ABBREVIATIONS

ATC	Air Traffic Controller
ATPL	Airline Transport Pilot License
CEF	Common European Framework
DGCA	Directorate General of Civil Aviation
EASA	European Union Aviation Safety Agency
ECAC	European Civil Aviation Conference
ESP	English for Specific Purposes
FAA	Federal Aviation Administration
ICAO	International Civil Aviation Organization
L1	Language First
L2	Language Second
LPR	Language Proficiency Requirements
PPL	Private Pilot License
SMM	Safety Management Manual
SMS	Safety Management Systems

Chapter 1

Introduction

This chapter serves as an introduction, providing the background of the study titled “Breaking Communication Barriers for a Safer Sky: A Safety-Focused Investigation into Challenges and Perceptions of Aviation English Competency among Ab-Initio Pilots in Turkey”. It begins by presenting the background of the study and the problem statement, followed by a clear statement of the study's purpose and its significance. Additionally, this chapter outlines the assumptions made, acknowledges the limitations of the study, and provides operational definitions of key terms for clarity.

1.1 Background of the Study

Although “Aviate, Navigate, Communicate” is an essential mantra that pilots need to bear in mind, the unpleasant truth is communication errors continue to remain a big threat to aviation safety. In addition to the quality of the audio signal and accent of pilot or air traffic controller, the operator's lack of English language proficiency and failure to adhere to standard phraseology are commonly thought to contribute to communication errors (Molesworth and Estival, 2015).

Among the 508 case studies available on the National Transportation Safety Board's database regarding airplane crashes, it was discovered that 49 accidents were partially attributed to various forms of miscommunication. This suggests that approximately 10% of commercial aviation incidents involve critical miscommunication, which plays a contributing role in the accident's outcome (Hillis,2019). International Civil Aviation Organisation (ICAO)’s Safety Report (2022) presents a relatively more optimistic picture. According to this report, from 2017 to 2021, there was a noticeable downward trend in the annual number of accidents. The highest recorded count during this period was in 2019, with a total of 114 accidents. Yet, in both 2020 and 2021, the number of accidents decreased significantly. It is noteworthy to consider that these two years saw a substantial reduction in passenger traffic and flights due to COVID-19. Among the accidents reported with no fatalities, there was only one accident resulting from runway incursion due to miscommunication and it accounted for 2.1 percent of the total

number of accidents. Nevertheless, it is of significance to indicate that communication-induced issues in aviation are still causing trouble and stress in operations and there is room for improvement.

Acknowledging the crucial importance of linguistic skills in aviation and the potential effects on both pilots and operational aspects, ICAO took significant measures to enhance safety and introduced a new standard in 2003. The new requirement, which was placed at the forefront of safety precautions, was put into practice in 2008. With this change, all pilots are mandated to possess a minimum Level 4 (Operational Level) of English Language Proficiency. As outlined in the ICAO Language Proficiency Rating Scale, all aviators must adhere to language requirements in six different areas encompassing pronunciation, vocabulary, fluency, comprehension, interactions, and structure (ICAO, 2006).

1.2 Statement of the Problem

The linguistic, communicative, and interactional competence of ab-initio pilots in Aviation English is a critical issue that requires thorough research to understand the underlying issues, causes, and effects. While effective communication in English is paramount in the aviation industry, there is a lack of comprehensive research focusing on the specific challenges faced by ab-initio pilots during their training and the implications of this issue on their performance and safety. Although the number of accidents and incidents due to miscommunication and poor language proficiency is rather high, the amount of empirical research focusing on Aviation English and ab-initio pilot training is surprisingly meager. There are studies (Roberts and Orr, 2020; Bieswanger, Prado and Roberts, 2020) shedding light on how language education should be for ab-initio flight training and the design of Aviation English courses for ab-initio pilots. Additionally, there is another study (Treadaway,2021) which focuses on developing a valid diagnostic language test for ab-initio pilots prior to starting their flight programs. In Turkey, there is one important study (Demirdoken,2019) examining the needs of Aviation English learners at tertiary level and another one (Dinçer and Demirdöken,2023) analysing ab-initio pilots' perspectives regarding the integration of simulation in the Aviation English course. Yet, there is not a study specifically focusing on the competency of ab-initio pilots in Aviation English, the issues they have and the causes and the consequences of the potential problems from

a safety-centric point of view in literature. Given the paramount importance of effective English communication within the aviation realm, it is essential to have a 360° look at the matter starting with the causes and effects of the language competency related issues in Aviation English and how student pilots perceive their language competency in this area.

1.3 Purpose of the Study

The initial purpose of this research is to examine the state of ab-initio pilots' competency in Aviation English at a Turkish foundation university, with the aim of shedding light onto the existing issues, root causes and their wide-ranging effects. This study also seeks to contribute to the improvement of safety standards and safety management in the aviation industry by gaining insights into these factors. These crucial insights to be gained through this study can generate new strategies to enhance the Aviation English training program for ab-initio pilots at the Turkish foundation university. Through a detailed investigation of these aspects, the study also aims to contribute to the improvement of ab-initio pilots' linguistic, communicative, and interactional competence by fostering more effective communication practices and ultimately leading to safer and more efficient operations within aviation industry.

In line with the aims of the study, the researcher explores the following research questions and pursues answers that cater to the aforementioned goals.

Q1. What are the perceptions of ab-initio pilots at a foundation university in Turkey towards their competency in Aviation English?

Q2. What are the issues ab-initio pilots at a foundation university in Turkey have in Aviation English?

Q3. What do the ab-initio pilots at a foundation university in Turkey think about the causes and effects of the issues they have in Aviation English?

1.4 Significance of the Study

To date, a limited number of researchers (Cushing,1997; Alderson,2009; Cookson,2009; Estival &Molesworth,2012; Aiguo, 2008; Molesworth and Estival,2014; Roberts and Orr, 2020; Kim & Elder, 2009; Kay, 2009; Seiler,2009; Bieswanger, Prado and Roberts, 2020; Demirdoken,2019;) have investigated certain facets of Aviation English. Given the scarcity of studies focusing on ab-initio pilots,

this research possesses importance as it is the first study to pave the way for understanding ab-initio pilots' perceptions about their competency in Aviation English, issues they have and additionally the causes and effects of these potential issues. Accordingly, this research can offer enlightenment to both academia and the aviation industry in different respects. Initially, it can serve a solid foundation to facilitate better learning programs, curriculum enhancements and instructional approaches in training institutions to address the communication related issues more effectively. Additionally, having a better understanding of the underlying causes that contribute to the inadequate proficiency of ab-initio pilots in Aviation English can trigger the implementation of strategies to mitigate language-related barriers and enhance pilots' communication skills and take preventative measures accordingly. Last but not least, the awareness gained through the results of this research can prompt educational institutions and regulatory bodies to allocate more resources towards improving Aviation English training programs.

1.5 Assumptions

The current investigation has been undertaken at a foundation university in Istanbul, Turkey, in strict accordance with the defined research objectives and inquiries. Initially, it is essential to emphasize that all research participants willingly chose to take part in this study after being informed about the goals and direction of this research in a detailed way. It is presumed that all research participants possessed a comprehensive understanding of the scale and interview questions in the focus group meetings and responded candidly and transparently. An additional supposition in this study is that all data collection instruments underwent meticulous pre-analysis to ensure their validity and reliability, thus yielding precise and dependable outcomes.

1.6 Limitations

There exist certain limitations in this study. The scope of this research encompasses 90 ab-initio pilots enrolled in a foundation university in Istanbul, Turkey. The size of the population is good enough to reach conclusions within the given context. Nevertheless, the sample size is relatively small considering the number of all ab-initio pilots in Turkey. Additionally, the study also focuses on qualitative research methods, despite employing a mixed methods approach. Taking these factors into

consideration, the generalizability of the findings is limited. As per Smith et al. (2009), qualitative research is best interpreted through theoretical judgments rather than broad generalizations. Therefore, the research findings cannot be universally applied due to the limited number of participants and the qualitative aspect in the nature of the thesis.

The second limitation pertains to the potential influence of the researcher's close relationship as the participants' only Aviation English instructor. This proximity may have influenced their responses during focus group meetings, potentially leading to responses which they assume the researcher wanted to hear. Moreover, it is recommended that future studies replicate the research throughout the learning process and upon its conclusion. This would provide a more comprehensive understanding of the learning environment and target goals, facilitating the implementation of necessary improvements for the benefit of learners. Thus, the researcher suggests conducting longitudinal studies in this field with a broader range of participants for further investigation.

1.7 Operational Definitions

Competence is the ability to do something well (Longman Dictionary, n.d). In the context of language, it is related an individual's overall proficiency and success in a particular language.

Linguistic competence is a term to characterize how language is delineated within a specific community of speakers. It pertains to the mastery of the combination of sounds, syntax, and semantics known as the grammar of a language. Individuals possessing linguistic competence have acquired the proficiency to utilize the grammar of their spoken language proficiently (Thornbury,2006).

Communicative competency refers to the capability to engage in effective social interactions by employing appropriate linguistic structures and sociolinguistic rules. It requires the active involvement of individuals in expressing themselves using the target language (Canale and Swain, 1980).

Interactional competence is the capability of users to collaboratively share responsibilities for communication across all participants (Kim and Elder,2009).

Ab-initio pilot refers to an individual who is undergoing initial flight training and is in the early stages of their pilot career. They are typically enrolled in a flight training program or flight school and are acquiring the fundamental skills, knowledge, and

experience required to become a qualified pilot The term "ab-initio" is derived from Latin and translates to "from the beginning" (Oxford Learner's Dictionaries, n.d) indicating that these individuals are starting their pilot training from the very beginning without any prior flight experience.

1.8 Outline of the Study

A concise overview of the subsequent chapters is highlighted below:

Chapter Two, Literature Review reviews relevant literature of competency in Aviation English as well as an exploration of the causes and effects associated with inadequate communicative competence in aviation in accordance with the purposes of this dissertation.

Chapter Three, Methodology, outlines the research approach by presenting the contextual background, the participants involved, the methods employed for data collection, and ultimately delineating the procedures utilized for data collection and analysis.

Chapter Four, Findings, shows the major findings obtained from the various data collection methods employed in this research. Furthermore, the findings are analysed and discussed in connection with the current literature in this particular domain.

Chapter Five, Conclusion, encapsulates the key points and provides a summary of the study. Additionally, it offers recommendations for further research endeavours.

Chapter 2

Literature Review

This chapter is divided into six distinct sections. In the initial section, the importance of safety management systems, safety culture, implementation of safety management systems into flight training and the role effective communication in aviation safety management are presented. In the second section, an in-depth exploration of Aviation English is undertaken, with a particular emphasis on standard phraseology, plain English. The third section introduces international standards and regulations by referring to ICAO Doc 9835, ICAO Language Proficiency Requirements, and how the proficiency guidelines established by the Turkish Directorate General of Civil Aviation are in line with these standards and regulations. Moving on to the fourth section, Aviation English competencies are assessed, covering linguistic competence, communicative competence, and interactional competence. The fifth section involves an analysis of the factors influencing competence in Aviation English, where various elements affected by proficiency are considered. In the final section of this chapter, the consequences of poor competence in Aviation English are examined, shedding light on the effects stemming from a deficiency in proficiency within this critical domain.

2.1 The Importance of Safety Management Systems (SMS) and Safety Culture

Safety is commonly defined as the state of being "secure" and the state of being shielded from harm or other undesirable outcomes (Blištanová, Kešelová, & Brůnová,2021). Aurino (2000) defines safety as a mindset adding that while formal structures and protocols play a role, the foundation of safety lies primarily in attitudes. From a corporate standpoint, safety entails the absence of accidents. The paramount responsibility of safety management is the prevention of accidents, given that accidents not only result in financial losses but also damage the company's reputation. To attain this clear-cut objective, safety measures are employed to avert accidents, encompassing safety equipment, devices, and various behavioural activities (Li and Guldenmund,2018). Thus, managing safety in a fruitful fashion involves a comprehensive endeavour, requiring an organization to define safety requirements and establish a solid framework (Strutt et al., 2006). At this juncture, Aurino (2020)

indicates a critical issue noting that even though safety is a shared value, determining what is an acceptable risk is subjective and varies across cultures and organizations. Since safety is influenced by cultural beliefs, and cannot be universally measured, it is of importance to understand how safety aligns with the cultural values of the group involve before pursuing safety initiatives.

In differentiating safety from safety management, the former pertains to a state or condition, while the latter involves a process or a sequence of specific activities (Li and Guldenmund,2018). Implementing a safety management system (SMS) is a successful approach to attaining safety (Blištanová et. al.,2021). Federal Aviation Administration (FAA) (2015) defines it as a holistic strategy for safety management which encompasses a safety policy, established procedures for recognizing and reducing hazards, and the cultivation of a favourable safety culture. In a similar way, Piric et.al (2019) specifies it as a structured set of specifications that help organizations comprehend safety principles, which enables them to construct a management framework tailored to achieve the specific safety outcomes. Li and Guldenmund (2018) present a simpler definition indicating that SMS can function either as a system for overseeing and controlling safety or as a management system specifically focused on ensuring safety. Through the identification of potential dangers, the management and analysis of data at hand, and the continuous assessment of safety risks, it strives to monitor and mitigate threats in advance of their manifestation in aviation accidents and incidents (Friend & Friend, 2015).



Figure 1. FAA (2021) The four SMS components.

As clearly seen in Figure 1, the initial significant element is the safety policy, where the upper echelon of an organization is required to formally record policies

outlining how safety objectives will be realized. This involves specifying the responsibilities of each member within the organization and establishing individual accountability for fulfilling these roles. The accountability policy should encompass the highest leadership within the organization and delineate their responsibilities in ensuring safety and adherence to SMS policies (Stolzer et al., 2015). The subsequent crucial component is safety risk management, which involves a risk management system that recognizes, evaluates, regulates, and oversees safety risks to ensure their proper resolution. This system must guarantee the diligent identification and timely response to safety risks (Stolzer et al., 2015). The third vital component is the safety assurance system, which offers proactive monitoring and systemic enhancement for the SMS. This is accomplished by employing quality assurance tools and methods to guarantee the realization of SMS objectives. In essence, it is responsible for measuring, tracking, and assessing the performance of the SMS to ensure its effectiveness. Various measures, such as audits, management reviews of safety issue resolutions, and internal analysis and evaluation of safety policies and procedures, collectively contribute to ensuring the efficiency of the SMS (Stolzer et al., 2015). The concluding element of an SMS is the safety promotion which is dedicated to ensuring that every individual in the organization comprehends their safety responsibilities and is adept at fulfilling them. This encompasses providing employees, managers, and top leaders with a thorough understanding of the organization's safety policies and the proficiency to utilize associated reporting procedures, risk management tools, and communication mechanisms. In order to achieve it, all members of the organization must undergo training to execute their duties consistently with the organization's safety policies and procedures (Stolzer et al., 2015).

In the realm of aviation safety management, Annex 19 which highlights the critical role of communication within safety management systems stands as a guiding document. It emphasizes effective communication as the cornerstone for a proactive approach to identify and mitigate safety risks (ICAO,2016). ICAO DOC 9859, the Safety Management Manual (SMM), further highlights the importance of communication by incorporating it into the core elements of an SMS (ICAO,2018). Within SMS, safety culture serves as the groundwork, contributing to a safer operational landscape (FAA, 2015). In other words, the success of a safety management system in an airline is built upon the bedrock provided by its safety

culture (Woo, 2015). SMS holds necessitates a positive safety culture to achieve effectiveness. This positive safety culture encompasses reporting culture, just culture, flexible culture, informed culture, and learning culture, as outlined by Stolzer and Goglia (2015). Without a positive safety culture, the implementation of SMS would be merely a nominal endeavour. SMS also hinges on the organizational safety culture enabling frontline employees to incorporate SMS principles into their day-to-day operational tasks, concurrently with the organization's ongoing assessment of performance.

FAA (2013) characterizes safety culture as the collective manifestation of values, actions, and behaviours committed to prioritizing safety over conflicting goals and demands. In practical terms, safety culture forms the nucleus of the organization's broader culture, encompassing behavioural norms, core values and the organizational approach to safety, including processes namely communication, reporting, flexibility, information sharing, and continual improvement strategies (FAA, 2013). According to Wiegmann et.al. 2002), safety culture is characterized by the lasting emphasis given to worker and public safety throughout all levels and groups within an organization. It refers to the degree of commitment individuals and groups demonstrate in taking personal responsibility for safety, actively addressing safety concerns, striving for continual learning, adaptation based on insights gained from mistakes, and receiving recognition that aligns with these core value. In a similar fashion, Torres (2008) underscores the central role of communication in the emphasis of safety culture, which prioritizes flexibility, accountability, and a blame-free atmosphere. This setting encourages the reporting of safety and emphasizes continuous improvement.

The aviation sector is transitioning towards proactive safety measures that extend beyond the confines of the flight deck to encompass the entire corporation. In this context, SMS necessitates a proactive examination of organizational processes, identifying potential threats, and mitigating risks. At this very point, communication assumes a critical role, becoming an integral component of each organization's safety culture. This emphasis on communication is not solely driven by the need to comply with FAA mandates but is also vital for enhancing overall organizational safety (Stolzer & Goglia, 2015).

2.1.1 The implementation of sms in flight training. As highlighted above, safety promotion in the SMS model focuses on providing safety training and all members of the organization must undergo training to execute their duties consistently with the organization's safety policies and procedures (Stolzer et al., 2015).

There are many studies (Adjekum,2014; Mendonca and Carney,2017; Ricci et al.,2016; Robertson ,2018; Dickson,2021; Petitt,2019; Vinodkumar and Bhasi,2010; Adjekum,2017) in the literature highlighting the importance and efficiency of the implementation of SMS in flight training. Investigating the establishment of a model for SMS implementation, Mendonca and Carney (2017) found that within the safety promotion component, training plays a pivotal role by providing a means for essential information sharing in the SMS. The effectiveness of the organization's SMS relies significantly on the quality of SMS training. Similarly, with the aim of examining the effects of safety training on workers' safety knowledge, attitudes, and behaviours, Ricci et al. (2016) discovered positive impacts. Their study revealed improvements in safety knowledge, attitudes, beliefs, behaviours, and overall health as a result of the safety training. Notably, significant enhancements were observed in safety knowledge and attitudes. The authors also confirmed the effectiveness of classroom-based training in contributing to increased safety knowledge. In a similar vein, Robertson's (2018) and Dickson' (2021) research findings indicated a favorable correlation between the implementation of SMS and the development of a positive safety culture and knowledge. In another study, Vinodkumar and Bhasi (2010) explored the correlation between safety behavior and safety management practices. The study highlighted safety training as a predictor for safety knowledge, safety motivation, and safety performance.

There are also important studies focusing on the safety-culture perceptions of student pilots and flight instructors. Surveying the distinctions in safety-culture perception between students and flight instructors, Adjekum (2014) discovered that students in the early stages of their training had differing views on safety culture compared to those in the later stages of their education. The author stressed the importance of delivering thorough initial SMS training to ensure all students have adequate knowledge of the safety program. In a different research endeavor including both student pilots and flight instructors, Adjekum (2017) pointed out challenges associated with building knowledge of and engagement in SMS. The author

underscored the necessity for both students and instructors to be well-informed about and actively participate in the SMS, both during its implementation and in subsequent phases. Addressing student and flight instructor engagement in the SMS, the study specifically highlighted training as a key solution.

In the light of these studies, it could be advocated the implementation of SMS in flight training has a central role in fostering a positive safety culture, ensuring effective SMS implementation, and enhancing safety-related knowledge, attitudes, and behaviors among aviation professionals at different stages of the training.

2.1.2 The role of effective communication in SMS. Aviation is a risky industry where safety enhancements are always possible, with communication being a key area needing special consideration (Molesworth and Estival,2015). At this juncture, integrating human factors expertise into aviation operations offers a chance to enhance the achievement of the main objective, which is ensuring the secure and streamlined conveyance of individuals and cargo. Moreover, it signifies a cost-efficient strategy to proactively address human errors, avoiding the need to deal with their repercussions after the fact (Aurino,2000). Thus, a nuanced understanding of human factors allows for the development of targeted strategies to proactively address errors in safety management, particularly in communication.

Whilst there is a common belief that real pilots can withstand various pressures and setbacks, the truth is that they do not function in isolation. In reality, their work is influenced and limited by factors beyond their control (Dekker,2003) and communication is one of those critical areas. Recognizing the multidimensional impact of communication on aviation safety, ICAO DOC 9859 acknowledges that communication is not just an isolated element but a critical factor that has substantial impacts on safety policy, risk management, safety assurance, and safety promotion (ICAO,2018).

Effective communication is a cornerstone of aviation safety management and plays a pivotal role in fostering a culture of safety, risk mitigation, and operational excellence. Language holds a prominent and critical role in safety, permeating nearly every aspect of operational procedures. As Roberts and Orr (2020) indicate, its impact on safety is evident in operational and safety manuals, maintenance records, audio warnings on flight decks, trainings, and radiotelephony communications between

pilots and air traffic controller. The number of aircraft accidents which are attributed to human factors, including language barriers (Cookson, 2019) highlight the criticality of effective communication as an important element of safety management. The expanding capacity of passenger airliners contributes to a higher incidence of language-related accidents, resulting in a greater number of casualties. The Tenerife airport disaster, for instance, starkly illustrate how language-related issues can lead to tragedy (Vaz, 2018). Since language proficiency emerges as a critical dimension within the broader scope of effective communication in aviation safety management, pilots, air traffic controllers, and aviation personnel must not only possess technical proficiency but also demonstrate a high level of language competency. The ability to convey and comprehend information accurately is paramount in situations where split-second decisions can impact safety outcomes (Tarnavska et al., 2021).

In the context of aviation, where multicultural and multilingual teams are commonplace, language proficiency assumes an added layer of significance. Misinterpretations or misunderstandings arising from language barriers can compromise the effectiveness of communication and, consequently, jeopardize safety (Hazrati, 2015). Another important fact is that the examination of aviation accidents reveals that the primary cause of the tragedies in aviation is not solely the insufficient proficiency of pilots and air traffic controllers in English but rather their inability to apply their second language knowledge in critical situations. Therefore, there is a dire need to incorporate this aspect into their language training (Tarnavska et al., 2021).

With the aim of setting the standards and enhancing safety, language proficiency is explicitly integrated into ICAO's language proficiency requirements which are detailed in ICAO Annex 1. These requirements emphasize that pilots and air traffic controllers must demonstrate the language proficiency necessary for the safe and efficient performance of their duties (ICAO,2018). The criteria include not only aeronautical phraseology but also plain language communication, recognizing the diverse linguistic backgrounds within the global aviation community.

The expansion of aviation industry into regions where English is not the first language is experiencing substantial growth. With the addition of new routes and more airports, the future of air travel is expected to be more congested, which can cause safety issues. As Roberts and Orr (2020) indicate in their study, the demographics of those navigating this emerging airspace are expected to include a greater number of

non-native English speakers with limited operational experience. The Asia-Pacific region alone is expected to require 35% of the new pilots. The projected increase in air travel will lead to more crowded airways, reducing available radio talk time. Hence, it is essential for communication to be prompt, succinct, and precise in this evolving landscape (Kay, 2019).

In brief, the importance of effective communication in aviation safety management cannot be overstated and it continues to be a paramount concern in the aviation industry, given its high-stakes implications and nature (Atak & Kingma, 2011). However, finding a delicate balance between safety considerations and financial constraints is typically a formidable task, as highlighted by ICAO (2009). Given that effective communication is the element that binds together the various elements of safety management systems, as highlighted in Annex 1, Annex 19 and ICAO Doc 9859 and Doc 9835, it is of significance to reiterate that the shared language of aviation is not just a technical necessity but a safeguard for the industry, promoting a culture of safety in the rapidly evolving aviation landscape. Accordingly, teaching ab-initio pilots the importance of effective communication is a bedrock investment in the future safety culture of the aviation industry (Roberts and Orr, 2020). By instilling these communication skills early in their training, the industry not only improves the overall proficiency of individual pilots but also makes a meaningful contribution to the safety culture of the aviation community.

2.2 Introduction to Aviation English

English ascended to its status as the world's foremost language of science, business, and tourism during the 20th century. As early as 1950, it was designated as the official language of aviation (Tajima, 2004). According to Aiguo (2008), Aviation English falls under the classification of English for Specific Purposes, placing a unique emphasis on aviation, covering both phraseology and plain language. In the perspective presented by Estival and Farris (2016), Aviation English is characterized as a language with a distinct purpose, utilized by both native and non-native English speakers. These individuals employ this specialized language when communicating in an environment where English serves as the predominant working language, even though it might be a secondary language for many of them. Therefore, it is of significance to underscore that Aviation English does not have native speakers because

it is a specialized form of language that requires learning, even for those who are native English speakers. Simply being a native speaker does not assure competence in Aviation English (Seiler,2009).

Following the adoption of Language Proficiency Requirements (LPRs), the term 'Aviation English' has come to be closely associated with the language employed in pilot-ATC radiotelephony communications (Augio,2008). However, it is also essential to recognize that Aviation English should have a broader scope, encompassing the language utilized by ground and maintenance staff, engineers, cabin crew and dispatchers as prescribed by ICAO (Estival and Farris,2016).

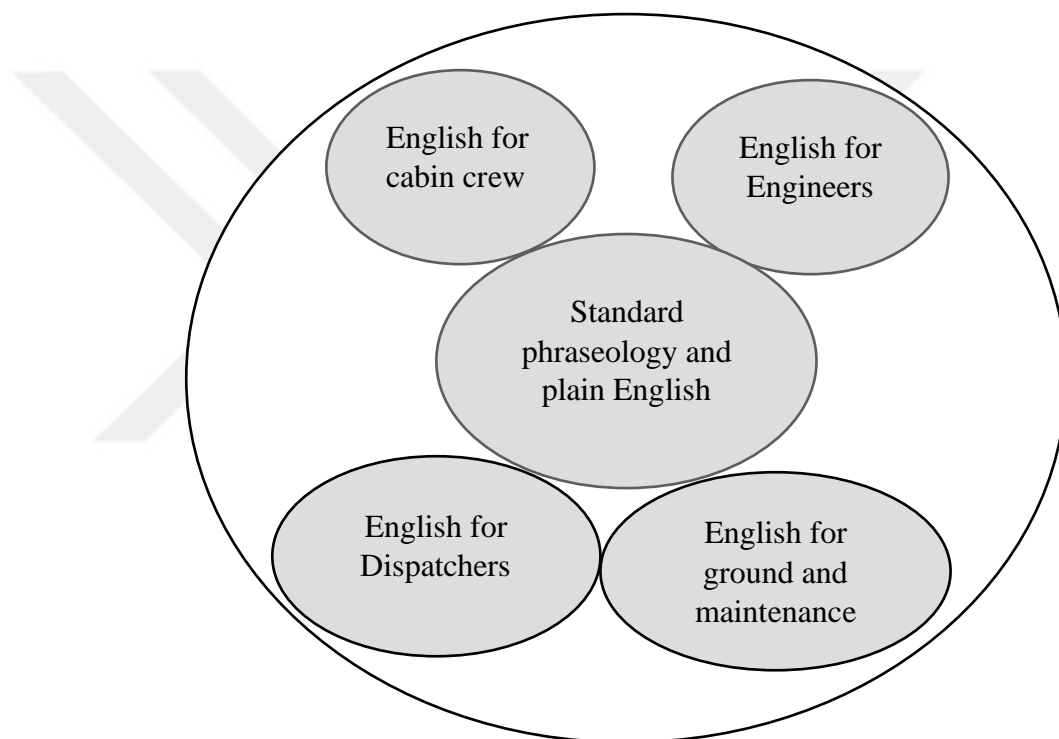


Figure 2. Categories of Aviation English.

Aviation communication carries immense stakes, as lives depend on its accuracy. Despite ongoing efforts to enhance aviation safety, tragic air accidents continue to occur. One persistent issue that contributes to these accidents is miscommunication. Effective communication, especially between pilots and air-traffic controllers, plays a vital role in ensuring safe flights (Kanki and Palmer, 1993). The consensus among a vast majority of pilots and controllers is that "good communication is as crucial as technical proficiency for flight safety" (Wulle and Zerr, 1997, p.91).

Ideally speaking, aviation communication should be devoid of vagueness to ensure safety. Nonetheless, it is widely recognized that human languages do not operate on the same principles as the precise languages of logic or mathematics. Misunderstandings in language can happen at various levels, including mishearing words and misinterpreting messages due to grammatical issues, accents, or intonation. These occurrences can even arise among speakers of the same language variety with shared socio-cultural backgrounds (Seiler,2009). In critical contexts like aviation, it becomes imperative to take all possible measures to prevent such misunderstandings and promote safety.

An effort was made in aviation to minimize fatal miscommunication by using a predefined set of phrases with explicit meanings for handling standard situations. Although the implementation of phraseologies has brought some improvements to aviation communication, it has not entirely eliminated misunderstandings. While English has emerged as the universally accepted language of aviation, achieving a universally agreed-upon standard of English for aviation remains a distant goal (Seiler,2009). It is evident that additional measures are necessary to address emergency situations that demand linguistic abilities beyond standard phrases for routine tasks. According to ICAO statistics, accidents between 1976 and 2001 resulted in the loss of over 1,100 lives among airline passengers and crew, with communication playing a significant role in these incidents. Moreover, numerous other reported cases persist annually, involving the misuse or misunderstanding of English (Considine, 2007). Another important fact reported by Graddol (2006) is that nearly 75% of all trips are undertaken between countries where English is not the primary language of communication for both the departure and arrival points, which highlights the criticality of the risks involved in communication and the required language proficiency in Aviation English.

2.2.1 Standard phraseology. Radiotelephony communication serves as the primary means of interaction between pilots and air traffic controllers, employing standard phraseology as its foundation. Standard phraseology refers to a specialized and restricted sub-language exclusively designed for radiotelephony communications between pilots and air traffic control (Estival and Farris, 2016). Aiguo (2008) defines it as the accurate and standardized utilization of terminologies and phraseologies in

air/ground communication, as well as in aircraft manufacturing and specification processes. With the aim of meeting the precise communication needs within the aviation domain, ICAO (2007) has defined and documented the specific requirements for radiotelephony communication between pilots and air traffic control, known as Standard Phraseology, in Document 9432: Manual of Radiotelephony. The main goal of establishing these standards is to facilitate "efficient, clear, concise, and unambiguous communications" (ICAO,2007, p.3), This mode of communication is primarily utilized for air-ground communication, facilitating directives, information exchange, inquiries, requests, and responses, with the air traffic controller assuming the role of directing and controlling pilots. The main focus of these communications revolves around aircraft take-off and landing, flight navigation, and related activities, and the mode of transmission is through spoken language via radiotelephony. An example of standardized phraseology is as follows:

ATC:TK9988, roger, climb to 6000 ft and turn right 360 degrees and standby for further instructions.

AIRCRAFT: Roger approach, 6000ft on 360 and standing by, TK9988

In this example, the Air Traffic Controller (ATC) communicates with the aircraft with the callsign "TK 9988." The controller acknowledges the message received from the pilot ("roger"), and then issues instructions to the pilot. "Climb to 6000 ft": The ATC instructs the pilot to ascend to an altitude of 6000 feet above sea level. "Turn right 360 degrees": The ATC instructs the pilot to make a right turn, completing a full 360-degree rotation in the process. "Standby for further instructions": After completing the climb and turn, the pilot is instructed to wait for additional instructions from the ATC. The aircraft, using the callsign "Roger approach," acknowledges the ATC's instructions."6000ft on 360": The pilot confirms that the aircraft has climbed to the assigned altitude of 6000 feet and has completed the instructed 360-degree right turn. "Standing by": The pilot acknowledges that they are ready and waiting for further instructions from the ATC.

In this exchange, the ATC provides clear and concise instructions to the pilot, who promptly acknowledges the given directions. This adherence to standard phraseology ensures efficient communication between the controller and the aircraft. Much more importantly, ICAO mandates the obligatory use of this phraseology in all routine communications.

Mell (n.d) takes a positive stance in this matter and advocates that routine air-ground communications tend to be smooth and effortless, and thus misunderstandings are rare and typically easily resolved. This favourable outcome can be attributed to the development of internationally recognized standard phraseology over the years. This standardized code has undergone refinement, in reaction to the meticulous examination of aviation incidents and accidents due to poor communication or miscommunication. As a result, ambiguities have been substantially minimized.

Despite these improvements and procedures, it is not uncommon for participants in emergency circumstances to deviate from standard phraseology and resort to using plain (or natural) language. In unpredictable situations, where quick and clear communication is of utmost importance, and both parties must comprehend the information accurately, the language proficiency demands on aircrew and air traffic controllers can be exceptionally high. This poses a significant problem, especially when one or more of the participants do not have English as their first language (Alderson, 2009).

It is also important to note that even in highly predictable and controlled situations, miscommunications can still happen due to various contributing factors. These factors may involve pilots failing to recognize that a communication is meant for them, radio frequency interference, overlapping calls, misinterpretation of flight parameters, inaccurate readbacks, insufficient clarification of flight details, and more (Cushing, 1997). One evident cause of phraseology misunderstandings lies in the miscomprehension of pronunciation by one of the individuals engaged in the communication. This is particularly true when one or both parties possess regional or nonnative accents in English, which can lead to confusion and misinterpretation (Alderson, 2009). The bigger risk is that serious miscommunications, especially when a corrective action or vital information is urgently needed, can arise, particularly during emergencies. (Mell, n.d.).

2.2.2 Plain English. ICAO (2010) defines plain language as “the spontaneous, creative and non-coded use of a given natural language [...] required by aeronautical radiotelephony communication” (Sec.3.3.14). This means using plain English in situations involving unexpected events or non-routine circumstances, where standardized phraseology may not entirely fulfil the communication needs of the

particular situation (Estival and Farris,2016). According to Aiguo (2008), Aviation English also pertains to the widespread adoption of the English language among aviation personnel in their day-to-day communication, irrespective of their nationality, race, or diverse cultural backgrounds. Yet, the notion of plain English is rather complex when it comes to air speak. Several scholars (Douglas, 2004; Augio,2008; Moder & Halleck, 2009; Kim& Elder,2009; Emery, 2014) have expressed their concerns regarding the definition of the scope of English in radiotelephony communications, advocating that there is a dire need to clarify the concept of "plain English." Studies have revealed that speakers tend to favor plain English when dealing with abnormal or emergency situations, even when standardized phraseology would suffice (Kim & Elder, 2009; Morrow, Rodvold, & Lee. 1994; Howard, 2008). This situation poses certain risks because when pilots and air traffic controllers opt for plain English instead of standardized phraseology, they inadvertently use more complex sentence structures and vocabulary.

When these issues are considered, it is “*necessary to gather extensive and detailed information about the nature of aviation English, both the standardized phraseology and what is referred to as ‘plain language’, the relationship between them, and the conditions in which each is used*” (Douglas, 2004, p. 251). An example of plain English is as follows:

Pilot: "Kennedy Tower, this is Air China 123. We have a medical emergency on board. A passenger is having a heart attack. We have notified the cabin crew, and they are providing medical assistance. Requesting priority landing and medical assistance upon arrival."

ATC: "Air China 123, Roger. Your request for priority landing is approved. Emergency medical services will be standing by at the destination airport to provide urgent assistance. Maintain present altitude and heading."

Pilot: "We will maintain present altitude and heading. We'll keep you informed of any changes in the passenger's condition. Please advise the ground medical teams to be prepared for our arrival, Air China 123."

ATC: "Air China 123, will do. Medical teams have been informed and will assist you upon your arrival. Please contact us if you need any further help."

Pilot: "Appreciate your help, Kennedy Tower. We'll keep you informed, Air China 123."

In this dialogue, the pilot informs the air traffic controller about the medical emergency in which a passenger is having a heart attack. The air traffic controller grants priority landing and coordinates with the airport authorities for medical assistance. The pilot acknowledges the assistance and assures the ATC of updates. Throughout the communication, plain English is used to convey the urgency effectively.

2.3 International Standards and Regulations

2.3.1 ICAO DOC 9835 and its content. Document 9835 has been developed to offer guidance on the implementation of the Standards and Recommended Practices (SARPs) pertaining to language proficiency, as detailed in Annexes 1, 6, 10, and 11. It is crucial to distinguish between this guidance material and the SARPs themselves, as member states are obligated to comply with all elements of the Language Proficiency Requirements (LPRs) found in the Annexes, while all content within Document 9835 may be viewed as recommendations or supplementary guidance, rather than mandatory requirements (Estival, Farris and Molesworth 2016). This document commences by establishing a safety rationale for the ICAO LPRs, referencing significant accidents with substantial loss of life where insufficient language proficiency was identified as a contributing factor. It is composed of seven chapters, each of which plays a critical role in establishing effective communication in international aviation. The brief summary of the chapters is presented below.

Chapter 1 presents the rationale and background for the strengthened ICAO language proficiency requirements. It reviews the provisions before the adoption of amendments containing language proficiency requirements and outlines the actions taken by ICAO to enhance language proficiency in international aviation.

Chapter 2 provides a general introduction to language proficiency and language acquisition. It covers the importance of effective communication, defines language proficiency and user status, and explains the levels of proficiency. The chapter also discusses the role of English as a lingua franca and how language proficiency is acquired.

Chapter 3 focuses on aeronautical radiotelephony communications. It explains and describes the general and specific features of the language used in aeronautical radiotelephony communications.

Chapter 4 offers an overview of ICAO's language proficiency SARPs (Standards and Recommended Practices) and includes descriptors of the ICAO language proficiency requirements and explains the rating scale descriptors.

Chapter 5 introduces the implementation of language proficiency requirements and provides guidelines for developing a language proficiency implementation plan.

Chapter 6 discusses language testing criteria for global harmonization and presents the recommended criteria for conducting language testing in the aviation context.

Chapter 7 addresses language proficiency training and discusses training trainers and best practices for training programs.

ICAO Document 9835 highlights four accidents in which inadequate English language proficiency among the flight crew or air traffic controllers played a major role. These accidents were presented as the Tenerife runway collision in 1977, the Cove Neck, New York, fuel exhaustion crash in 1990, the Cali, Colombia, controlled flight into terrain in 1995 and the Charkhi Dadri, New Delhi, mid-air collision in 1996 (ICAO,2010).

In a study conducted by Cookson (2019) to unveil pilots' awareness of these four accidents cited by ICAO and the importance of English proficiency in the accidents, a survey was given to British pilots (n=92). Findings indicate that nearly 99% of the pilots emphasize the significance of analysing previous airline accidents as a pivotal factor in advancing airline safety and the majority of the respondents believe that the English proficiency of pilots contributed to three of the accidents namely, the 1977 Tenerife, 1990 Cove Neck, and 1996 New Delhi incidents (Cookson,2019, p.233). Accordingly, it could be denoted that the need for language training to equip pilots, especially ab-initio ones, with strong communication skills from the outset is vital.

2.3.2 ICAO language proficiency requirements (LPRs). One of the important tasks of ICAO is establishing and revising international standards for licensing aviation personnel and aircraft operations. Additionally, ICAO develops principles and techniques related to air navigation, encompassing meteorology, radio communication, and rules of the air (Ragan, 2007). Acknowledging the pivotal role of English language proficiency in ensuring the safety of operations, ICAO has established a set of language proficiency requirements (Estival and Farris,2016).

Minimum standards for language proficiency for pilots and air traffic controllers are established by these requirements. To enforce this requirement for licensing purposes, ICAO introduced operational level 4 English proficiency in March 2008. Member states are responsible for implementing this regulation, as ICAO itself does not develop a test to measure language proficiency (Alderson,2009). As per the LPRs, assessments should concentrate solely on the proficiency of speaking and listening, with the specific objective of evaluating the application of plain language in operational setting.

The ICAO Language Proficiency Requirements (LPRs) encompass two main components: the holistic descriptors (See Appendix A) and the ICAO rating scale (See Appendix B). These holistic descriptors consist of five comprehensive traits that outline proficient speakers and the suitable communication context (Garcia,2015). Achieving operational level 4 requires demonstrating adherence to these holistic descriptors.

The construction of language tests and the assessment of language proficiency levels rely on the ICAO language proficiency scale. It assesses candidates across six distinct categories: *pronunciation, structure, vocabulary, fluency, comprehension, and interactions*. Each category is evaluated on a scale of six levels. To meet the international operational standard, a minimum level of operational level 4 is mandatory. This means that a test taker must attain at least a level 4 in all six skills, as the final rating is determined by the lowest level achieved, not the average. For language proficiency at level 4, ICAO suggests conducting formal evaluations at least once every three years for pilots and air traffic controllers (ATCs). For those exhibiting proficiency at level 5, evaluations should take place at least once every six years. If a candidate reaches Level 6, they receive a lifetime license for operation.

It is important to note that there have been controversies surrounding the ICAO policy and the quality of its rating scale, as noted by various authors (Alderson, 2009; Douglas, 2004, 2014; Emery, 2014; Garcia,2015; Kim,2013). The key problem is whilst there have been improvements in manuals and projects, the actual requirements themselves have remained unchanged. Douglas (2004) highlighted the need for a revision of the ICAO LPRs to clarify areas of ambiguity and uncertainty. Kim (2013) believes that resistance among non-native speakers towards the ICAO LPRs will persist until both the ICAO policy and its underlying construct are reevaluated and

updated. Garcia (2015) acknowledges that the ICAO LPRs have been a significant step forward but advocates for a revision, pointing out that an unreliable scale poses potential safety risks. Therefore, these issues must be taken into account because ab-initio language training programmes, their objectives and learning outcomes are also shaped considering the holistic descriptors and the scale.

2.3.3 Turkish aviation regulations & directorate general of civil aviation.

The very first operations in aviation started in Turkey in 1912. The first Civil Aviation Transportation began in 1933 under the name "Turkish Air Mails," operating a small fleet comprising five aircraft. To safeguard national interests and manage international relations concerning aviation, the "Civil Aviation Department" was created under the Ministry of Transport in 1954, responding to the rapid advancements in World Civil Aviation and technology (Directorate General of Civil Aviation, n.d). In 1987, reflecting prevailing conditions, it underwent a reorganization and became the "Directorate General of Civil Aviation" (DGCA).

Over the years, Turkish aviation has observed bedrock changes which in fact mirrored the changes seen worldwide. Turkey became a party to the " the Chicago Convention in 1945 and also became a founding member of the International Civil Aviation Organization. In addition to these big steps, Turkey has been a member of the European Civil Aviation Conference (ECAC) since 1956 and the European Organization for the Safety of Air Navigation (EUROCONTROL). Furthermore, Turkey holds membership in several regional organizations, all of which contribute to the effective execution of aviation operations on both national and international levels. These significant steps have paved the way to adhere to the current standards and requirements of the global aviation industry, prioritizing safety, and quality (DGCA History, n.d).

DGCA mandated that aviation personnel meet the language requirements set by ICAO as of 2013. This decision has spurred an escalating demand for aviation personnel and the necessity to train these individuals, making language training a fundamental aspect of aviation education in Turkey.

The language proficiency guidelines of DGCA comprises four comprehensive sections, encompassing a total of twenty-four elements. The initial chapter introduces the purpose, scope, definitions, and abbreviations, intending to establish criteria for

language proficiency requirements aligned with the standards of both ICAO and EASA. Additionally, it grants authorization to service providers to conduct the examination. The manual has been meticulously crafted in adherence to ICAO Appendix 1 Standards and ICAO Doc. 9835.

The second section presents the principles of language proficiency, the evaluation of Turkish language competency, the various levels of linguistic proficiency, the validity of language provisions, the re-examination of candidates who do not meet the criteria, examination conduct protocols, rules for examination procedures, examination assessment methodologies, reporting of examination results, avenues for contesting results, and the process of reassessment.

In extraordinary situations where standard aviation terminology might fall short, pilots are expected to transcend the use of standardized phraseology. Instead, they must communicate in English proficiently, employing a straightforward, precise, and effective manner to ensure clear understanding within the aviation community. Moreover, pilots should demonstrate the ability to converse fluently and accurately on general, specific, or professional subjects, while effectively addressing and resolving misunderstandings through appropriate communication strategies. It is imperative that their dialect and accent are comprehensible to the aviation community 9835 (Sivil Havacılık Müdürlüğü [Directorate General of Civil Aviation], Dil yeterliliği talimatı [Language Proficiency Guideline] (SHT-1DY), 2018, p. 2).

Pilots lacking English language proficiency in their licenses are required to possess Level-6 Turkish language competence. Such proficiency is evaluated by control pilots during licensing or competence checks. If pilots do not meet this level, their licenses do not undergo further processing. To maintain impartiality and accuracy in the evaluation process, each candidate's exam is assessed by two assessors—one an English language expert and, ideally, the other an experienced pilot or air traffic controller. If one assessor is not from the pilot or air traffic control domain, they must also be an expert in the English language. Furthermore, institutions and organizations authorized to conduct language proficiency examinations must have their English language exams approved by either the civil aviation authorities of EASA member states or the General Directorate of Civil Aviation. These examinations must adhere to ICAO General Guideline on Language Proficiency Tests, Circular 318, and the ICAO Manual on the Implementation of Language Competence Requirements, based

on Doc 9835 (Sivil Havacılık Müdürlüğü [Directorate General of Civil Aviation], Dil yeterliliği talimatı [Language Proficiency Guideline] (SHT-1DY), 2018, p. 5).

The third part of the manual revolves around the authorization of service providers concerning service suppliers, elucidating the conditions to be met at the test centres and the required personnel qualifications. In the fourth section, important matters pertaining to administrative sanctions, the validity, and enforcement of regulations are comprehensively outlined.

2.4 Competencies Required in Aviation English

Effective communication in a language demands a speaker's comprehensive grasp of linguistic, sociolinguistic, and socio-cultural aspects associated with that language. This profound understanding empowers the speaker to use the appropriate language in various contexts and for specific purposes. Nevertheless, for foreign language learners, attaining this level of knowledge and understanding poses a considerable challenge. Throughout their learning journey, they encounter numerous obstacles as they strive to achieve this goal. The complexities of mastering languages, adapting to diverse sociolinguistic norms, and understanding the cultural subtleties can be daunting (Saleh,2013).

In aviation industry, where safety is the buzz word, effective communication is the key to make the difference between a successful operation and a potential disaster. Based on the investigation carried out by Sexton and Helmreich (2000), it was found that more than 70% of the reports submitted to Aviation Safety Reporting System implicated issues linked to failures in interpersonal communication. In a similar fashion, Krifka, Martens, and Schwarz (2003) posit that factors connected to interpersonal communication have been identified as contributing to as much as 80% of aviation accidents in the past two decades. These findings highlight the criticality of the competencies required in using Aviation English and navigating the complexities of aviation communication. Linguistic, communicative, and interactional competencies which are essential for developing effective communicational skills in the aviation industry are explored below.

2.4.1 Linguistic competence. Linguistic competence refers to the innate ability of native speakers to construct "well-formed sentences" (Thornbury, 2006, p. 37). In

other words, the ability to form structurally sound statements and use the language effectively. The idea proposed by Chomsky (1965) is that an "ideal speaker-listener" possesses a total command of the language spoken within their speech community. He additionally posited that every language speaker has acquired a generative grammar, which reflects their knowledge of that specific language. Accordingly, Chomsky's primary emphasis, as asserted by Jordan (2004), focuses on linguistic competence, allowing native speakers to generate well-formed sentence structures. As Thornbury (2006) advocates, language learning, nevertheless, cannot be limited solely to linguistic competence, as effective communication goes beyond merely mastering sentence structures.

In this respect, it is crucial to note that although linguistic competence presents a limited perspective of what effective communication is, it still has paramount importance for ab-initio pilots because it shapes a solid foundation for clarity and understanding to build a cohesive environment and to ensure safe operations. Additionally, adhering to the principles of linguistic competence through effective use of phraseology and plain language can ensure uniformity. Thereby, all individuals involved in the operation can effectively pursue the standardized communication protocols. Another potential contribution of linguistic competence is to interoperability. Aviation industry has an international context, in which pilots and aviation personnel often find themselves interacting with individuals from various countries and linguistic backgrounds. In this international setting, linguistic competence can allow for effective communication with individuals from diverse linguistic backgrounds and mitigate the risk of miscommunication.

Although there is not a specific study investigating the importance linguistic competence of ab-initio pilots, there are various studies which shed light on the importance of linguistic competence in a broader language learning context, which can act as a steppingstone to use the valuable information in ab-initio training.

An intriguing perspective emerges from Yoon et al.'s (2004) study, indicating that students do not find passive learning of grammar to be appreciated. This finding underlines the need for an engaging and active approach to teaching grammar during ab-initio training. Passive instruction may hinder learners' motivation and hinder their language acquisition progress. In contrast, Pazaver and Wang (2009) and Saaristo (2015) present qualitative and quantitative findings, respectively, revealing that all

participants in their studies recognize the utmost importance of grammar in language learning. This reaffirms the centrality of linguistic competence as a foundational element in ab-initio training. Tuan's (2017) quantitative study complements this notion by showing that students with linguistic competence are more inclined to communicate effectively about a given topic. This highlights how mastering grammar and language structures can empower ab-initio pilots to express themselves more confidently.

In a similar vein, a strong correlation was observed by Wahyuni et al. (2015) between participants' speaking ability and their linguistic competence. This finding indicates that a robust grasp of grammar positively influences oral proficiency, further highlighting the importance of linguistic competence in ab-initio training. Last but not least, Araki's (2015) study brings an intriguing perspective, revealing that grammar does not hinder speaking performance. While this finding challenges the conventional belief, it underscores the complexity of language learning and the influence of various factors on language production.

In brief, the collective evidence from these studies reinforces the significance of linguistic competence in ab-initio training. Mastering language structures can help learners to communicate confidently. Nevertheless, the varying findings also remind us of the need for tailored teaching approaches to foster linguistic competence in learners during their language learning journey.

2.4.2 Communicative competence. According to Hymes (1972), 'communicative competence' refers to the level of language learning that allows users to convey messages effectively and understand others within specific contexts. This involves relating classroom learning to the real world and knowing how, when, and where to use language appropriately, beyond just accurate grammar. In an ab-initio training setting, learners are exposed to practical scenarios that they are likely to encounter. This approach can help them have a good command of grammar and vocabulary. It will additionally develop their ability to apply the knowledge in various situations outside the classroom.

Canale and Swain (1980) built on Hymes' ideas, presenting another theoretical model of 'communicative competence' which relied on three main domains. Grammatical Competence refers to the knowledge of various language elements, including lexical items, morphology, syntax, sentence grammar, semantics, and

phonology (Canale & Swain, 1980, p. 29). It focuses on understanding and using the fundamental building blocks of language. Sociolinguistic proficiency is further categorized into two sets of norms, namely socio-cultural rules of use and discourse rules. Socio-cultural rules involve knowing how to produce and interpret utterances appropriately in different socio-cultural situations. On the other hand, discourse rules relate to maintaining cohesion and coherence (Canale & Swain, 1980, p.30). This component emphasizes understanding the social and cultural nuances that influence communication. The third component is Strategic Competence, which includes both verbal and non-verbal strategies used by speakers to manage communication breakdowns (Bagaric & Djigunovic, 2007). Strategies like paraphrasing, repetition, and guessing are employed to overcome obstacles in understanding and to ensure successful interactions. In aviation context, these three elements are extremely important because they help student pilots be better equipped in terms of interacting with native speakers and navigating various potential communication challenges.

Communicative Language Ability (Bachman, 1990), which includes both knowledge and the skill to implement that knowledge in appropriate communication, focuses on 'language competence,' 'strategic competence,' and 'psychological mechanisms.' This framework stands out for its incorporation of neurological and psychological elements in language use. Bachman (1990) These mechanisms are responsible for “the actual execution of language” (p.84). Considering 'psychological mechanisms' is really critical since it can assist educators in addressing potential challenges faced by ab initio learners, namely the apprehension or fear when attempting to communicate in emergency situations. By understanding the psychological factors influencing language use, teachers can implement strategies to create a supportive learning environment.

Macaro (1997) identified four beliefs among language teachers that foster the development of 'communicative competence,' including emphasizing speaking and listening skills, practicing with new information, increasing student involvement, and using language in meaningful situations rather than focusing solely on well-formed sentences or individual words. Nevertheless, it's essential to note that developing 'communicative competence' should not prioritize speaking and listening over reading and writing skills. A good command of any language requires sufficient understanding of all language skills (Saleh,2013).

Notwithstanding its popularity, communicative competence as a notion has also received criticism. According to Butler (2005), communicative competence lacks a clear definition, and implementing communicative activities in classrooms might not effectively improve students' learning. Another setback is teaching language programs with a focus on developing communicative competence poses significant challenges for instructors, mainly due to the high proficiency level required for effective instruction. Low proficiency levels among some teachers further hinder the use of communication-based teaching methods. Additionally, measuring language learners' communicative competence is complicated, as various factors beyond language ability can impact their performance (Bachman, 1990). In ab-initio training, factors such as stress and time pressure in high-stakes aviation situations can influence communication performance adversely. Accurate and reliable assessment of communicative competence is essential to ensure that student pilots meet the required language standards. Given these complexities, Alptekin (2002) criticized the conventional model of 'communicative competence,' suggesting a redefinition as "intercultural communicative competence" for foreign language settings (Alptekin, 2002, p. 63). The difficulties involved and the high proficiency level required may make achieving communicative competence unrealistic for non-native speakers. Therefore, it becomes essential to set realistic objectives for language learning and improvement. Rather than striving for native-like fluency, the focus should be on developing communicative competence that suits the specific realities and requirements of non-native ab-initio pilots to address the unique challenges.

Several studies have explored the effectiveness of various instructional approaches in developing communicative competence among language learners. In their study, Ampatuan and Jose (2016) highlighted the importance of using role-play to improve communicative competence since it provides meaningful ways to practice language use in realistic scenarios, enabling them to apply their knowledge in authentic contexts. In a similar vein, ab-initio pilots can practice using the target language in situations they are likely to encounter in flights through role plays.

Similarly, Bang (2003) conducted a mixed-method study that found drama activities to be beneficial in creating an interactive environment. Through drama activities, students can experience natural language use, helping them develop their communicative skills and confidence in using the target language.

Catoto and San Jose (2016) conducted a qualitative study and discovered that class reporting is an effective strategy for enhancing learners' communicative competence and self-esteem. Class reporting encourages active participation and communication, fostering a conducive environment for language learning. In the context of student pilot training, this could be achieved through news reporting which can help learners engage with real aviation news materials and authentic content, such as aviation-related news articles or videos and introduce industry-specific topics.

Buitrago Campo (2016) conducted a mixed-method action research study, recommending the task-based learning approach to improve students' communicative competence in English. Task-based learning emphasizes real-life communication tasks, enabling learners to engage in meaningful interactions and enhance their language skills.

In another study, Xue (2013) explored learners' attitudes towards group work and discovered that active engagement in group work positively impacted their communicative abilities. Group work provides learners with opportunities for collaborative language practice, enhancing their language proficiency through interaction with peers. In student pilot training this can prove fruitful not only in terms of developing communicative competence but also enhancing communicational skills necessary for building crew resource management.

These research findings can collectively support the significance of employing communicative teaching approaches in ab-initio training. Utilizing role-play, drama activities, task-based learning, group work, and providing ample opportunities for communicative practice can greatly enhance student pilots' ability to use the target language effectively. With regards to communicative competence, the ICAO Manual (2010) underscores the paramount importance of it with the following words:

A number of accidents and incidents have been attributed to either a controller or pilot using less direct forms to communicate some concern, which was in part either misunderstood or ignored. Therefore, it is important that air traffic controllers and pilots be familiar with the concepts of function, form and register (ICAO,2010, Sec. 5.3.3.4).

Briefly, it is crucial for ab-initio pilots to develop strong communicative competence as well as understanding the concepts of function, form, and register to ensure effective communication.

2.4.3 Interactional competence. According to Kim and Elder (2009), interactional competence refers to the capability of users to collaboratively share responsibilities for communication across all participants. This competence involves the participants' capacity to adapt to various situations and effectively employ a diverse range of communicative resources. These skills are essential for actively participating in and comprehending messages delivered by speakers with varying levels of English proficiency. Such situations can span from standard and predictable contexts to unexpected ones. Interactional competence is built upon the foundations of linguistic and communicative competences. However, what sets it distinctly apart is the concept of inter-subjectivity, as proposed by Kramsch (1986). A key distinction lies in their focus. Whilst communicative competence revolves around an individual speaker's understanding and abilities to interact effectively within a social setting, interactional competence is a collaborative effort that involves all participants in this setting (Young, 2013). This collaborative nature highlights the significance of shared understanding and mutual awareness in interactive exchanges. According to Kramsch (1986), interactional competence relies on the idea of a shared internal context or understanding between individuals engaged in communication. This means that participants in a conversation possess the ability to infer and comprehend each other's thoughts and intentions.

It is noteworthy that interactional competence extends beyond verbal communication, encompassing various forms of interaction such as written, digital, and non-verbal exchanges. Being deemed an essential skill, interactional competence empowers students to actively engage in social interactions and thrive in their prospective professional pursuits (Xiao 2016).

Interactional competence encompasses various communicative resources, such as simplifying speech and avoiding redundant information, as well as the skill of paraphrasing utterances when comprehension issues arise. Additionally, it involves the thoughtful and strategic use of available language resources, including the established aviation phraseology repertoire (Douglas, 2000).

The ICAO Manual (2010) provides valuable guidance on these strategies within a section dedicated to cross-cultural communication, which highlights the importance of these competencies in facilitating effective communication in aviation context:

Native and highly proficient speakers can, for example, focus on keeping their intonation neutral and calm...take particular care to be explicit, rather than indirect, in their communications...train themselves away from the use of jargon, slang, and idiomatic expressions...ask for readbacks and confirmation that their messages have been understood...attend more carefully to readbacks in cross-cultural communication situations, taking greater care to avoid the pitfalls of “expectancy”...Additionally, a slower rate of delivery seems to make speech more comprehensible (ICAO,2010, p. 5.3.3.2)

There are numerous valuable studies related to interactional competence, which hold great potential for ab-initio training and teaching methodology. First and foremost, According to Kecskes et al.'s (2017) research, the effectiveness of non-native speakers in engaging with native speakers hinges on both their application of socio-culturally appropriate practices and techniques and their grasp of the mechanics of interactions. This finding is highly relevant to ab-initio training as it highlights the importance of equipping language learners with both language skills and a deeper comprehension of communication dynamics from the beginning of their language learning journey. Ab-initio training should emphasize the cultivation of interactional competence alongside linguistic competence to ensure effective communication with native speakers. In Park's (2017) action research, the critical impact of multimodal behaviors on learning suggests that incorporating nonverbal communication elements, such as gestures, gaze, and facial expressions, can significantly enhance language acquisition. Ab-initio training should encourage the integration of these nonlinguistic features into language learning experiences, promoting a holistic approach to communication and improving learners' overall communicative abilities. Yagi's (2007) explorative study highlights the value of frequent involvement in situated practice for students' learning. In ab-initio training, providing ample opportunities for learners to engage in authentic and contextually relevant communication will foster interactional competence development. Regular practice and immersion in communicative situations will enable learners to refine their communication skills and adapt to real-world language use.

Xiao's (2016) exploratory study points out that aspects of interactional competence may not be automatically transferred from one's first language. This underscores the need for targeted instruction and training in interactional competence

specific to the target language during ab-initio training. Teachers should address potential gaps between learners' first language interactional patterns and those required in the target language, providing explicit guidance to build effective communicative strategies. Incorporating the findings from these studies into ab-initio training programs can create a comprehensive and effective learning environment that nurtures learners' linguistic and interactional competencies. By recognizing the significance of interactional competence from the outset and integrating diverse communication elements, ab-initio training can empower learners to become confident communicators, well-prepared for interactions with native speakers and real-world language use scenarios.

When all these three competencies are considered, it is crucial for researchers to explore the potential benefits of integrating them in the classroom in an eclectic manner, especially in the realm of ab-initio training. Each of these competencies offers distinct advantages to language learners (Abdurrahman and Abu-Ayyash,2019). For instance, linguistic competence empowers learners to form accurate language (Hedge, 2000) while also enhancing their receptive language skills (Akbari, 2014; Liao, 2007). Communicative competence equips individuals with the skills necessary for effective communication as an individual speaker (Young 2013). On the other hand, interactional competence plays a pivotal role in facilitating shared understanding and successful communication among participants (Xiao 2016).

By skillfully blending features from these three competencies, instructors can help student pilots to develop a well-rounded skill set, enabling them to express themselves accurately and fluently, comprehend messages from others, and actively engage in meaningful interactions. Emphasizing the integration of these competencies in ab-initio training can significantly enhance language learners' overall proficiency and better prepare them for successful communication.

2.5 Factors Affecting Competence in Aviation English

2.5.1 Issues with language proficiency and linguistic background. In the history of civil aviation, instances of inadequate language proficiency among pilots and air traffic controllers (ATCs) have been linked to several incidents and accidents, as reported ICAO (2010). Kim and Elder (2014) further underscored the gravity of this issue, noting that a single piece of unclear information could potentially result in

disastrous outcomes within the domain of air traffic control. Within the context of ab-initio training, issues in language proficiency can adversely affect student pilots' ability to use Aviation English effectively.

In addition to the issues in language proficiency, the linguistic background of the learner can have a dramatic impact on competence. Learners often encounter challenges in their second language, including difficulties in phonology, vocabulary, and grammar, primarily due to the influence of habits acquired from their first language (L1) and second language (L2), as pointed out by Beardsmore (1982). Several factors contributing to this interference have been explored, including the structural similarities and differences between the two languages, the learner's background knowledge, their proficiency in the second language, and the configurations of consonant clusters in both L1 and L2 (Bhela, 1999).

When there are substantial similarities between L1 and L2, learners tend to face fewer difficulties in acquiring the second language, resulting in fewer errors. Conversely, if L1 and L2 exhibit minimal or no structural similarities, learners encounter significant challenges in L2 acquisition, making the learning process more demanding. The impact of the first language on second language acquisition can be either negative or positive. Negative transfer arises when the structures of the two languages differ significantly, while positive transfer occurs when their structures are similar, facilitating the acquisition of L2, as discussed by Derakhshan and Karimi (2015). This clearly shows that a pilot's native language and its linguistic features may influence their learning and use of Aviation English, including potential interference or challenges related to specific grammar structures or pronunciation.

2.5.2 Language anxiety. Spielberger (1983) defines anxiety as "the subjective of tension, apprehension, nervousness, and worry associated with an arousal of the autonomic nervous system" (p.1). Ab-initio training for aspiring pilots is affected by learners' perceptions of language classes, which are often considered the most anxiety-provoking subjects, as highlighted by Horwitz et al. (1986). Grenfell and Harris (1999) further suggest that anxious learners may struggle with comprehending strategy instruction, leading to challenges in managing their learning process and reduced confidence during ab-initio training.

Öztürk (2009) conducted a study investigating foreign language speaking anxiety and its determining factors, along with students' perceptions of it in Turkey. The research involved 383 students and the qualitative analysis of the data highlighted that speaking skill was identified by most students as a major source of anxiety. Moreover, pronunciation, immediate questions, fear of making mistakes, and concerns about negative evaluation were also recognized as significant factors contributing to foreign language speaking anxiety among the participants. In another study, Cagatay (2015) found out that students tend to experience higher levels of anxiety when speaking with native speakers as compared to their peers and further suggested that students should be encouraged to engage in authentic conversations with native speakers in informal settings. Real-life experiences where students can interact and converse meaningfully with native speakers can contribute significantly to building their confidence and competence in communicating with native speakers.

Relating these findings to Aviation English context, we could argue that the journey towards proficiency in ab-initio training can be hindered by the presence of anxiety to a great extent. Initially, under high-stress situations, anxious pilots may struggle to articulate themselves clearly, leading to misunderstandings and potential safety hazards. Anxiety may also disrupt cognitive processes, making it challenging for pilots to recall and apply the correct aviation English terms and phraseology. Additionally, high anxiety levels can impair student pilots' decision-making abilities, particularly in critical situations. Anxious pilots may find it difficult to process information rapidly, leading to delayed or incorrect responses. Considering all of these potential issues, it is critical to note that anxiety-induced communication difficulties can lead to critical errors, misunderstandings, and confusion, posing significant safety concerns for flight operations. Addressing learners' anxiety and fostering a supportive learning environment becomes crucial to ensuring effective language acquisition and overall success in pilot training.

2.5.3 Lack of authentic exposure. Student pilots should be exposed to authentic interactions to practice what they have learned in classroom setting and to meaningfully transfer this input into real-life application as this is vital for enhancing confidence. As underscored by ICAO (2009), the significance of practice, particularly exposure to authentic material, in achieving substantial progress towards proficiency

is often underestimated. Therefore, it is crucial to ensure that the amount of listening practice offered in a curriculum should incorporate authentic materials and meet the expected progress of students. In the study conducted by Demirdöken (2020), it was revealed that Turkish cadet pilots encounter significant difficulties in listening comprehension, ranking it among the two most challenging areas for them. The primary reason for this struggle was thought to be the lack of exposure to authentic listening materials prior to enrolling in Aviation English courses. In a similar line, Albritton (n.d) emphasized that pre-operational flight students can be enrolled in content-based aviation English classes and this way language learning becomes an intrinsic part of their flight training process, resulting in significant progress. These classes incorporate authentic training materials and realistic flight scenarios, mirroring the actual flight training curriculum. Apart from achieving ICAO Level 4 proficiency, students gain valuable aviation content knowledge, facilitating smoother flight training experiences with fewer setbacks due to language proficiency limitations.

These findings underscore the importance of addressing the listening aspect in aviation English training programs for ab-initio pilots. Needless to say, limited opportunities for exposure to authentic Aviation English interactions may result in communicational issues. By incorporating more authentic listening materials and dedicating sufficient time to hone their listening abilities, institutions can better equip student pilots for effective communication in real aviation scenarios.

2.5.4 Trainers. Aviation English trainers are essential figures in the aviation industry, acting as the bridge between language proficiency and specialized communication in the field. As stated in ICAO's (2009) guidelines, they must possess a unique blend of comprehensive aviation and English language expertise, allowing them to effectively teach aviation-specific terminology and phraseology while providing accurate language instruction. Communication is a cornerstone of their role, requiring trainers to have excellent skills in conveying complex aviation concepts in a clear and understandable manner. Moreover, they must demonstrate patience and adaptability in their teaching approach, recognizing the diverse backgrounds and language proficiency levels of their students and tailoring their instruction to individual needs. These trainers also have a deep understanding of international aviation regulations and procedures, ensuring that their students are well-versed in

complying with safety standards and industry practices. Cultural awareness and sensitivity are crucial traits for fostering an inclusive learning atmosphere, as they often interact with students from various cultural backgrounds. Ultimately, their expertise in conducting language proficiency tests equips them to guide and support learners in achieving the necessary standards for aviation communication, contributing to the overall safety and success of aviation operations worldwide.

To ensure the effective delivery of the best-designed aviation English training programme, trainers must possess a minimum set of essential skills and experience. Accordingly, careful attention should be given to the trainers' capabilities to guarantee that the aviation English training is conducted with utmost efficacy because trainers' skills, experience and deep understanding of international aviation ensure that ab-initio pilots are well-prepared to comply with industry standards, ultimately contributing to the pilots' proficiency in aviation English and enhancing the success of aviation operations globally.

2.5.5. Teaching materials and language support resources. Language teaching materials, such as textbooks, play an indispensable role in the process of language teaching and learning. They are considered highly relevant for pedagogical purposes due to their portability, usability, and ease of implementation (Nugraha, Mayui, Anwar, 2023). It is crucial to differentiate between teaching materials and teaching resources. According to Mishan and Timmis (2015), teaching resources are abundant sources that can potentially be transformed into teaching materials guided by our pedagogical ideas. Thus, designers of teaching materials must incorporate pedagogical objectives into the activities that accompany the materials, aligning with the principles of the language acquisition approach (Kuci, 2020).

A crucial aspect of English for Specific Purposes (ESP) teaching materials, such as Aviation English, is that they must align with the objectives of the communicative situation. Therefore, ESP teaching materials typically include authentic materials (Anthony, 2018). It is important to note that the process of creating language learning materials is intricate and involves several stages. These stages include conducting needs analysis, identifying the target audience (e.g., local, national, or global learners), determining curriculum and examination requirements, considering current teaching

techniques, being open to innovation, accounting for local infrastructure, and ensuring that the materials cater to the requirements of language acquisition (Tomlinson, 2016).

ICAO (2009) set the standards for the language training materials to be used in the Guidelines for Aviation English Training Programmes by touching upon different areas. With regards to the instructor manuals, it is noted that mastering new training materials sufficiently to deliver them with confidence is a time-consuming journey, even for experienced trainers. To support this endeavour, clearly structured instructor manuals or notes are a must. These manuals should present detailed instructions for conducting each exercise and include answer keys when solutions are not self-evident for trainers. It is emphasized that these manuals cannot replace the irreplaceable practical training provided by experienced instructors already familiar with the materials. Their hands-on approach and in-depth knowledge continue to be vital in ensuring successful training delivery. As for the student manuals, the following note is stressed:

Equally, students should be provided with complete training materials and simple instructions on how to use and navigate their way around their training materials. Technical or administrative information and an overall chart, which enables them to situate themselves within the course, may also be very useful (ICAO,2009, p.17).

It is significant to reiterate that the effective development and implementation of language teaching materials, backed by the guidance of experienced instructors, play a key role in achieving language learning goals. Limited opportunities in this area can adversely affect an ab-initio pilot's language proficiency.

2.5.6 Teaching methodology. The learning context for Aviation English requires special attention because the development of communicative language skills is paramount. In circular 323, ICAO (2009) underscored the importance of this subject with this statement:

In addition to addressing non-formulaic, work-related language, aviation English training must adopt an essentially communicative approach to language learning with the main focus on speaking, listening and interactive skills. Although grammar, syntax, vocabulary and reading underlie oral

communications, the primary objective of aviation English training is voice-only communication (ICAO,2009, p.2).

In the realm of ab-initio training, ESP training encompasses a range of tasks centered around their future professional communication abilities. These tasks should be skillfully designed to promote open dialogue, problem-solving, and information sharing among students, ensuring active engagement in the subject matter. Moreover, ESP training facilitates their proficiency in conducting professional information searches, which plays a vital role in the acquisition of specialized language skills tailored for effective aviation communication (Bystrova, Nemliy, Paziura,Vasiukovych, 2019). Considering this, instructors can enhance learning and language use through student-centered communicative activities and simulation exercises. By doing so, students gain valuable experience in handling specific situations and learn what to say effectively because participating in these real-life simulations enhances the learning process (Yee,2020). In the context of teaching ab-initio pilots, it can serve as an excellent example of efficient learning through guided conversation. In such simulations, participants assume roles, take on duties and responsibilities, and interact based on their individual personalities within a simulated and structured environment.

The significance of interactive methods was also underscored in a study conducted by Pershukova, Pazyura, and Vasiukovych (2023). Their research highlighted the importance of employing a targeted communicative approach and task-based activities, such as role-playing scenarios for problem-solving, simulations of specific situations, and engaging games, to foster professional readiness. This approach enables learners to develop their English professional communication skills implicitly and subconsciously while also acquiring vital professional knowledge and skills. Such preparation is crucial for mastering radio exchange, a critical aspect of effective communication in the aviation industry.

2.5.7 Motivation and engagement. Motivation, a multifaceted and intricate concept, holds a key position in determining the success of learning foreign languages (Larsen- Freeman, 2001). It revolves around students' realization of the importance of using another language and the value it holds for their future careers and personal growth. Gardner (1985) proposed two types of attitudes that influence language

learning motivation: attitudes towards speakers of the target language and attitudes concerning the practical applications of the language being learned. This led to the development of the integrative and instrumental orientations. Integratively motivated learners seek to immerse themselves in the culture of the second language and engage socially with its speakers. In contrast, instrumental orientation focuses on the pragmatic advantages of learning a foreign language, such as career advancements and professional opportunities. Learning motivation is a distinct form of motivation that plays a systematic, directional, stable, and dynamic role in educational activities. It is shaped by the educational system, institution, learning process, and the subject matter itself. Additionally, learning motivation is influenced by subjective factors such as students' age, gender, intellectual development, learning abilities, desired achievements, self-esteem, and interpersonal skills (Pershukova, 2019).

ICAO (2009) also emphasizes the crucial role of motivation in language learning, as understanding the significance and relevance of the subject matter significantly enhances our capacity to absorb and comprehend it. Moreover, when the language we acquire is directly applicable to real-life situations, it seamlessly integrates with practical use, making it readily available and effortlessly applied when needed. With the aim of complying with ICAO requirements, Pershukova et al. (2023) pursued a study that highlighted the positive impact of interactive learning methods, such as professionally oriented simulations, role-playing, and games on student pilots' motivation. These methods involved simulating specific situations related to their future profession and enabled teachers to create communicative scenarios closely resembling real-life communication. The findings indicate that such interactive learning techniques significantly enhance students' motivation to learn and master Aviation English, which is increasingly essential for their professions.

In brief, it is important to note that creating an interactive learning, being flexible in training delivery and adapting the pace, style, and content to cater to the diverse requirements, backgrounds, levels, objectives, and learning styles of their students are important points to be considered to enhance motivation within the realm of ab-initio training.

2.5.8 Feedback and assessment. The role corrective feedback is paramount in ab-initio training. Corrective feedback is characterized as a response to an incorrect

statement made by a learner (Ellis et al., 2006). Among the various forms of corrective feedback, the present study focuses on recasts and explicit correction for several reasons. A recast involves the teacher rephrasing a learner's grammatically incorrect statement, constituting an implicit form of corrective feedback as it discreetly enhances accuracy without disrupting communication (Trofimovich et al., 2007). In contrast, explicit correction is more noticeable as it directly flags an utterance as erroneous (Leeman, 2003). In a study carried out by Rassei (2013), it was determined that both explicit corrections and recasts contributed to the acquisition of second language knowledge. Nonetheless, explicit corrections proved to be more impactful than recasts, enabling learners to identify the errors in their incorrect statements much more effectively.

Regarding oral corrective feedback, instructors are confronted with the decision of immediately addressing a learner's erroneous statement or deferring the correction to a later point. Teacher educators often distinguish between "accuracy" and "fluency" work, suggesting that corrective feedback has a role in the former but not the latter. Harmer (1983) argued that during communicative activities, teachers should avoid intervening by "pointing out mistakes, emphasizing precision, and requesting repetition, among other actions" (p. 44). Similarly, Bartram and Walt (1991) contended that student speech should remain uninterrupted.

As ICAO (2009) indicates, monitoring and testing play crucial roles within aviation English training schemes. Instructors must possess an awareness of their students' requirements and promptly address them by vigilantly overseeing students' endeavors and advancements. An aviation English curriculum must encompass an initial placement assessment as well as regular progress evaluations and final examinations to impartially gauge students' development. Furthermore, supplementary insights should be amassed regarding completed activities, exercises, tasks, time allocation, and evaluations provided by trainers.

In brief, ab-initio pilots should be tested and then receive constructive feedback on their performance and improvement on a regular basis. This will positively affect their awareness of areas for improvement in Aviation English, thus help them take timely actions accordingly.

2.5.9 Cultural factors. Culture has a profound impact on second language learning, influencing various aspects of the process. In aviation context, the cultural background of ab-initio pilots, the culture they are within and the extent to which this culture is open to support different language use and cross-cultural communication norms can have effects on their language learning experience and chances. As Byram (1994) puts forward, culture intertwines with an array of variables that have the potential to impact learning, with a primary focus on its affective dimensions. Seliger (1988) also highlights the significance of this perspective stating that learners' feelings, attitudes, and motivations towards the target language, its speakers, and the culture will significantly impact their receptiveness to the input they encounter because language is utilized in social interactions. In other words, these affective variables will ultimately dictate the speed and level of proficiency attained in second language learning.

Demirdöken (2020) conducted a study focusing on ab-initio pilots, revealing that the challenge of speaking in English for the ab-initio pilots in Turkey is influenced by sociocultural factors. In this study it was further argued that despite Turkey's ethnic diversity, a nationalist perspective towards English remains prevalent in many regions, which may impact the motivation of second language learners, including ab-initio pilots. Moreover, limited interaction with English-speaking communities further restricts language development opportunities. As a result, achieving higher levels of English language proficiency becomes accessible primarily to those who are fortunate enough to receive early exposure through determined teachers or parental support. This emphasizes the significant role of culture in shaping language learning experiences for ab-initio pilots in Turkey.

2.5.10 Time constraints and workload. Time constraints refer to the disparity between the available time and the time required to resolve a decision task (Benson & Beach, 1996). Research has revealed that time constraints negatively impact individuals' ability to make effective decisions (Maule & Edland, 1997). Additionally, time constraints play a significant role in learning. The capacity to handle time constraints improves with practice, as sufficient practice trials enable individuals to gain control over the system, leading to enhanced overall task performance. Consequently, individuals under severe time constraints, with adequate practice,

should achieve performance levels similar to those under low time constraints. (Gonzalez,2004).

Moreover, ab-initio pilots' cognitive capacity is another influential factor in learning. As human cognition has limitations, it can moderate the effects of time pressure on learning. In complex systems, the need to process large volumes of information increases as the available time decreases. Given that dynamic situations continuously evolve, decision makers must process new situations while concurrently retaining information and handling incoming variables (Gonzalez,2004). In ab-initio pilot training, the impact of time constraints becomes particularly relevant as aspiring pilots undergo rigorous instruction to develop their skills and decision-making abilities. Time constraints are a crucial aspect of this training, as they closely simulate the time-sensitive scenarios pilots may encounter during actual flights. Thus, understanding the interplay between time constraints, practice, and cognitive capacity is crucial for optimizing learning outcomes in complex learning scenarios.

In ab-initio pilot training, the pressure of the number of courses, exams, and tasks to be completed adds an additional layer of complexity to the learning process. Student pilots find themselves juggling multiple responsibilities, from attending various courses to preparing for exams and completing numerous tasks. This extensive workload poses a challenging environment in which to develop their language skills. Student pilots not only face time constraints but also the demand to manage their workload efficiently while striving to maintain high standards of performance in each assessment and task. The weight of these expectations can lead to heightened stress levels, potentially impacting their ability to focus and effectively acquire the necessary language competencies. What is more, the time pressure and demanding workload can negatively affect the time required to enhance their language skills. In the fast-paced and intense training environment, students may have limited opportunities to devote sufficient time and effort to language learning, hindering their progress in attaining proficiency. Another concern is that when student pilots are offered limited opportunities due to time constraints, they may not have the necessary time to fully immerse themselves in language learning.

2.5.11 Noise. Numerous factors pose challenges to effective communication, one of which is noise. Pilots exchange instructions via radio communication, often in

noisy settings. The cockpit environment is full of different sources of noise, namely engine noise, radio communications, and other aircraft systems. Inside the cockpit of a typical general aviation aircraft like the Cessna 172 during cruise, noise levels are 50 decibels higher compared to a standard office environment (Jang et al., 2014).

The impact of aircraft noise, particularly when aircraft fly over, on cognitive performance is well-documented. Language comprehension is also adversely affected by aircraft noise. While the noise remains consistent for all speakers, its impact on speech comprehension is not unfortunately the same. In other words, a greater effect is observed in non-native speakers (Molesworth,2016). This discrepancy is especially significant in the aviation context, where noise is a common factor, and a substantial number of pilots using Aviation English are not native speakers of the language (Shimizu et al.,2012)

Extensive research has explored the impact of noise on overall performance, and it is evident that noise can have adverse effects, such as impairing memory (Sorqvist, 2010) and increasing error rates (Jang et al., 2014). Additionally, excessive noise can lead to distraction, fatigue, and difficulty in sustaining situational awareness (Molesworth,2016).

In a study involving more than 80 pilots from various airports in eastern Australia, Estival and Molesworth (2012) discovered that pilots considered 'communicating with other pilots' to be the most convoluted communication task due to the pervasive background noise affecting both the transmitter and the receiver. Considering the extensive effects of noise on pilots, student pilots are at a greater risk because they are experienced enough to deal with these impacts and thus can be easily distracted and fatigued.

2.5.12 Stress. Stress, primarily a biological response, wields substantial influence over an individual's health, psychological state, and performance (Sanders and McCormick, 1993). It prominently contributes to accidents and incidents within civil aviation (Useche et al., 2017). Historical records highlight the correlation between stress-ridden pilots and diminished performance (Lee, 2010). The piloting endeavor itself is inherently stress-inducing demanding naturalistic decision-making under duress, wherein distinctions between expert and ab-initio pilots are apparent (Deitch, 2001). The latter, characterized by a lack of experience and insufficient internalization

of knowledge, are especially vulnerable (Kilic and Soran, 2019). As a result, student pilots respond more intensely to flight-related stressors (Farrace et al., 1996).

Among diverse stressors, lack of knowledge holds significant sway, negatively impacting individual performance (FAA, 2016). It leads to heightened concerns and vulnerability under stress, making them more susceptible to errors, thereby perpetuating their stress levels. This vulnerability can be exacerbated by poor language proficiency, which can significantly contribute to the stress experienced by ab-initio pilots. A lack of language skills can hinder effective communication with air traffic control and fellow crew members, creating a sense of isolation and increasing the cognitive load during flight. In high-stress situations, the inability to clearly understand or convey critical information due to language barriers can magnify stress levels. Needless to say, stress levels tend to peak during junior years until a comprehensive knowledge base is amassed. An investigation by Kilic and Ucler (2019) into the primary factors responsible for 56.7% of stress among ab-initio pilots highlighted a shortage of aviation knowledge as the most significant contributor, accounting for 19.5% of the total weight. This clearly shows us that lack of knowledge in Aviation English can create stress and impair ab-initio pilots' confidence.

2.5.13 Lack of knowledge. As indicated by knowledge deficiency in operating handbooks, checklists, and the operation of automatic equipment, coupled with inadequate preparedness for flight information, would substantially increase the risk associated with flights conducted by student pilots (Hong, Lee, Seol and Young, 2016). Similarly, insufficient knowledge of standard phraseology could pose a major threat. Another major issue with insufficient knowledge in aviation is that it represents an additional source of personal stress, impacting one's performance both in the workplace and during training (FAA, 2016). Individuals grappling with knowledge deficits often experience heightened levels of anxiety and stress. Consequently, they become more susceptible to making mistakes, and thus compounding their stress levels. In a study conducted by Hong et al. (2016), it was found that lack of flight knowledge played a key role in student pilots' perceptions of risk.

The pilot training program is designed to cultivate and consistently enhance their aviation knowledge, with a focus on ensuring safe flights. Nonetheless, this is a long process, and it takes time for them to acquire a comprehensive understanding of their

field (Kilic and Ucler, 2019). Briefly, it is significant to reiterate that a lack of knowledge can have detrimental consequences for student pilots, and this issue must be given precedence.

2.6 Effects of Poor Competence in Aviation English

2.6.1 Miscommunication and safety risks. Miscommunication or misunderstandings can be the biggest negative impact if student pilots have difficulty in vocabulary, pronunciation, and grammar. Mauranen (2006) provides a straightforward definition of misunderstanding as a "potential breakdown point in conversation" (p. 128). According to Bremer (1996), within a conversation, a misunderstanding pertains to situations in which the listener comprehends an interpretation that aligns with their understanding yet diverges from the speaker's intended message. In the context of aviation, Simmons (1974) specifies that miscommunication denotes the misinterpretation of instructions by pilots or controllers, evident through missing readbacks, incomplete instructions, or readbacks.

The consequences of miscommunication can be dire, potentially resulting in loss of human lives. Despite both pilots and controllers being fluent in English, the intricate nature of language and individual interpretation can still lead to misunderstandings. It is imperative to consistently refrain from linguistic ambiguities in radiotelephony (Hamzah and Fei, 2019). Uncertainty and ambiguity arising from non-standard phraseology in communication can have catastrophic outcomes. An illustrative incident is the 1990 Avianca Airlines accident. The first officer, facing adverse weather conditions, used the phrase "I think we need priority" instead of employing the standard emergency terminology. This mistake tragically led to fatalities (Flight Safety Foundation 2006).

Analyzing pilot readback errors, Prinzo (1998) identifies a common communication problem: controllers' instructions surpass pilots' ability to memorize all instructions within a single communication cycle. Cookson (2009) assert that miscommunication frequently arises during emergency scenarios. Seiler (2009) emphasizes that possessing aviation English skills alone is insufficient for effective communication. He contends that alongside aviation English, plain English is necessary as the former falls short of addressing all potential communication complexities (Seiler, 2009).

In the light of these studies, it is vital to reiterate that inadequate language skills can put operations at stake. If student pilots are unable to effectively communicate critical information or understand important instructions during normal or emergency situations, there will be safety issues.

2.6.2 Licensing issues. The link between poor language proficiency and licensing issues for ab-initio pilots is clear. Pilots, air traffic controllers, and aeronautical station operators must attain a minimum Level 4 proficiency on the ICAO scale to obtain licenses for piloting aircraft, managing air traffic on international flights, or participating in international aviation operations. This prerequisite underscores the vital role of effective communication in the aviation sector. However, for ab-initio pilots, the stakes are particularly high. If they fall short of the Level 4 proficiency requirement, they cannot embark on their careers. As the backbone of aviation safety, language proficiency remains an important pillar, serving as a safeguard against potential pitfalls.

An important issue related to licensing is that if the language proficiency assessments utilized for licensing aviation personnel are not dependable or fail to measure accurately, there can be hazardous outcomes (Alderson,2011). Therefore, it is critical to emphasize that it is not just about acquiring a valid license; it is also about having a reliable assessment process to ensure that student pilots meet the necessary language standards.

2.6.3 Stress. As indicated by Masi, Amprimo, Ferrairs, and Priano (2023), stress is a significant subject in aviation due to its profound impact on human performance. Encountering stress, along with factors like fatigue, and situational unawareness, can lead to human errors with devastating consequences. Within the context of Aviation English stress can be a double-edged sword, serving as both a cause and a consequence of poor competence. As well as its role in triggering language related issues by resulting in communication breakdowns as a root cause, it can also appear on the stage as a consequence of poor competence in Aviation English or poor communication due to their language limitations. What is critical is that enduring exposure to stress has been found to result in conditions such as post-traumatic stress disorder, anxiety disorder, depression (Stokes and Kite,2017). Given that ab-initio pilots are more susceptible to the influence of stressful conditions, it is accurate to assert that stress

affects student behaviors, leading to a succession of poor decision-making. As a result, stress significantly contributes to a substantial percentage of aviation accidents and incidents, raising concerns for ab-initio pilots (Kilic and Ucler,2019).

2.6.4 Additional training costs. Poor language skills not only impact not only pilots' ability to communicate effectively but also their overall training process. The study conducted by Hamzah, Krish, and Hamat (2023) highlighted a consensus among respondents regarding the crucial necessity of additional language training in aviation communication to enhance aviation safety. Their study revealed that a significant majority, 91% (n=101) of respondents, strongly advocate for the implementation of additional aviation language training. These findings suggest that the current language proficiency levels among pilots and air traffic controllers fall short of the operational standard. In addition to addressing the existing competency gaps among pilots and air traffic controllers, survey participants highlighted the potential benefits of practicing language skills during emergencies and unprecedented situations, such as adverse weather conditions and equipment malfunctions. This aspect holds particular relevance for ab-initio and less experienced aviation personnel.

When student pilots face language-related problems, the implications extend beyond communication barriers. These individuals may require supplementary training resources to address their language proficiency issues. This entails investing more time and financial resources to ensure that they can adequately communicate, understand instructions, and engage in effective aviation-related discussions. Additional language training, whether it's through specialized courses or personalized coaching, becomes necessary to bridge the gap in communication skills. While this does increase training costs, it is a crucial step to ensure that student pilots can fully comprehend and implement essential aviation concepts, procedures, and safety protocols.

Chapter 3

Methodology

The methodological rationale of the current study is sought to be explained in this chapter. It will commence with a brief overview of the research design. Following that, the setting, participants, data collection instruments, data collection procedures, data analysis will be presented. The research questions related to the methodological framework of this study are as follows:

Q1. What are the perceptions of ab-initio pilots at a foundation university in Turkey towards their competency in Aviation English?

Q2. What are the issues ab-initio pilots at a foundation university in Turkey have in Aviation English?

Q3. What do the ab-initio pilots at a foundation university in Turkey think about the causes and effects of the issues they have in Aviation English?

3.1 Research Paradigm

According to Cohen et al. (2011), research methodologies are deeply rooted in specific paradigms. They defined a paradigm as a perspective or approach for examining and exploring phenomena. Guba and Lincoln (1994) further elucidated this concept, stating that a paradigm represents a comprehensive worldview that not only shapes one's perception of the "world" but also one's role within it and the potential relationships with the world and its components (p. 107). Consequently, the research paradigm plays a pivotal role in guiding researchers, influencing research strategies, and ultimately shaping the study's findings and conclusions.

In the context of investigating student beliefs, the selection of an appropriate approach to frame the research design and data analysis becomes imperative. In this study, the pragmatic approach serves as the overarching research paradigm, aligning seamlessly with the study's research questions. Philosophically, a mixed research method adopts a pragmatic system and philosophical approach. This perspective, often considered the third research paradigm, acts as a bridge between the traditionally distinct realms of quantitative and qualitative research, as noted by Onwuegbuzie and Leech (2004). This approach gives researchers the flexibility to choose research methods, techniques, and procedures that align with their specific needs and

objectives. Therefore, for researchers employing mixed methods, pragmatism opens the door to, different worldviews, varied assumptions, and different modes of data collection and analysis, as underlined by Creswell (2009).

3.2 Nature of the Research

For numerous years, two predominant approaches have held prominence in the realm of language research. On one hand, scholars pursuing correlations or causal relationships between variables have adhered to the experimental tradition, characterized by quantitative data collection and analysis techniques. On the other hand, those inclined towards narration, description, and interpretation have leaned towards the qualitative tradition. As Nunan and Bailey (2009) indicate, although each of these approaches has its unique strengths and weaknesses, there is no conclusive evidence to establish a clear superiority among them. The determining factor, therefore, is the research question itself since it directs researchers in selecting the appropriate data collection methods and analytical techniques.

In recent times, the utilization of mixed-methods research has gained widespread acceptance. This approach involves the collection and analysis of data, as well as drawing conclusions, by incorporating both qualitative and quantitative methods within a single study (Tashakkori and Creswell, 2003; Halcomb and Hickman, 2015). Accordingly, as Doyle et al., (2009) put forward, mixed-methods research is regarded as a valuable third methodology within the domain of social research.

A mixed-methods sequential explanatory design was employed in this research. According to Ivankova, Creswell, and Stick (2006), this design involves the collection and analysis of quantitative data followed by qualitative data in two consecutive phases within a single study. Creswell (2003) notes that the primary aim of this approach is to use qualitative data to provide a more detailed explanation of the initial quantitative results. The fundamental premise underlying mixed methods research is that the combination of quantitative and qualitative approaches enhances our understanding of research problems more effectively than either approach in isolation (Creswell & Plano, 2007). While a questionnaire survey serves as a versatile technique for efficiently gathering substantial data within a short timeframe, it may yield shallow engagement from respondents, limiting its ability to provide nuanced insights on its

own (Dörnyei, 2007). Consequently, it is advisable to include a subsequent qualitative component, such as focus group meetings.

In light of this framework, quantitative data were gathered through a questionnaire, which was subsequently complemented by semi-structured individual interviews. To collect quantitative data, a questionnaire developed by Demirdöken (2019) was adapted and administered. Semi-structured focus group interviews were conducted to gather qualitative data and provide further insights. These interviews were used as a supplementary method to enhance the depth of understanding in the research study. The goal of incorporating interviews was to gain more detailed information about learners' current experiences with Aviation English courses and their perspectives on the causes and consequences of the challenges they face in Aviation English.

Furthermore, this inquiry can also be categorized as an ethnographic research approach because it unfolds within a natural setting and entails in-person interactions with participants, facilitating an exploration of their thoughts and emotions regarding a particular subject (LeCompte & Schensul, 1999). Ethnographic investigations come with various advantages, including the integration of data from diverse sources through the use of both qualitative and quantitative data collection methods. Nevertheless, as Mackey & Gass (2005) indicate, the outcomes of ethnographic research are often intricate to generalize to other contexts, due to the highly specific nature of such research endeavors.

3.3 Setting and Participants

3.3.1 Setting. As of 2023, there are 12 universities in Turkey that offer 4-year professional flight programs. Among them, certain universities focus solely on radio communication classes, while others offer a more comprehensive curriculum, including fundamental English courses, Aviation English, and radio communication. The research is conducted at an English-medium foundation university located in Istanbul, Turkey. To assess the English language proficiency of newly enrolled students, Test of Readiness for Academic English (TRACE) is administered at the beginning of the academic year. Students who successfully pass this exam are exempted from participating in the English Preparatory Program. Successful completion of TRACE allows students to advance to their freshman year.

This exam is specifically designed to assess students' preparedness for academic studies conducted in English. To begin their studies, students must achieve a minimum score of 65% on the TRACE exam. This examination is centered around a broad subject area, and all sections of the test are connected to this overarching topic. This approach aims to provide students with content that fosters critical thinking skills, reflecting the real-life demands of university students. The exam directly evaluates reading, writing, and listening skills for academic purposes, with grammar and vocabulary indirectly assessed through comprehension and usage. Yet, it does not assess speaking skills. In the construction of the exam, Common European Framework (CEF) levels are considered as a reference, with a focus on assessing language and skills at the B2 level.

As an alternative to the TRACE exam, students also have the right to enroll in their degree programs by submitting one of the nationally and/or internationally recognized foreign language exam results, which serve as evidence that they meet the foreign language proficiency criteria established by the school. Upon successful completion of the English Language Preparatory Program, students become eligible to commence their 4-year Undergraduate Professional Flight Program. This comprehensive program offers academic courses and theoretical ground training, all of which are administered by the Undergraduate Professional Flight Program. Nonetheless, flight training is conducted by a private flight training organization.

The curriculum of the Professional Flight Program has been carefully structured in line with the regulations of ICAO. The fundamental main of this program is to equip ab-initio pilots with the necessary skills, competencies, theoretical and practical knowledge which are important to meet the requirements of both national and international airline companies.

The Professional Flight program comprises three categories of courses: Flight courses, Academic courses, and Elective courses. Prospective pilots must successfully complete a total of 52 courses, equivalent to 240 ECTS credits, to qualify for graduation from the Undergraduate Pilot Training Program. Regarding Aviation English and communication courses, freshmen take two English courses, namely ENG 105 and ENG 106. These courses are specifically designed to facilitate the acquisition and improvement of English language skills for students pursuing undergraduate studies in pilot training. They employ a content-based language instruction approach

as their foundational methodology. The primary objective of ENG 105 and ENG 106 is to empower students with the ability to communicate effectively on topics that are commonplace, practical, and relevant to their work. Proficiency in these courses entails clear and precise communication, utilizing a dialect or accent that is comprehensible to professionals within the aeronautical community. Moreover, these courses are structured to equip students with a fundamental vocabulary and content specific to the aviation field. The proficiency level of these courses aligns with the guidelines outlined in the Manual on the Implementation of ICAO Language Proficiency Requirements. Moving into their sophomore year, students enroll in "Communication for PPL," a course designed to impart the necessary radiotelephony skills. In their junior year, students have the opportunity to participate in "Communication for ATPL." Both of these courses are led by an instructor pilot. Additionally, students are offered the Aviation English course during the same year. This course is dedicated to enhancing proficiency in both plain English and standard phraseology. It also serves as a foundation for preparing for the pilot level exam.

3.3.2 Participants. The total annual student pilot quota for 12 universities in Turkey that offer 4-year professional flight programs is 326 as of 2023. The present study was undertaken with a cohort of ab-initio pilots currently pursuing their education at a foundation university located in Istanbul, Turkey. The questionnaire was thoughtfully sent to a total of 110 students comprising sophomores, juniors, and seniors, resulting in 90 students providing responses. It should be noted that freshman students were intentionally omitted from the study's scope, given that they had not yet embarked on their private pilot license (PPL) coursework. The selection of these participants was guided by a careful consideration of the research's core objectives.

With regards to the size of the sample population, it could be noted that the selection of a study population comprising 110 individuals, with 90 students agreeing to participate, is a suitable and representative sample for the research purposes. The population size of 90 individuals is sufficiently large to provide statistical significance and draw valid conclusions about the broader group. This level of participation ensures that our study captures a diverse range of perspectives and characteristics within the population, enhancing the generalizability of the findings.

Semi-structured focus group meetings were conducted with students from the population. At the beginning, participants were also informed about the second stage and were given the option to reject or participate in the research. Among the 90 respondents who completed the questionnaire, 45 students agreed to participate in the focus group meetings. These students were interviewed in online group sessions via Zoom as part of the second stage of the study. This approach allowed the researcher to gain valuable insights into the learners' perceptions of Aviation English, existing challenges, underlying causes, and their far-reaching impacts. A comprehensive analysis of the data collected from the questionnaire and structured individual interviews is presented in Chapter 4.

3.4 Procedures

In this section of the study, data collection instruments, data collection procedures, data analysis procedures, and ethical considerations will be sequentially addressed.

3.4.1 Data collection instruments. In the present study, two data collection methods were employed: a competency in Aviation English questionnaire (See Appendix C) and semi-structured focus group interviews (See Appendix D). To address the first research question (Q1. What are the perceptions of ab-initio pilots at a foundation university in Turkey towards their competency in Aviation English?), the needs analysis questionnaire was utilized. Likewise, the second (Q2. What are the issues ab-initio pilots at a foundation university in Turkey have in Aviation English?) and third research questions (Q3. What do the ab-initio pilots at a foundation university in Turkey think about the causes and effects of the issues they have in Aviation English?) were explored through focus group meetings.

3.4.1.1 Questionnaire. The primary objective of scientific investigation is to methodically pursue answers. In the realm of the social sciences, the utilization of questionnaires has become a widely embraced methodology (Dörnyei, 2007). According to McDonough and McDonough (2014) questionnaires typically produce responses that are straightforward to tabulate or score, and the resultant data lends itself to straightforward analysis. For this study, the questionnaire developed by Demirdöken (2019) was adapted. This questionnaire has 18 items which are designed

to analyze the perceptions of learners regarding their competency in Aviation English. Participants are asked to indicate their level of agreement using a 5-point Likert scale. In this scale, "1" indicates "strongly disagree," "2" indicates "disagree," "3" indicates "neither agree nor disagree," "4" indicates "agree," and finally "5" indicates "strongly agree." The questionnaire was distributed to 110 students online through Google Forms and 90 students agreed to complete it.

Regarding the reliability of the questionnaire, Nunnally (1978) differentiated between the reliability requirements for instruments in basic research and those in applied research. He proposed that a Cronbach Alpha coefficient of .70 or higher is typically deemed acceptable in basic research, while in applied research, a higher threshold of .80 or more is recommended. Moreover, when pivotal decisions rely on test scores, it is advisable for reliability to reach at least .90, and preferably exceed .95 (p.245). Accordingly, the Cronbach Alpha score for the pilot study was determined as .893 by Demirdöken (2019).

3.4.1.2 Semi- structured focus group interviews. Semi-structured focus group sessions were thoughtfully integrated into the research design, with the intention of obtaining valuable insights into the participants' attitudes towards autonomous language learning. These focus group discussions were carried out online via zoom meetings. To foster a conducive atmosphere for informal group dialogues and to ensure active participation, the learners were organized into nine distinct groups, each comprising five students. With the aim of facilitating an interactive exchange of ideas and experiences among participants and enriching the data collection process, this kind of setting was arranged. The duration of each of these focus group meetings lasted approximately 25 minutes and it was ensured that each participant could actively engage without getting distracted.

The selection of focus group meetings as the primary data collection method for this study was a well-considered choice. This method aligns with the research's objectives, as it encourages participants to engage in dynamic conversations with one another. Focus groups allow participants to pose questions, share personal anecdotes, and offer comments on each other's perspectives (Kitzinger, 1995). This approach is particularly advantageous for exploring the depth of individuals' knowledge and their personal experiences. Moreover, it provides a unique opportunity not only to uncover

what participants think but also to delve into the underlying thought processes, reasoning, and motivations behind their beliefs and attitudes (Kitzinger,1995). This makes focus groups an invaluable tool for gaining comprehensive insights into the nuanced facets of the participants' attitudes and beliefs.

3.4.2 Data collection procedures. Data for this study were collected between August 20 and October 18, 2023. To streamline the process and enhance participant engagement, the initial phase of quantitative data collection was structured as an online survey using Google Forms. Using this method facilitated reaching a broader participant pool efficiently. An introductory notice in the questionnaire informed participants about the study's purpose, scope and confidentiality issues. The questionnaire link was emailed to 110 students, and 90 students completed it in full.

The questionnaire comprised two primary sections: the first section aimed to gather demographic data and details about the students' educational backgrounds, while the second section contained items designed to assess learners' perceptions of their proficiency in Aviation English. The responses were meticulously analyzed to draw meaningful insights. As per the qualitative phase of the study, data were collected through semi-structured focus group meetings. The focus group meetings were conducted in English. However, participants were also given the option to express themselves in Turkish to enhance their comfort and obtain more reliable data. Each meeting was recorded for subsequent analysis. If any responses were in Turkish, they were translated into English. Finally, the data were systematically coded, and both implications were derived from the analysis.

3.4.3 Data analysis procedures. Greene et al. (1989) argue that triangulation is a methodological approach aimed at achieving convergence, corroboration, and alignment of results obtained from different research methods (p. 259). The purpose of employing triangulation is to enhance the validity of research by either maximizing or counteracting the influence of diverse sources of variation, including inherent methodological biases, researcher perspectives, contextual factors, and underlying theoretical frameworks.

3.4.3.1 Quantitative data. The examination of quantitative data involves the utilization of numerical values and mathematical techniques, as described by

Walliman (2006). The analysis of quantitative data of this study was performed using Minitab 17. First and foremost, demographic and educational characteristics among the participants were analyzed. Subsequently, an in-depth analysis including means, standard deviations, and percentages, was conducted on the data gathered from the questionnaire's second part, which directly pertained to the identification of learners' perceptions about their competency in Aviation English (addressing Research Question 1). Furthermore, a two-sample t-test was utilized to distinguish between the responses of students who rated their English language proficiency below the B2 level, which is the prerequisite for commencing their undergraduate studies, and the group of students who indicated that their language skills were at B2 or higher prior to undertaking the Aviation English course. This statistical test was employed to ascertain whether there were significant differences in perceptions of Aviation English competency between these two distinct groups, shedding light on the impact of pre-existing language proficiency on their course-related perceptions.

3.4.3.2 Qualitative data. The focus group discussions were transcribed in their entirety before proceeding with the analysis phase. Within these transcripts, an exploration of key words and the identification of recurring themes were undertaken to uncover valuable insights into the perspectives and views of the participating students.

Throughout the data interpretation process, a concerted effort was made to adhere to the principles of objectivity and neutrality. It was deemed imperative to mitigate any potential influence of bias, preconceived notions, or personal values that might inadvertently affect the interpretation. As noted by Maxwell (1996), the imposition of one's own understanding upon the data was sought to be avoided, as such impositions could lead to distortions compromising the validity of the interpretation. Therefore, a deliberate and rigorous approach was taken to ensure that the analysis remained as impartial as possible. The main goal was to derive objective and valid qualitative conclusions from the collected data, a mission guided by the principles of interpretive analysis. As advocated by Cohen, Manion, and Morrison (2000), this approach entailed a thorough examination of the data without preconceived notions or rigid frameworks.

3.5 Ethics

All participants were informed about the goals and direction of this research in a detailed fashion prior to the research. In this comprehensive briefing session, it was ensured that they clearly understood the study's purpose and scope. Furthermore, all participants received a written consent form, which was designed to inform them about how their data would be collected, used, and securely maintained throughout the study. Furthermore, it was of paramount importance to convey to the participants that their decision to either consent or decline participation in the research would have absolutely no bearing on their academic grades or their interpersonal relationship with the researcher, me. In other words, participants were assured that their academic standing and their rapport with the researcher would remain entirely unaffected by their choice in this matter.

Chapter 4

Findings

The objective of this research was to investigate the competency of Aviation English among ab-initio pilots at a Turkish foundation university, with the intention of illuminating the existing issues, their underlying causes, and the consequences. In the initial section of this chapter, descriptive statistics derived from the questionnaire administered to 90 participants are presented to function as the foundation upon which subsequent analyses are built. Then, the analyses of qualitative data which derived from focus group meetings with 45 participants for research question two and three are presented. Additionally, comparative analyses of both quantitative and qualitative data were undertaken for the second research question with regards to language levels prior to taking Aviation English course and experience based on flight hours to provide a more in-depth exploration of the research problem.

4.1 Descriptive Statistics

Table 1

Demographic Information Related to the Participants in the Study

	Variables	N	%
Age	19	2	2.2%
	20	10	11.1%
	21	21	23.3%
	22	27	30%
	23	20	22.2%
	24	7	7.8%
	25	2	2.2%
	26	1	1.1%
Nationality	Turkish	82	91.11%
	Azerbaijani	3	3.33%
	Spanish	1	1.11%
	Turkish-British	1	1.11%
	Uzbek	1	1.11%
	Pakistani	1	1.11%
	Egyptian	1	1.11%
Gender	Male	73	81.1%
	Female	17	18.9%
Flight Hours	10-60	39	43.33%
	60-110	25	27.28%
	110-160	9	10%
	160-210	2	2.22%
	210 and above	15	16.67%

Table 1 cont'd

License Type	Currently in the process of obtaining PPL	1	1.1%
	PPL	46	51.1%
	Holding a PPL and recently completed ATPL theoretical courses	29	32.2%
	ATPL	14	15.6%
	Variables	N	%
Learning Experience	1-3 years	7	7.8%
	3-6 years	21	23.3%
	6-10 years	26	28.9%
Learning Circumstances	More than 10 years	36	40%
	I have learned English in a language school in Turkey.	25	28.1%
	I have learned English as part of compulsory education.	50	56.2%
	I have learned English abroad.	11	12.4%
	I have learned English with a tutor.	3	3.4%

Note: N: Number of responses, %: Percentage of responses

Participants' responses to the questions in Part A were calculated using a simple statistical analysis. As highlighted in the given table, there existed a diverse age range. The general distribution of participants' age range extended from 19 to 26 years. The largest portion of the participants was within the age range of 21 to 22 years, which formed 23.3% ($n=21$) each for both 21 and 22 years. 2 participants (2.2%) were 19 years old, 7 of them (7.8%) were 24 years old, and only 1 participant (1.1%) was 26 years old.

With regards to their nationality, the predominant group was Turkish forming 91.11% ($n=82$) of the sample. There were also student pilots from other nationalities, including Azerbaijani (3.33%, $n=3$), Spanish (1.11%, $n=1$), Turkish-British (1.11%, $n=1$), Uzbekistan (1.11%, $n=1$), Pakistani (1.11%, $n=1$) and Egyptian (1.11%, $n=1$).

In terms of the gender distribution, 81.1% ($n=73$) of participants were male and 18.9% ($n=17$) were female in this study.

When it comes to flight hours, participants' experience varied significantly. The largest group, at 43.33% ($n=39$), had flight hours in the range of 10-60, while 27.28% ($n=25$) reported having 60-110 hours. A smaller 2.22% ($n=2$) had only 160-210 hours, and 16.67% ($n=9$) boasted 210 hours or more.

Regarding their pilot licenses, a notable 51.1% ($n=46$) held a Private Pilot License (PPL). Additionally, 32.2% ($n=29$) had already obtained a PPL and recently completed ATPL theoretical courses, and 15.6% ($n=14$) possessed an Airline

Transport Pilot License (ATPL). Finally, only one participant, (1.1%) was in the process of obtaining a PPL.

There were major differences regarding the learning experience and background of the participants. It can be observed that 40% ($n=36$) of the participants had more than 10 years of aviation experience whilst 28.9% ($n=26$) had 6-10 years of experience. Additionally, 23.3% ($n=21$) had 3-6 years of experience, and 7.8% ($n=7$) had 1-3 years of experience.

Last but not least, participants learned English through various circumstances. Initially, 56.2% ($n=50$) learned it as part of compulsory education, 28.1% ($n=25$) learned it in a language school in Turkey, 12.4% ($n=11$) learned it abroad, and 3.4% ($n=3$) learned it with the assistance of a tutor.

Table 2
Participants' Own Perceptions of their English Language Proficiency Level Prior to Taking Aviation English Courses

	Variables	N	%
Speaking	A1 Beginner	0	0.00%
	A2 Elementary	7	7.78%
	B1 Intermediate	39	43.33%
	B2 Upper Intermediate	27	30.00%
	C1 Advanced	16	17.78%
	C2 Proficient	1	1.11%
Listening	A1 Beginner	1	1.11%
	A2 Elementary	1	1.11%
	B1 Intermediate	37	41.11%
	B2 Upper Intermediate	32	35.56%
	C1 Advanced	19	21.11%
	C2 Proficient	0	0.00%
Reading	A1 Beginner	0	0.00%
	A2 Elementary	4	4.44%
	B1 Intermediate	31	34.44%
	B2 Upper Intermediate	35	38.89%
	C1 Advanced	19	21.11%
	C2 Proficient	1	1.11%
Writing	A1 Beginner	1	1.11%
	A2 Elementary	3	3.33%
	B1 Intermediate	37	41.11%
	B2 Upper Intermediate	38	42.22%
	C1 Advanced	11	12.22%
	C2 Proficient	0	0.00%

Note: N: Number of responses, %: Percentage of responses

According to the data presented in the table, 43.33% ($n=39$) of the population perceived their speaking proficiency at B1 level and 35.56% ($n=27$) of students

indicated their speaking skills at B2 level. Among the participants, 16 individuals (17.78%) self-assessed their speaking skills at C1 level while only 1 participant (1.1%) marked it at C2 level. Moreover, 7 individuals (7.78%) perceived their speaking skills to be at A2 level taking CEFR standards into consideration.

In terms of listening competency, the data clearly shows that the majority of participants, 41.11% (n=37) again fell into B1 level whilst 7.4% (n=32) were at B2. 21.11% (n=19) of the population were at the C1 level. The percentage of the students who perceived their listening skills as A1 and A2 was 1.1% (n=1) each.

The table also presents findings about the students' reading skills. It is evident that most students, 38.89% (n=35) were at B2 level. Additionally, 34.44% (n=31) was at B1, 21.11% (n=19) was at C1 and 1.1% (n=1) reached a proficiency level of C2. Lastly, 4.44% (n=4) marked their reading skills as A2.

Furthermore, the data reveals that 42.22% (n=38) of the population believed that they had B2 level writing competency and 41.11% (n=37) marked their writing skills as B1. While the percentage of C1 level students was 12.22% (n=11), it was 3.33% (n=3) for A2 and 1.11% (n=1) for A1 as indicated by the students.

Table 3

Participants' Personal Thoughts on the Most Difficult Skill to Develop in English

	Variables	N	%
Skills	Listening	12	13.3%
	Speaking	43	47.8%
	Reading	5	5.6%
	Writing	30	33.3 %

Note: N: Number of responses, %: Percentage of responses

Based on this data, it is evident that the biggest portion of students (47.8%), which comprised 43 individuals, regarded speaking to be the most challenging skill., 33.3% of students (n=30) marked writing as their primary challenge, whilst 13.3% (n=12) noted listening as their most difficult skill to master. Finally, only 5.6% (n=5) considered reading as the most challenging skill to develop in English.

4.2 Analysis of Research Questions

Quantitative and qualitative data relevant to each research question are presented in this part. The analysis is divided into three sub-sections, each aiming to address the research inquiries. The data related to the first research question, which concerns the

perceptions of ab-initio pilots regarding their competency in Aviation English, is presented in the initial sub-section. The second sub-section conducts an analysis of the second research question, which explores the challenges encountered by ab-initio pilots in the domain of Aviation English. The last sub-section focuses on the third research question, examining the opinions held by ab-initio pilots concerning the causes and effects of the challenges they face in Aviation English.

4.2.1 Findings for the first research question. The first research question was designed to explore how ab-initio pilots at a foundation university in Turkey perceive their competence in Aviation English. To gain meaningful insights into this research question, the data collected from participants via a questionnaire was subjected to statistical analysis using Minitab software version 17. Frequencies and descriptive statistics were analyzed for the questionnaire items. The results of the descriptive analysis for the items in the questionnaire can be found in the following table.

Table 4

Mean Score and Standard Deviation of Items in the Questionnaire

	Mean	Standard Deviation	N
1.I can speak Aviation English fluently.	3.72	0.816	90
2. I can pronounce Aviation English terms correctly	4	0.632	90
3. My Aviation English accent is intelligible for other aviators.	3.85	0.888	90
4. I can have good control of sentence patterns in Aviation English.	3.73	0.679	90
5.My knowledge of Aviation English terms is enough to understand audio files related to Aviation English.	3.76	0.667	90
6.My knowledge of Aviation English terms is enough to express myself to other aviators	3.94	0.720	90
7.My knowledge of Aviation English terms is enough to explain an emergency situation.	3.82	0.782	90
8.I can communicate with other aviators effectively.	3.93	0.742	90
9. I can maintain fluent speech even in emergency situations.	3.3	0.781	90
10.I am a fluent English speaker in terms of aviation.	3.62	0.810	90
11.I can respond to the questions of other aviators appropriately.	3.84	0.728	90
12. I can maintain effective communication when I speak Aviation English.	3.81	0.713	90
13. I can easily understand a speech related to aviation.	3.92	0.748	90
14.I can ask for clarification when I do not understand other people in terms of Aviation English	4.23	0.667	90
15. I can easily inform other aviators on a topic related to aviation.	3.85	0.723	90
16.My knowledge of Aviation English terms is enough to explain a problem.	3.84	0.728	90
17.I can ask for confirmation when a misunderstanding occurs.	4.26	0.573	90
18. I can express myself in black and white easily.	3.92	0.777	90

Note: N: number of responses.

The data from Table 4 illustrates the respondents' perceptions of their competencies in Aviation English. Among the items, Item 17, which is *I can ask for confirmation when a misunderstanding occurs*, received the highest mean score of 4.26. This item also had the lowest standard deviation of $\sigma_{17}=0.573$. The second-highest mean score in this section, 4.23, was associated with Item 14, which is *I can ask for clarification when I do not understand other people in terms of Aviation English*. The standard deviation for Item 14 was $\sigma_{14}=0.667$. Item 2, *I can pronounce Aviation English terms correctly*, with a standard deviation of $\sigma_2=0.632$, had the third-highest mean score of 4.

Conversely, Item 9, which is *I can maintain fluent speech even in emergency situations*, received the lowest mean score of 3.3. The standard deviation for Item 9 was $\sigma_9=0.781$. The second-lowest mean score in this section, 3.62, was observed in Item 10, which is *I am a fluent English speaker in terms of aviation*. The standard deviation for Item 10 was $\sigma_{10}=0.810$. Additionally, Item 1, *I can speak Aviation English fluently*, has the third-lowest mean score of 3.72. It is important to note that Item 1, with a standard deviation of $\sigma_1=0.816$ displayed the second highest deviation. Finally, Item 3, which is *My Aviation English accent is intelligible for other aviators*, with the mean score of 3.85 had the highest deviation of $\sigma_3=0.888$.

Table 5

Frequencies of Participants' Responses in the Questionnaire

Items	1	2	3	4	5
1.I can speak Aviation English fluently.	1	5	25	46	13
2. I can pronounce Aviation English terms correctly	0	0	18	54	18
3. My Aviation English accent is intelligible for other aviators.	0	9	16	44	21
4. I can have good control of sentence patterns in Aviation English.	0	3	27	51	9
5.My knowledge of Aviation English terms is enough to understand audio files related to Aviation English.	0	4	22	56	8
6.My knowledge of Aviation English terms is enough to express myself to other aviators	0	3	17	52	18
7.My knowledge of Aviation English terms is enough to explain an emergency situation.	0	3	28	41	18
8.I can communicate with other aviators effectively.	0	4	16	52	18

Table 5 cont'd

Items	1	2	3	4	5
9. I can maintain fluent speech even in emergency situations.	0	12	45	27	6
10. I am a fluent English speaker in terms of aviation.	0	8	29	42	11
11. I can respond to the questions of other aviators appropriately.	0	4	20	52	14
12. I can maintain effective communication when I speak Aviation English.	0	3	24	50	13
13. I can easily understand a speech related to aviation.	0	3	20	48	19
14. I can ask for clarification when I do not understand other people in terms of Aviation English	0	1	9	48	32
15. I can easily inform other aviators on a topic related to aviation.	0	2	25	47	16
16. My knowledge of Aviation English terms is enough to explain a problem.	0	4	20	52	14
17. I can ask for confirmation when a misunderstanding occurs.	0	0	6	30	54
18. I can express myself in black and white easily.	0	4	19	47	20

Note: 1: Strongly Disagree, 2: Disagree, 3: Neither agree nor disagree, 4: Agree, 5: Strongly Agree.

As clearly displayed in the table, in Item 1, *I can speak Aviation English fluently*, only 1 participant (1.11%) strongly disagreed, 5 participants (5.56%) disagreed, 25 participants (27.78%) neither agreed nor disagreed, 46 participants (51.11%) agreed, and 13 participants (14.44%) strongly agreed with this statement.

For Item 2, which is *I can pronounce Aviation English terms correctly*, 18 participants (20.00%) neither agreed nor disagreed, 54 participants (60.00%) agreed, and 18 participants (20.00%) strongly agreed.

For Item 3, which is *My Aviation English accent is intelligible for other aviators*, 9 participants (10.00%) disagreed, 16 participants (17.78%) neither agreed nor disagreed, 44 participants (48.89%) agreed, and finally 21 participants (23.33%) strongly agreed with this item.

In terms of Item 4, which focuses on *having good control of sentence patterns in Aviation English*, 3 participants (3.33%) disagreed, 27 participants (30.00%) neither agreed nor disagreed, 51 participants (56.67%) agreed, and 9 participants (10.00%) strongly agreed.

When Item 5, *My knowledge of Aviation English terms is enough to understand audio files related to Aviation English* was analyzed, it was seen that 4 participants (4.44%) disagreed, 22 participants (24.44%) neither agreed nor disagreed, 56 participants (62.22%) agreed, and 8 participants (8.89%) strongly agreed.

As for Item 6, *My knowledge of Aviation English terms is enough to express myself to other aviators*, 3 participants (3.33%) disagreed, 17 participants (18.89%) neither agreed nor disagreed, 52 participants (57.78%) agreed, and 18 participants (20.00%) strongly agreed.

For Item 7, *My knowledge of Aviation English terms is enough to explain an emergency situation*, 3 participants (3.33%) expressed disagreement, 28 participants (31.11%) neither agreed nor disagreed, 41 participants (45.56%) agreed, and 18 participants (20.00%) strongly agreed.

When Item 8, *I can communicate with other aviators effectively*, was analyzed, it was seen that 4 participants (4.44%) expressed disagreement, 16 participants (17.78%) neither agreed nor disagreed, 52 participants (57.78%) agreed, and 18 participants (20.00%) strongly agreed.

In Item 9, *I can maintain fluent speech even in emergency situations*, it was observed that 12 participants (13.33%) expressed disagreement, 45 participants (50.00%) neither agreed nor disagreed, 27 participants (30.00%) agreed, and 6 participants (6.67%) strongly agreed.

As for Item 10, which is *I am a fluent English speaker in terms of aviation*, 8 participants (8.89%) expressed disagreement, 29 participants (32.22%) neither agreed nor disagreed, 42 participants (46.67%) agreed, and 11 participants (12.22%) strongly agreed.

In Item 11, *I can respond to the questions of other aviators appropriately*, 4 participants (4.44%) expressed disagreement, 20 participants (22.22%) neither agreed nor disagreed, 52 participants (57.78%) agreed, and 14 participants (15.56%) strongly agreed.

When Item 12, *I can maintain effective communication when I speak Aviation English*, was analyzed, it was seen that 3 participants (3.33%) noted disagreement, 24 participants (26.67%) neither agreed nor disagreed, 50 participants (55.56%) agreed, and 13 participants (14.44%) strongly agreed.

As for Item 13, which is *I can easily understand a speech related to aviation*, the findings were as follows: 3 participants (3.33%) displayed disagreement, 20 participants (22.22%) neither agreed nor disagreed, 48 participants (53.33%) agreed and 19 participants (21.11%) strongly agreed.

In Item 14, which is *I can ask for clarification when I do not understand other people in terms of Aviation English*, it was seen that 1 participant (1.11%) expressed disagreement, 9 participants (10.00%) neither agreed nor disagreed, 48 participants (53.33%) agreed and 32 participants (35.56%) strongly agreed.

When Item 15, *I can easily inform other aviators on a topic related to aviation*, was analyzed, it was observed that 2 participants (2.22%) expressed disagreement, 25 participants (27.78%) neither agreed nor disagreed, 47 participants (52.22%) agreed, and 16 participants (17.78%) strongly agreed.

The findings for Item 16, which is *My knowledge of Aviation English terms is enough to explain a problem*, were as follows: 4 participants (4.44%) noted disagreement, 20 participants (22.22%) neither agreed nor disagreed, 52 participants (57.78%) agreed, and 14 participants (15.56%) strongly agreed.

In Item 17, *I can ask for confirmation when a misunderstanding occurs*, it was observed that 6 individuals (6.67%) neither agreed nor disagreed, 30 individuals (33.33%) agreed, and 54 individuals (60.00%) totally agreed.

Finally, the findings for Item 18, which is *I can express myself in black and white easily*, it was seen that 4 respondents (4.44%) disagreed, 19 respondents (21.11%) neither agreed nor disagreed, 47 respondents (52.22%) agreed, and 20 respondents (22.22%) strongly agreed.

4.2.2 Findings for the second research question. The second research question aimed to find the issues ab-initio pilots have in Aviation English. Through a series of focus group interviews involving a total of 45 students, 9 different interviews were conducted with 5 students in each meeting. There were four groups: those who had recently acquired their Airline Transport Pilot License ($n=10$), those who had completed their ATPL theoretical courses and embarked on their flight training ($n=10$), and those who had recently received their Private Pilot License ($n=24$) and one participant who was in the process of flights for PPL.

The responses were recorded and transcribed before the analysis phase. Within these transcripts, an exploration of key words and the identification of recurring themes were conducted to gain insights into the views of the participating students. Additionally, a two-sample t-test was utilized to differentiate between the responses of students who assessed their English language proficiency as below the B2 level, the prerequisite for commencing their undergraduate studies, and the group of students who indicated that their language skills were at B2 or higher before undertaking the Aviation English course. This statistical test was utilized to determine whether significant differences in perceptions of Aviation English competency existed between these two distinct groups.

The results below were found out from the participants' responses to question 1 (*Have you ever encountered problems when using Aviation English?*), question 2 (*What are the problems you encounter when you are using Aviation English?*), question 3 (*Have you ever encountered problems related to Aviation English in class? If yes, what are these problems?*), question 4 (*Have you ever encountered problems related to Aviation English during your flights? If yes, what are these problems?*)

Out of 45 participants, 5 (11.11%) of them indicated that they had never encountered issues in using or learning Aviation English. Additionally, 40(88.89%) of them emphasized that they had several problems at the beginning of training flights, but they had fewer problems now. Based on the specific phase of training and licensure, ab-initio pilots articulated different challenges which are presented below.

4.2.2.1 Rate of speech. 30 out of 45 participants (66.67%) indicated that the rate of speech presented a notable challenge for them especially in the initial phase of the flight training adding that they had problems comprehending the transmissions as they were expected to quickly understand a substantial amount of information during their training, and if this information is presented too rapidly, it can hinder comprehension and retention. Regarding this matter, the interviewees provided the following responses:

Oh, God! I do not want to remember my first flights. It was terrifying. The rapid pace of transmissions from the ATC caused a lot of stress. I thought I was fully ready for the flight, but when ATC started talking in a fast manner, I was really lost. (Interviewee 8, online interview, October 16, 2023)

I find that I can manage the rapid speech at my main airfield better because I am more familiar with the procedures and have adapted to the specific communication style of the ATC. But, when I fly to different airfields such as Çorlu or Çanakkale, it becomes a significant challenge. The change in surroundings and controllers create anxiety and pressure. The change in the airfields can make me feel less confident in my ability to understand and respond effectively. (Interviewee 32, online interview, October 18, 2023)

On the other hand, 10 students (22.22%) who have either completed their ATPL theoretical classes or received their ATPL noted that rate of speech was not a big issue anymore in their training, but it could be a problem when they start their professional careers. The responses are as follows:

Personally, at this stage of my training, I am very used to the speech rate of the ATCs in different airfields. It is not a problem at all. However, I am a bit concerned about the future when I start the line training. When I listen to different frequencies in different countries, it sounds a bit scary. (Interviewee 22, online interview, October 17, 2023)

I agree with my friend. No, it is not a problem. Everything is difficult when you first start. I am not worried about my performance when I become a professional pilot. I know that as I gain experience, I can handle all types of speech rates in different regions. (Interviewee 23, online interview, October 17, 2023)

4.2.2.2 Fluency. Participants reported fluency related issues in two different areas. 32 out of 45 participants (71.11%) stated that they had difficulty in maintaining a fluent speech in Aviation English lessons when they were instructed to describe pictures, summarize a topic by recording themselves and have a group discussion. 7 participants (15.56%) noted that fluency can also be an issue when using plain English in radio communication. 13 participants (28.89%), however, indicated that it was not a major issue.

When learners were asked whether they could maintain a fluent speech in an emergency case, 39 participants (86.67%) stated that it could be a problem if they were flying over a different country and talking to a non-Turkish ATC. Below are the responses of the participants regarding fluency.

When I am on the radio, fluency is not a problem because we are using the same terminology and words again and again. But, I feel that it is a problem in Aviation English class. I feel incompetent when I cannot describe a picture fluently. Sometimes our instructor ask us questions when we are training for the ICAO Level Exam and I cannot answer them as quickly as I want. (Interviewee 14, online interview, October 16, 2023)

In my opinion, fluency is not a major problem for me and for our fleet because we know that we can also express ourselves in Turkish in a critical situation. However, it can be a problem for me if I am flying to a different country. I can get stuck at that time. (Interviewee 9, online interview, October 16, 2023)

I have a native flight instructor and most of the time I feel that I have issues with fluency when I am talking to him. With Turkish instructors, it is not that stressful, and I can express myself better. (Interviewee 44, online interview, October 18, 2023)

4.2.2.3 Issues with different accents. All of the participants reported that they did not have any issues understanding the accent when they were on the radio as they were talking to a Turkish ATC. 5 international students (11.11%) confirmed this saying that understanding Turkish accent was not difficult. However, 39 students (86.67%) expressed that the transmission recordings which include various different regional accents were very difficult to understand in Aviation English course. Regarding this matter, the interviewees provided the following responses:

As we are flying in Turkey and all the ATCs are Turkish, understanding the accent has never been a problem during my training. However, the recordings we listened in Aviation English course have shown me that I have problems understanding Indian and Russian accents. I am grateful for spotting this problem because I am working on it on a daily basis. (Interviewee 7, online interview, October 16, 2023)

Regional accents are a huge problem, and they make me feel stressed when I think about the future and start flying to different countries. I try to cope with this fear by practicing the recordings our teacher assigns us. But, yes it will take some time to improve myself. (Interviewee 39, online interview, October 18, 2023)

4.2.2.4 Lack of knowledge and experience. 9 participants (20%) who have recently got their PPL license and 1 participant (2.2%) who is still in the PPL flight phase indicated that they had very basic knowledge of radio communication, which posed a problem when they were required to fly to more congested airfields. They added that they felt lost if the ATC used a broader spectrum of phrases and terminology. All of the participants noted that there was a direct relationship between using Aviation English effectively, especially standard phraseology and the level of experience in flights. Below are the responses of the participants regarding this issue.

In Radio Communication class for PPL, we are given a script and learn basic phraseology. When we fly to Çorlu or Edremit, sometimes ATC uses terms which I have never heard of. I ask for clarification of course in such a case. But I feel that I need to be more knowledgeable in phraseology. (Interviewee 11, online interview, October 16, 2023)

I have recently got my ATPL license. Communication is not a problem for me now, but in the initial part of my training I had really hard times because I thought I was only responsible for the script we learned in Radio Communication class. Sometimes, I heard unknown terms on the radio, and I panicked. The good thing is you learn all of them in time as you fly more. (Interviewee 31, online interview, October 18, 2023)

The more you fly, the better you get in radio communication. It is also about improving your confidence. I was very inexperienced at the beginning and felt incredibly embarrassed when I made a mistake or misunderstood something in radio communication. I can easily say that the experience you have in flight training positively affects your radio communication skills. (Interviewee 12, online interview, October 16, 2023)

With the aim of comparing participants' verbal answers with the results of the questionnaire, an additional regression analysis was conducted. Although 45 participants (100%) indicated that there was a direct relationship between their radio communication skills and experience, the graphic below displays that flight hours can explain only 8.7% of the variation in the average answers of the participants.

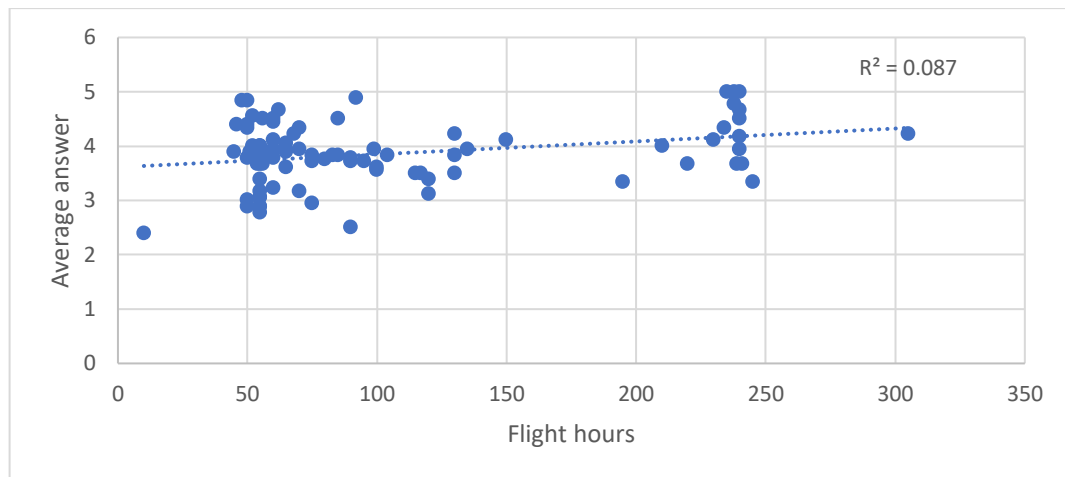


Figure 3. Results of the regression analysis.

4.2.3 Findings for the third research question. The third research question aimed to discover the causes and effects of the issues ab-initio pilots have in Aviation English. Same procedures were applied for recording and transcription of the answers.

The results below were derived from the participants' responses to question 5 (*What are the causes of the problems you have mentioned?*), question 6 (*You have indicated.... as a big problem during your flights, why do you think it occurred?*), question 7 (*You have indicated.... as a big problem in Aviation English class, what are the root causes of this problem in your opinion?*), question 8 (*What was your English level in speaking and listening prior to Aviation English course?*), question 9 (*Do you think your general English level has effect on your competency in Aviation English? If yes, how?*), question 10 (*Do you think the more you fly the better gets your Aviation English use? Is there a relation between these two in your opinion?*) question 11 (*Do you think this problem/ these problems negatively affect/s you during flight or in class? If yes, what are the effects?*) and question 12 (*Do you think these problems cause safety issues?*). Below are the findings for the causes and effects of competency related issues of ab-initio pilots in Aviation English.

4.2.3.1 Causes. When participants were asked about the root causes behind the issues they had, they mentioned six different issues which are highlighted below.

4.2.3.1.1 Issues with language proficiency. 10 participants (22.22%) noted that they do not have any language-related issues and they feel proficient enough to communicate in different contexts. 30 participants (66.67%) indicated that they have

language related issues, but this does not affect their flight performance because standard phraseology is straightforward, and they can switch back to Turkish if they feel like they cannot express themselves. Below are the responses of these participants.

Before starting my undergrad studies in our school and the flights, I have already had good language skills. I can confidently grade my speaking and listening skills as Upper Intermediate. Therefore, learning and using Aviation English has never been a problem for me. Yes, it takes some time to digest standard phraseology and use it effectively, but it is easy too. (Interviewee 13, online interview, October 16, 2023)

I don't think that radio communication requires sophisticated language skills. All you need is to memorize standard phraseology, the script that your instructor gives you and practice them. To be honest, I do not have very good speaking skills in English but this did not affect my performance in radio communication so far in Turkey (Interviewee 15, online interview, October 16, 2023).

The participants were then asked whether their language background and linguistic issues would affect them if they had their flight training in a different country and had native English instructors and ATCs around, 23 participants (51.11%) articulated that they could have problems. The responses are as follows.

Oh yes! This is a different story now. Yes, I would probably have some issues expressing myself if I had a native flight instructor. Additionally, flying over a different county and talking to non-Turkish ATC, especially in a non-standard situation could be stressful. (Interviewee 1, online interview, October 16, 2023)

I am very confident in Turkey. If I cannot explain the problem in English in an emergency situation, I know that I can use Turkish. However, if this took place in a different county, for example now, I would definitely have problems when using plain English and be stressed a lot because my speaking skills are Intermediate. (Interviewee 5, online interview, October 16, 2023).

30 participants (66.67%) expressed their language related issues affect their speaking and listening performance in Aviation English class in which they are expected to give short presentations, discuss topics with their friends, record themselves and listen to ATC transmissions. When they were asked about their speaking and listening levels prior to taking Aviation English course, 28 of them

(62.22%) indicated that they were Intermediate and 2 of them (4.44%) noted that they were Pre-Intermediate. Regarding this issue, below are the responses of the participants.

I learned English in a state school and unfortunately there were not many opportunities to improve our language skills. Speaking is a big problem for me, and I do not enjoy it at all. I make a lot of grammar mistakes when I speak, and I am not fluent. When our Aviation English instructor asks us to describe the pictures or ask discussion questions, I cannot do it effectively or it takes some time for me to think and answer the questions. (Interviewee 28, online interview, October 17, 2023)

I told you my language skills do not really affect my radio communication. I somehow manage it because it is straight forward. All you need is to memorize and use that standard terminology. But it is a problem at school, especially in Aviation English class. I have issues with pronunciation, listening and speaking. I am trying hard to do all the assignments for practice in this class and get Level 4 in ICAO Level exam. (Interviewee 33, online interview, October 18, 2023).

In the focus group meetings, as the majority of the participants ($n=30$) indicated that they had language related issues and all them were below B2 level in terms of their speaking and listening skills prior to the Aviation English course, a T- test was conducted to see if there was a statistically significant difference between the group that marked their speaking and listening skills below B2 and the group that marked the same skills as B2 and above in the questionnaire. Below are the results of the test.

Table 6
Speaking Comparison of the Groups

	Students at B2 level and above ($n=44$)		Students below B2 ($n=46$)		<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Scores	4.128	0.731	3.594	0.702	3.53	0.001

Note: M: Mean, SD: Standard Deviation, t: T-Value, p: P-Value

In order to assess learners' perceived competency in speaking skills considering their levels prior to the Aviation English course, the scores of the participants that fall

below b2 level and participants that are B2 and above were compared. According to the analysis presented in the table, the first group, students at B2 level and above had 44 participants with a mean of 4.128 and a standard deviation of 0.731. On the other hand, the second group, students below B2, included 46 participants with a mean of 3.594 and a standard deviation of 0.702. The two-sample t-test indicated a t-value of 3.53 and a p-value of 0.001.

Table 7

Listening Comparison of the Groups

	Students at B2 level and above (n=51)		Students below B2 (n=39)		t	p
	M	SD	M	SD		
Scores	4.066	0.727	3.580	0.724	3.15	0.002

Note: M: Mean, SD: Standard Deviation, t: T-Value, p: P-Value

Same procedure was applied to assess the listening skills considering their self-reported levels. As highlighted in the table, the first group that included 51 participants with B2 level listening skills and above displayed a mean of 4.066 and a standard deviation of 0.727. The second group included 39 participants with listening skills lower than B2 displayed a mean of 3.580 and a standard deviation of 0.724. The two-sample t-test for the listening skills showed a t-value of 3.15 and a p-value of 0.002.

4.2.3.1.2 *Cultural factors.* 6 participants (13.33%) said that the culture they are in shapes the way they learn and practice their language skills and therefore affect their competency in Aviation English. With regards to this issue, responses are as follows:

I think there is a cultural barrier. What do I mean by this? For example, I am Turkish, my flight instructor is Turkish and almost all of my friends in the fleet are Turkish with a few exceptions. We always speak in Turkish. We know that we have to practice our language skills for more effective communication, but it is quite weird to speak in English in daily life. I think we only think it is normal when we have Aviation English lessons. (Interviewee 39, online interview, October 18, 2023)

Outside the Aviation English class, I do not have any chances to practice my language skills. If I asked this to a Turkish friend of mine, probably she or he would laugh at me. We, Turkish people, are not very good at creating chances

to improve our language skills in my opinion. (Interviewee 3, online interview, October 16, 2023)

4.2.3.1.3 *Stress and fear of making mistakes.* 27 participants (60%) shared that were afraid of making mistakes when flying.5 of them (2.25%) indicated that they were also of afraid of making mistakes in Aviation English class too although they knew that they would not be penalized or humiliated. Participants ‘responses are presented below:

As a student pilot, my journey in aviation is just about constant anxiety. Talking on the radio is a terrifying experience. I have always feared that I would say something wrong or not understand what the controller was saying. Although I am trying my best to accept mistakes as part of the learning process, it is not easy, not easy at all. Even with guidance from my instructors and a lot of practice, I can't overcome this feeling, but I hope I can manage it when I complete all my flights in PPL. (Interviewee 25, online interview, October 17, 2023)

It is hard to confess but I am afraid of making mistakes because I am also afraid of my flight instructor. I do a lot of practice before the day of the flight and listen to different frequencies to improve myself. Why? Because I don't want to make mistakes. This is something unacceptable in the eyes of my flight instructor. (Interviewee 33, online interview, October 18, 2023)

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My fear of making mistakes is not just during flights. Making mistakes on the radio is a different story. All the other people in other aircraft is listening to you and my instructor is always stressing this over and over. In that case, it makes me feel more afraid of making a very simple mistake. I also have this fear in language classes. Some students can talk very confidently although they make grammatical mistakes in their speech. I think I am a perfectionist, and I don't want to make any mistakes when I am talking in Aviation English classes.

Our instructor motivates and tells us that there is nothing wrong with making mistakes when speaking in English. But, no it still scares me. (Interviewee 6, online interview, October 16, 2023)

4.2.3.1.4 *Issues with the teaching style.* 14 participants (31.11%) indicated that they had poor communication with their flight instructors, and this negatively impacted their overall performance and motivation. They added that good guidance and teaching not based on fear are essential for them to be successful during flight training. Participants' responses are follows:

This is an issue we really need to talk about. In my ground training, I had a very strong bond and communication with all my instructors. I was never afraid of asking a question or seeing them in their office hours. I was shocked when I started my flight training because everything was based on fear. I tried to do everything my flight instructor said, but I was not appreciated at all. I lost all my motivation at that time. (Interviewee 21, online interview, October 18, 2023)

My flight instructor is a very disciplined person and I really like him as a person. When it comes to teaching, I think there are things he needs to change such as yelling at students when we make a mistake. Flying and communicating on the radio are very stressful already. I think he can have a more supportive teaching style. (Interviewee 9, online interview, October 16, 2023)

Now that I have completed all my flights, I can confidently say your flight instructor and his/her teaching style is the most important thing. I have flown with five different instructors. Younger flight instructors have a more motivating style and can empathize with you when you make a mistake on the radio. Moreover, teaching a subject by talking for hours and hours is not effective. We need to get information in a more practical way. (Interviewee 42, online interview, October 18, 2023)

4.2.3.1.5 *Lack of enough practice materials.* 10 participants (22.22%) stated that there could have been more practice materials to study outside the class in radio communication class and added that this would have decreased their level of stress when they heard an unknown term on the radio. Below are the responses of the participants about this cause.

Having a script in radio communication class makes our job. I am not against this, but most of the time I felt that this was not enough. There should be more practice materials on the learning management system such as recordings or real recordings from Çorlu or Edremit because ATC may use terms which I have never heard of. Practice materials can help us develop our listening skills. (Interviewee 17, online interview, October 17, 2023)

I agree with my friend because generally what we do in class is not enough for me. I need more than that. Having more practice materials for readback can definitely help me and feel more confident when I have a flight to other fields. Things are manageable in our main base, but for crowded airfield we definitely need practice materials. (Interviewee 19, online interview, October 17, 2023)

4.2.3.1.6 Multitasking & Workload. 31 participants (68.89%) indicated that multitasking was a big challenge and there was too much workload on their shoulders when they were flying. Issues with managing the aircraft and following the instructions of the flight instructor at the same time were given as the trigger factors to have issues in communication. Respondents' views about this issue are presented below.

In my opinion, multitasking is the biggest problem for me. In the initial part of the training, I lost so many instructions and asked ATC to repeat again because of this. The feeling is also very stressful and deep inside I know that I may misunderstand the ATC because I have to do so many things at the same time (Interviewee 28, online interview, October 17, 2023)

I had issues with the workload. You have to fly the aircraft, listen to your flight instructor attentively and also follow what is being said by the ATC. This is very difficult. In some cases, I missed the ATC instructions because I was fully focused on what my instructor was trying to teach me. (Interviewee 45, online interview, October 18, 2023)

4.2.3.1.7 Noise. 11 participants (24.44%) indicated engine noise and especially radio chatter are affecting their competence in using Aviation English and cause comprehension issues. Responses regarding this issue are presented below.

I have good a headset, but the noise is still very nerve breaking. Especially the parasite sounds on the radio and the intermittent messages do affect my

comprehension and cause stress. (Interviewee 28, online interview, October 17, 2023)

I am not easily distracted normally but sometimes there is too much noise in the background, and I feel fatigued. But more importantly, it causes comprehension issues of course. (Interviewee 2, online interview, October 16, 2023)

4.2.3.2 Effects. During the interviews, 39 participants (86.67%) articulated three major negative consequences of having issues in Aviation English. 6 participants (13.3%), however, noted that they had never suffered from the negative consequences in a dramatic way. Below are the effects and participants responses regarding the issue.

4.2.3.2.1 Stress. As well as being a root cause for problems in using Aviation English effectively, stress has also been mentioned as an adverse effect of having issues in Aviation English. 39 participants (86.67%) indicated that they were stressed when they could not understand the ATC or readback properly. 26 participants (57.78%) stated that they also felt stressed during Aviation English classes when they could not understand practice ATC transmission recordings. Regarding this matter, the interviewees provided the following responses:

Being a student pilot is already very stressful. When I wake up on the day of the flight, I feel stressed already. This stress is doubled when I make a mistake in the radio communication. Sometimes my flight instructor gets really angry when I cannot effectively communicate and starts shouting. This situation also creates stress. (Interviewee 4, online interview, October 16, 2023)

I don't want to remember the PPL days seriously. Flying the aircraft and communicating at the same time was really difficult at the beginning. When I flew to other airfields and could not understand what the ATC said, I was really really stressed. When your instructor realizes your mistakes in communication, it is also stressful. I have completed all my flights now. It is not that stress-provoking anymore. (Interviewee 43, online interview, October 18, 2023)

I want to answer this question by referring to both flights and my in-class performance. Making mistakes on the radio, yes, is very stressful. But I think I can manage it much better now. When I am flying solo especially, I am not afraid of making mistakes or not understanding the ATC. What is stressful now

is not understanding the regional accents in the recordings that we practice in Aviation English course. I hope I will improve myself and have less stress by the end of the course. (Interviewee 18, online interview, October 17, 2023)

4.2.3.2.2 *Negative effects on flight performance.* 12 participants (26.67%) expressed that making mistakes additionally affected their flight performance. Below are some of the responses of the participants.

Once I misunderstood the instruction and instead of maintaining 1,000 feet, I descended to 1,000 feet below my assigned altitude. It was a dangerous situation I have to confess. (Interviewee 12, online interview, October 16, 2023)

Solo flights are much better. When I am flying with the flight instructor, I get nervous because he immediately criticizes me when I make a mistake on the radio. A couple of times, I had issues with the altitude and the bank angle as a result of not reading back the instruction quickly and therefore feeling stressed. If he was more tolerant, I think that I could handle the situation more effectively and make less mistakes. (Interviewee 45, online interview, October 18, 2023)

4.2.3.2.3 *Safety issues.* 12 participants (26.67%) indicated that the issues related to competency affected their flight performance and caused safety issues. 32 participants (71.11%) expressed that they did not experience major problem so far, but they were aware of the fact that language related issues might cause safety problems in the future if other contributory factors such as fatigue, heavy traffic, regional accents and stress exacerbated the situation.

When I make mistakes, I get stressed and in two occasions I had problems with following the instructions of my foreigner flight instructor. Yes, making mistakes because of language issues can definitely cause stress and safety problems (Interviewee 28, online interview, October 17, 2023)

I have not experienced a major problem so far, thank God. But this does not mean that I am fully confident about my language skills. When I graduate and start the line, I know that it will be difficult at first with the schedules, stress and fatigue and everything. All of these things can make the situation worse and lead to miscommunication and safety issues. (Interviewee 42, online interview, October 18, 2023).

Chapter 5

Discussion

A detailed discussion of the research findings compared with the findings in the existing literature and the drawn conclusions will be firstly presented in this final chapter. Then, an exploration of the pedagogical implications and implications for safety in aviation management will be highlighted. This chapter will conclude with suggestions for further research and the conclusion.

5.1 Introduction

The objective of this research was to investigate the perceptions of ab-initio pilots at a Turkish foundation university about their competency of Aviation English, with the intention of understanding the existing issues, their underlying causes, and the consequences. To this end, a mixed-methods sequential explanatory design was employed, which involved the collection and analysis of quantitative data followed by qualitative data in two consecutive phases within a single study (Ivankova et.al,206).

The first research question was designed to explore how ab-initio pilots at a foundation university in Turkey perceive their competence in Aviation English. To gain meaningful insights into this research question, the data collected from participants via a questionnaire was subjected to statistical analysis using Minitab software version 17. The second research question aimed to find the issues ab-initio pilots have in Aviation English. Comparative analyses of both quantitative and qualitative data were also undertaken for the second research question with regards to language levels prior to taking Aviation English course and experience based on flight hours to provide a more in-depth exploration of the research problem. The third research question aimed to discover the causes and effects of the issues ab-initio pilots have in Aviation English. Through a series of focus group interviews involving a total of 45 volunteer students, 9 different interviews were conducted with 5 students in each meeting. Additionally, a two-sample t-test was utilized to differentiate between the responses of students who assessed their English language proficiency as below B2 level, the prerequisite for commencing their undergraduate studies, and the group of students who indicated that their language skills were at B2 or higher before undertaking the Aviation English course. This statistical test was utilized to determine

whether significant differences in perceptions of Aviation English competency existed between these two distinct groups.

5.2 Discussion of Findings Regarding Research Question 1

The first research question aimed to unveil participants' perceptions about their competency in Aviation English. The results of the questionnaire yielded interesting results with paramount implications.

The first notable finding is that a significant portion of students did not view their speaking and listening skills, which are core skills used in Aviation English, as B2 or higher. According to the data, 43.33% of the participants stated that their speaking proficiency was at B1 level and 7.78% of the population considered their speaking skills at A2 level prior to taking Aviation English course. Additionally, in terms of listening skills, the majority of participants (41.11%) again fell into B1 category. The percentage of the students who considered their listening skills as A1 and A2 was 2.2% in total. These results highlight potential gaps in linguistic competence, indicating that a notable proportion of participants may not meet the language proficiency standards necessary for effective communication in the aviation domain.

This finding was also in line with the data coming from the focus groups. Although B2 level is the prerequisite to start undergraduate studies, majority of the students having studied in the prep program did not believe that they were not there yet. In this respect, two critical points can be considered. The institutional proficiency exam directly evaluates reading, writing, and listening skills for academic purposes, with grammar and vocabulary indirectly assessed through comprehension and usage. However, it does not assess speaking skills. Messick (1996) emphasizes that, in language testing, the assessment should incorporate genuine and direct examples of communicative behaviors, encompassing listening, speaking, reading, and writing in the language being learned. Therefore, an additional section which focuses on speaking skills could be embedded to assess students' levels. The second point is that although Common European Framework levels are considered as a reference in the construction of the exam with a focus on assessing language and skills at the B2 level, both the curriculum and the materials could be revisited to check whether they truly set a solid foundation for B2 level in terms of all four skills and be adapted if necessary.

However, it is also important to note that compared to implementing reforms via teacher training, curriculum development, or new textbooks, modifying the test can be a significantly more cost-effective endeavor (Shohamy, 2001)

The second important result was that when participants were asked about their thoughts on the most difficult skill to develop in English, 43 individuals (47.8%) regarded speaking to be the most challenging skill. Considering the fact that “speaking in a foreign language is very difficult, and speaking competence takes a long time to develop” (Luama, 20004, p. 1), this was not a surprising result as majority of the learners (51.11%) also viewed their speaking skills below B2. The second challenge was marked as writing by 33.3% of students ($n=30$). As Dastgeer and Afzal (2015) indicate, students primarily acquire English language skills within the confines of school, with limited opportunities for practical application in their homes and they heavily on memorization and often reproduce learned information during exams. The second issue with this productive skill is that there is no emphasis on writing skills in Aviation English program. The most interesting result was that only 13.3% ($n=12$) noted listening as their most difficult skill to master although 42,21 % of the students viewed their listening skills below B2. This finding can be explained with the results of the focus group meetings as majority of the learners believed that listening skills can be improved by doing more practice and gaining more experience in the field. Thus, they regarded it as a much more manageable skill compared to speaking and writing. It is also important to indicate that participants' perceptions regarding the difficulty of developing certain language skills display the challenges associated with linguistic competence. Speaking, identified by a majority as the most challenging skill to develop, suggests that participants may face obstacles in achieving proficiency in verbal communication. Moreover, the acknowledgment of speaking as the most challenging skill also indicates potential problems related to communicative competence.

Furthermore, the findings of the respondents on their perceptions of their competencies in Aviation English shed light onto important findings about their strengths and areas to be improved. Among the items, Item 17, which is *I can ask for confirmation when a misunderstanding occurs*, received the highest mean score of 4.26. 30 individuals (33.33%) agreed, and 54 individuals (60.00%) totally agreed with this item. Similarly, the second-highest mean score (4.23) was associated with Item

14, which is *I can ask for clarification when I do not understand other people in terms of Aviation English*. 48 participants (53.33%) agreed, and 32 participants (35.56%) strongly agreed with this statement. Both of these items indicate that there is a strong inclination among learners to proactively address misunderstandings and they are confident in dealing with issues by asking for help. Students' responses in the focus group meetings are also in line with these findings since they indicated that they knew the criticality of effective communication and were always ready to resolve miscommunication related issues by asking for clarification as this was always emphasized in both theoretical and flight trainings. As Uplinger (1997) highlighted, communication between pilots and air traffic controllers lacks the non-verbal elements present in face-to-face interactions, such as body language and facial cues. Therefore, the use of clarification techniques becomes crucial to convey meaning effectively. Both of these findings also imply that the training in place are successfully equipped learners with the necessary coping strategies in line with the demands of Aviation English. The participants' responses regarding their ability to seek clarification and confirmation in communication scenarios demonstrate a strong inclination toward interactional competence. The high mean scores for items related to seeking confirmation and clarification indicate that learners are proactively addressing potential misunderstandings.

As findings indicate, *I can maintain fluent speech even in emergency situations*, received the lowest mean score of 3.3. Among 90 participants, 12 participants (13.33%) expressed disagreement, 45 participants (50.00%) neither agreed nor disagreed. This finding indicated a lower level of perceived ability among participants in maintaining fluency during emergency situations with a majority of participants who are uncertain about their fluency in such situations. This finding was also supported by the focus group interviews. When learners were asked whether they could maintain a fluent speech in an emergency case, 39 participants (86.67%) stated that it could be a problem if they were flying over a different country and talking to a non-Turkish ATC. The findings related to maintaining fluent speech in emergency situations indicate potential challenges in interactional competence during critical moments. The uncertainty expressed by a majority of participants about their fluency in emergency situations requires attention in training phase.

The second- lowest mean score (3.62) in this section was observed in Item 10, which is *I am a fluent English speaker in terms of aviation*. Although majority of the learners either agreed (46.67%) or strongly agreed (12.12%) with this item, 8 participants (8.89%) expressed disagreement, 29 participants (32.22%) neither agreed nor disagreed. This indicates a diversity of opinions among the participants regarding their proficiency as fluent English speakers in aviation context. In the focus group meetings, 32 participants (71.11%) stated that they had difficulty in maintaining a fluent speech in Aviation English lessons when they were instructed to describe pictures, summarize a topic by recording themselves and have a group discussion. This also revealed that some learners, despite possessing fundamental grammar and vocabulary skills, may encounter challenges in establishing and sustaining fluency (Paramasivam, 2013). 7 participants (15.56%) noted that fluency can also be an issue when using plain English in radio communication. These findings shed light onto the necessary training interventions. It is of critical importance to address concerns related to fluency in emergency situations for enhancing communication skills during critical moments in aviation by focusing on activities and materials which prioritize the development of fluency. As Harmer (1983) indicates thinking strategy exercises, involving students in discussions and collaborative problem-solving, simulated communication in authentic scenarios, such as role-play activities can contribute to fluency improvement. Furthermore, with the varying levels of agreement or disagreement with these statements, it could prove useful to provide tailored approaches to language training to enhance fluency with additional support mechanisms for weaker students.

5.3 Discussion of Findings Regarding Research Question 2

The second research question aimed to find the issues ab-initio pilots have in Aviation English through a series of focus group interviews.

The first problem raised by the participants was the rate of speech. 30 participants (66.67%) expressed that they faced challenges with the rate of speech, especially during the initial phase of flight training. Understanding the transmissions became an issue as they were expected to quickly understand a substantial amount of information. This finding highlights the fact that although ICAO (2010) advocates for a steady speech rate which does not surpass 100 words per minute in radio

communication, this problem continues to exist. As Sayer (2013) suggests, miscommunication is not primarily caused by the absence of distinct breaks between words but rather by the insufficient time granted to recipients for processing and comprehending information. Therefore, in ab-initio pilot training ATCs must be extra careful when it comes to allowing time to inexperienced pilot trainees for grasping the information.

Fluency was the second issue mentioned in the meetings. Participants reported fluency related issues in two different ways. A majority of the participants (71.11%) expressed their concerns about their performance in sustaining fluent speech in Aviation English lessons, particularly during activities such as describing pictures, summarizing topics through self-recordings, and engaging in group discussions. This finding is crucial as it implies that students may need more time for digesting the new input and have more opportunities for practice before going into production stage. This finding additionally implies that students may prioritize accuracy over fluency in these activities which can hinder their flow of speech. Accordingly, instructors can encourage learners to give precedence to fluency to ensure learners remain meaningfully engaged in language use (Brown 2007) and also to enhance communicative competence. Another important finding with regards to fluency is that when questioned about their capacity to sustain fluent speech in emergency scenarios, 86.67% of the participants indicated potential challenges, especially when flying over a different country and communicating with a non-Turkish Air Traffic Control (ATC). This finding is also in line with the questionnaire results as maintaining a fluent speech in emergency situations had the lowest mean score. As stated in Chapter 2, factors like stress and time pressure in emergency situations can negatively impact fluency and communication performance and thus ensuring an accurate and reliable assessment of communicative competence becomes crucial to meet the necessary language standards for student pilots. Nonetheless, achieving communicative competence may be unrealistic for non-native speakers due to the associated difficulties and the high proficiency level required (Alptekin,2002). Consequently, setting realistic objectives for language learning and improvement rather than pursuing native-like fluency must be given precedence and the emphasis should be on developing communicative competence tailored to the specific realities of non-native ab-initio pilots.

The third issue raised in the focus group meeting was regional accents. Although the majority of the students noted that accent was not an issue in their flights as they were talking to Turkish ATCs, 86.67% expressed that the transmission recordings which include various different regional accents were very difficult to understand in Aviation English course, but this challenge helped them improve their listening skills more by doing a lot of practice. This finding aligns with Richard and Sampson's (1975) statement that accents impact transmissions due to variations in pronunciation across languages, resulting in non-native English speakers' speech being influenced by the tendencies of their native language. It is also important to note that challenges in pilot-ATC transmissions are likely to escalate when both parties involved are non-native English speakers, and thus level of comprehension substantially decreases when striving to understand accents that are alternative or unfamiliar (Fallon,1997). When these issues are taken into consideration, it is of paramount importance to help students be better equipped to gain awareness regarding regional accents, study their common phonological features and dedicate time to practicing inside and outside the class as much as possible.

The final issue mentioned in the focus group meetings was lack of the knowledge and experience. 22.2% of the population reported that having only basic knowledge of radio communication presented challenges in busier airfields, and thus they felt confused and stressed when ATC used phrases they had never heard before. This finding aligns with the results of Kilic and Ucler's (2014) study in which lack in body of knowledge was found to be the biggest stressor under personal factors. Hence, comprehensive training under sufficient supervision is imperative in aviation (Wilpert and Thoralf, 2013). In the light of these findings, it is critical to reiterate that ab-initio pilots should firstly be equipped with all necessary phrases, terminologies and their possible alternatives during their theoretical training rather than being presented a limited script that they are expected to memorize. Then, they should have ample opportunities to practice these through role plays and simulation exercises.

With regards to this issue, all of the participants also acknowledged a direct correlation between the effective use of Aviation English, particularly standard phraseology and their level of flight experience. They noted that the issue about the lack of knowledge got resolved as they gained more flight experience. With the aim of comparing participants' verbal answers with the results of the questionnaire, an

additional regression analysis was conducted. Although 45 participants (100%) indicated that there was a direct relationship between their radio communication skills and experience, the results showed that flight hours can explain only 8.7% of the variation in the average answers of the participants. This can be due to the fact that except for one participant all of the participants had either PPL or ATPL license and thus felt competent in using standard phraseology at the end of their training. Additionally, they answered the questionnaire based on their current performance and there was no item in the questionnaire which helped them to compare their initial performance with their current situation.

5.4 Discussion of Findings Regarding Research Question 3

The third research question aimed to discover the causes and effects of the issues ab-initio pilots have in Aviation English. Same procedures were applied for recording and transcription of the answers.

5.4.1 Causes. When participants were asked about the root causes behind the issues they had, they mentioned seven different issues which are *issues with language proficiency, cultural factors, stress and fear of making mistakes, issues with the teaching style, lack of enough practice materials, multitasking and workload, and finally noise.*

Two-thirds (66.67%) of the participants acknowledged encountering language-related challenges. However, this doesn't hinder their flight performance, given the straightforward nature of standard phraseology. They have the option to switch to Turkish if they find expressing themselves challenging.

When questioned about the potential impact of their language background and linguistic issues during flight training in a different country with native English instructors and ATCs, 51.11% anticipated difficulties.

The most important finding with regards to the language proficiency is that 66.67% of the students indicated that their language-related issues affect their speaking and listening performance in Aviation English class which short presentations, discussions, self-recording, and ATC transmissions. The t-test results also proved the statistical difference between the students who rated their speaking and listening below B2 and the ones who rater their skills B2 or above B2. In the light of these findings, it

is essential to reiterate two critical points. First of all, the language proficiency criteria for admitting students into their undergraduate program should be revisited and they should all be obliged to submit high scores on standardized exams instead of the institutional proficiency exam which does not assess speaking skills. According to Dusenbury and Bjerke (2013), higher English proficiency scores on standardized English exams align with student success in flight school. This correlation serves as an indicator of enhanced performance on oral exams and a reduced total number of hours needed to complete training. The second important point to consider is the design and content of the preparatory program. The study conducted by Nishikawa & Nawata (2019) displays that among ab initio flight students at a Japanese institution, only 20% of respondents found intensive academic English preparation classes to be generally beneficial for the skills required in flight training. As these programs prioritize writing instruction, they do not translate effectively to the context of flight training and form the necessary foundation required for ab-initio pilots. Accordingly, designing a program which specifically addresses the language requirements of ab initio flight training is a dire need.

13.33% of the participants indicated that the culture they are in shapes the way they learn and practice their language skills and therefore affect their competency in Aviation English. This finding is in line with Demirdöken's (2020) study which underscored the substantial influence of sociocultural factors on the English-speaking proficiency of ab-initio pilots and further suggested that the limited engagement with English-speaking communities in Turkey serves as a constraint on language development opportunities. As a result, attaining higher levels of proficiency in English becomes more accessible to individuals fortunate enough to have early exposure through dedicated teachers or parental support. Given this insight, there are certain important changes that could be implemented to increase students' exposure to the target language. Initially, technology such as virtual reality simulations and online language exchange platforms can be integrated into the program to bridge the gap in exposure to English-speaking environments. Secondly, a cultural awareness component can be added into the curriculum to raise students' awareness regarding this issue. Moreover, peer support and mentorship groups focusing on the use and practice of target language can be established to provide additional opportunities for learners to practice their language skills.

Another very important cause mentioned by the participants was stress and the fear of making mistakes. 60% shared that were afraid of making mistakes when using Aviation English during their flight training. Given that ab-initio pilots are more susceptible to the influence of stressful conditions (Kilic and Ucler,2019), stress may affect students' behaviors and causing them to make mistakes using the language.2.25% of the participants also expressed fear about making mistakes in their Aviation English class in spite of being aware that there would be no penalties or humiliation for doing so. In the light of these findings, it is important to make critical adaptations in the overall program. Stress management workshops could be embedded within aviation training which can help participants cope with the pressures associated with language learning in stressful conditions. In addition to that, learners could be provided with opportunities to practice Aviation English in simulated environments that mimic real-life scenarios. This way they can build confidence through practical experience and be more open to the idea of making mistakes. In their investigation focused on understanding student pilots' viewpoints regarding the incorporation of simulation in the Aviation English course, Dinçer and Demirdöken (2023) discovered that aspiring pilots not only appreciated instruction based on simulation but also attained the desired outcomes. Consequently, it can be inferred that introducing innovation to the ESP classroom through simulation is deemed beneficial for ab-initio pilots. Moreover, in Aviation English class, language anxiety awareness training could be implemented at the beginning of the course to help learners understand and conquer their fears by developing coping mechanisms when using Aviation English.

Issues with the teaching style was another caused mentioned by 31.11% of the participants. They emphasized that good guidance and teaching not based on fear are essential for them to be successful and maintain their concentration during flight training. As highlighted in Chapter 2, creating an interactive learning, being flexible in training delivery and adapting the pace, style, and content to cater to the diverse requirements, backgrounds, levels, objectives, and learning styles of their students are important points to be considered to enhance learning and motivation in ab-initio pilot training. The results of Pershukova et.al's (2023) study which focused on the beneficial outcomes of employing interactive learning approaches displayed that the adoption of interactive learning techniques substantially boosts students' motivation to acquire and excel in Aviation English. Additionally, if instructors prioritize

constructive feedback that fosters improvement without inducing unnecessary stress and positive reinforcement in language learning, learners can be nurtured within a culture that views mistakes as opportunities for growth rather than sources of fear. As indicated by Ovando (1994), by minimizing the threat and adverse reactions linked to performance evaluation and by providing encouragement and optimism regarding students' potential for development, instructors can increase the efficiency of their teaching.

Lack of enough practice materials was the next cause articulated by 22.22% of the students. They indicated that there could have been more practice materials to study outside the class in radio communication class and added that this would have decreased their level of stress when they heard an unknown term on the radio. In the light of this finding, it can be suggested that students should be provided with ample materials outside the class to build a strong foundation by practicing the skills. Secondly, as indicated by ICAO (2009), they should receive comprehensive training materials along with clear and straightforward instructions on utilizing and navigating through their training resources. At this point, the inclusion of technical details and a comprehensive chart that aids in orienting themselves within the course can also prove highly beneficial.

Multitasking and workload was the cause with the highest percentage. 68.89% of the participants indicated that handling multiple tasks simultaneously posed a significant challenge causing an incredible workload during their flights especially in the initial phase of their training. The challenges mainly stemmed from difficulties in managing the aircraft simultaneously adhering to the instructions given by the instructor and trying to follow what has been said on the radio. This finding underscores the complexity faced by ab-initio pilots in the initial stages of their flights and therefore requires utmost attention since ab-initio pilots' cognitive capacity has limitations and processing new situations while concurrently retaining information and handling incoming variables is challenging for them (Gonzalez,2004). With the aim of helping students develop this skill, providing guidance on prioritizing tasks and presenting training strategies that gradually introduce and build up the complexity of tasks can assist them in navigating through convoluted situations. If these trainings are strengthened with realistic simulations that replicate the multitasking challenges faced

during actual flights, student pilots can enhance their ability to manage multiple tasks simultaneously.

Finally, 24.44% of the students reported that their ability to use Aviation English is negatively impacted by engine noise and particularly radio chatter, which posed challenges to their comprehension. In light of these student perspectives, it is important to consider the broader context of aircraft noise and its adverse effects on cognitive performance. As highlighted in Chapter 2, the influence of aircraft noise, especially during overflights, on cognitive performance has been extensively documented. Additionally, language comprehension experiences negative effects due to aircraft noise. Despite the noise being constant for all speakers, its impact on speech comprehension is not standard. To clarify, non-native speakers exhibit a more pronounced effect (Molesworth, 2016). This finding is also in accordance with research involving more than 80 pilots from diverse airports in eastern Australia. In that study, Estival and Molesworth (2012) found that pilots perceived 'communicating with other pilots' as the most challenging communication task. This difficulty stemmed from the background noise affecting both the transmitter and the receiver. With the aim of helping learners cope with the effects of noise, there should be investment in quality headsets with noise-cancelling features. Additionally, throughout their theoretical and flight training, students should be exposed to authentic materials including background noise to help them familiarize themselves with such conditions.

5.4.2 Effects. During the interviews, three adverse effects were mentioned, the first of which is stress. 86.67% of the participants noted that they were stressed when they could not understand the ATC or readback properly and when they were harshly criticized as a result of these mistakes. 57.78% indicated that they also felt stressed during Aviation English classes when they could not understand practice ATC transmission recordings. As stress emerges as a prominent factor contributing to accidents and incidents, notably within civil aviation (Useche et al., 2017), and considering the heightened responsiveness of ab-initio pilots to flight-related stressors in comparison to their experienced instructors (Farrace et al., 1996), it is imperative to give this issue extra attention. Given these findings, it is evident that comprehension related issues are causing stress among students. With the aim of addressing these setbacks and alleviate stress, certain strategies could be incorporated. First of all, a

supportive learning environment for learners in which real-world scenarios are implemented should be created to practice and to overcome challenges. Moreover, providing learning coaching sessions for individualized support and resources for self-paced learning could contribute to a more confident and stress-free learning experience. This finding is also crucial from the safety management point of view. Aurino (2000) posits that traditional safety relies on the simple idea that accidents result from mistakes made by individuals performing inadequately. However, accidents actually reveal a system's underlying issues and involve neglecting visible and identifiable warnings beforehand. In a similar fashion, Reason (1997) asserts that the shortcomings of individuals in their daily tasks are indicative of underlying flaws at the core of the system. Accordingly, safety management culture and the approach to making mistakes could be revisited and redefined by the flight instructors through standardized trainings in coordination with the university.

26.67% expressed that stress additionally affected their flight performance. This finding aligns with the historical records which highlight the correlation between stress-ridden pilots and diminished performance (Lee, 2010). Considering this finding, it is important to note that instructors play a bedrock role in providing support and guidance to help students manage their stress levels. Instead of overemphasizing the mistakes in a harsh way, a holistic approach to pilot training which includes not only technical skills but also humanistic values and psychological well-being to foster better performance should be pursued.

Another important potential effect mentioned by 71.11% of the participants is safety issues. They indicated that although they did not have any miscommunication related issues so far, language related issues could be a major problem in the future during international flights when coupled with other factors in emergency situations. This finding is in line with the fact that miscommunication frequently arises during emergency scenarios (Cookson, 2009) and possessing aviation English skills alone is insufficient for effective communication (Seiler, 2009). To address these concerns, there needs to be a multifaceted strategy in training. Most importantly, aviation language training should not only focus on linguistic proficiency but also include scenario-based activities that help them simulate real-life emergency situations and get ready for high-pressure aviation environments. Secondly, cross-cultural

communication training can be beneficial given the diverse backgrounds of individuals, regional accents and cultural differences in the industry into account.

Surprisingly, despite the prevalence of miscommunication issues in aviation, none of the student pilots mentioned miscommunication issues as a major effect. They indicated that they were very much focused on not making mistakes and immediately asked for clarification if they did not understand something. This finding is also in line with the questionnaire results in that *I can ask for confirmation when a misunderstanding occurs*, received the highest mean score. They additionally expressed that having a regular schedule and not being fatigued contributed positively to their ability to communicate accurately.

5.5 Implications

The results of this research not only reveal the current issues, their roots, and outcomes but also provide important insights into the future direction of Aviation English training. As a result, there is a compelling need for thoughtful actions in this specific area, covering both teaching methods and safety practices in Aviation. These important implications will be presented under two headings.

5.5.1 Pedagogical implications. In the light of the findings, there are paramount recommendations to be made.

- The institutional proficiency exam must be comprehensive in its evaluation, ensuring a thorough assessment of all four skills: listening, speaking, reading, and writing rather than focusing on three of them. It is also crucial that this examination is aligned with the B2 level of the Common European Framework of Reference and meticulous attention should be paid to the preparation of the exam.
- Rather than offering an EAP program which prioritizes academic reading, writing and listening skills in the preparatory program, ab-initio pilots could be offered another program which specifically focuses on the language skills they need in the training phase.
- Whilst crafting the curriculum and the materials, flight instructors and the ground instructors teaching communication and Aviation English classes should work collaboratively to ensure that the content covered in both flight

training and language classes aligns. This alignment can create a comprehensive learning experience for students in which the language skills acquired in the classroom directly support their practical application during flight training. Additionally, this coordinated approach can improve the quality of delivery and efficiency of the training.

- Due to the scarcity of commercial textbooks dedicated to aviation English, with none exclusively tailored for ab initio flight students, a custom-designed program and materials developed in-house could be preferred by prioritizing the needs of the learners in the program (Paramasivam, 2013).
- With the issues related fluency, realistic objectives for language learning and improvement must be initially set rather than prioritizing native-like fluency. Accordingly, the emphasis should be on developing communicative competence tailored to the specific realities of non-native ab-initio pilots. This can be achieved through activities which focus on the ability to recognize and address breakdowns, seek clarification, articulate information and describe situations.
- A multifaceted approach must be followed to help students develop their fluency. Using interactive multimedia resources and authentic materials, integrating simulated scenarios, designing peer to peer communication activities and role plays, having students record their speaking tasks and keep them in their recording portfolio can help students build confidence in this area.
- Investing in high-quality headsets equipped with noise-cancelling features is essential at flight schools. Moreover, students should be exposed to authentic materials, incorporating background noise, in Aviation English classes to familiarize themselves with real-world conditions.
- To aid students in managing workload, providing guidance on prioritizing tasks and presenting training strategies that gradually introduce and build up the complexity of tasks can assist them in navigating through complex situations. If these trainings are strengthened with realistic simulations that replicate the multitasking challenges faced during actual flights, student pilots can enhance their ability to manage multiple tasks simultaneously.

- Students need abundant resources beyond the classroom to practice, refine their language abilities, and establish a solid foundation. Furthermore, in accordance with the ICAO (2009) guidelines, students should be presented with extensive training materials along with explicit instructions for using these resources.
- Incorporating stress management workshops and language anxiety awareness training into aviation program can empower learners with effective coping mechanisms and help them deal with the challenges of language learning under stressful conditions. Practicing Aviation English in simulated environments that mimic real-life scenarios help them build confidence through practical experience and be more open to the idea of making mistakes.
- Technology such as virtual reality simulations and online language exchange platforms can be integrated into the program to bridge the gap in exposure to English-speaking environments. Moreover, peer support and mentorship groups focusing on the use and practice of target language can be established to provide additional opportunities for learners to practice their language skills.
- With the aim of dealing with the adverse impacts of lack of knowledge and experience, ab-initio pilots should firstly be equipped with all necessary phrases, terminologies and their possible alternatives during their theoretical training rather than being presented a limited script that they are expected to memorize. Then, they should have ample opportunities to practice these through role plays and simulation exercises.
- To equip students with a deeper understanding of regional accents, it is paramount to adopt a holistic approach. This includes guiding them in the exploration of common phonological features associated with these accents. Furthermore, they should be presented with ample opportunities to practice both within and outside the classroom through different materials.
- In mixed ability groups, it can be useful to provide tailored approaches to language training to enhance fluency with additional support mechanisms for weaker students and offer learner coaching sessions for students with different needs.

- Both ground and flight instructors should prioritize constructive feedback that fosters improvement without inducing unnecessary stress. With positive reinforcement in language learning, learners can be nurtured within a culture that views mistakes as opportunities for growth rather than sources of fear. As indicated by Ovando (1994), by minimizing the threat and adverse reactions linked to performance evaluation and by providing encouragement and optimism regarding students' potential for development, instructors can increase the efficiency of their teaching.
- Cultural awareness component can be added into the curriculum to raise students' awareness regarding this issue.

5.5.2 Implications for safety in aviation management. The findings of this study has also crucial implications for safety management which requires a comprehensive approach including standardized admission protocols, regular assessments, targeted training, stress management, and clear communication protocols. Additionally, to enhance safety in aviation operations, continuous improvement and adaptation to evolving industry standards are required. Below are the pivotal recommendations that should be taken into consideration.

- Safety remains a paramount concern within the aviation industry given its high-stakes nature (Atak & Kingma, 2011). Nevertheless, decisions in this sector are often weighed against financial considerations due to the industry's economic realities (ICAO, 2009). Whilst it is true that economic factors play a role in decision-making within the aviation sector, there is an undeniable potential conflict between safety and financial considerations. Given that safety cannot be compromised, effective aviation management should find synergies between safety measures and economic considerations. Accordingly, strategic investments should be prioritized to increase the quality of training and delivering targeted English language instruction.
- In the context of safety management and ab-initio flight training, acknowledging that mistakes are inherent in human performance is crucial. This recognition emphasizes the need for robust monitoring and reporting systems within aviation. These systems play a vital role in identifying factors contributing to errors before they become entangled with human and

organizational vulnerabilities, ultimately leading to safety issues (Aurino, 2000). Accordingly, a culture of open communication and reporting within the flight school should be formed. Thus, student pilots and flight instructors can report mistakes without fear allowing for resilient safety culture and a proactive identification of potential safety hazards.

- In a similar fashion, rather than viewing the identification of errors as a conclusive endpoint, it should serve as the starting point for a comprehensive safety investigation process (Aurino,2000). This perspective is invaluable in ab-initio language and flight training, as it shifts the focus from merely trying to suppress errors to developing proactive strategies that equip trainees to recognize, respond to, and recover from errors in real-time. Emphasizing this approach not only enhances safety protocols but also fosters a culture of continuous improvement in both language and flight training contexts.
- In cases where universities have a collaboration with flight schools for training, the implementation of standardized safety management training proves to be advantageous for the university, the flight school, and student pilots. Consistent training practices and approaches can ensure uniform safety protocols across instructors and compliance with aviation regulations. For student pilots, standardized safety can ensure industry readiness, making them more safety-conscious professionals upon graduation. Overall, the integration of standardized safety management training regarding communication contributes to a collaborative environment that prioritizes safety and excellence in education.
- Since ICAO, is primarily dedicated to the development and upkeep of standards rather than the creation of assessment instruments, the specific choice of assessment tools is still a grey area causing issues with regard to safety. There is a clear necessity for an official criteria and standardized testing method designed for non-native students for admission into a flight school.
- The absence of regulatory frameworks governing English language training, as noted by ICAO (2009), is also posing significant challenges. This is particularly evident student pilots lack the essential English skills required for effective communication. Thus, it is imperative to institute robust

language assessment and training practices for optimal effectiveness. To address this issue, assessment tools and curricula need to be carefully designed to meet the specific linguistic demands of aviation training.

- As stress can often lead to communication breakdowns, and thus have serious consequences, establishing clear protocols, providing standardized stress management and coping skills training to communicate effectively during stressful situations can have a positive effect on operational safety.
- There should be protocols and standardized assessment with regards to the regular emergency response drills with a focus on effective communication in ab-initio training. This approach can ensure the required proficiency in the language used for emergency protocols.
- Fostering a multilingual and culturally aware environment is a dire need for a safer aviation industry. To this end, clear communication protocols for multilingual teams in ab-initio flight training should be established since it can be a proactive step towards preventing misunderstandings or errors that may arise due to language differences.
- Considering the dynamic nature of the aviation industry and evolving technology, updating training programs on a regular basis in the light of safety protocols to align with changing requirements is a meaningful approach.
- Last but not least, flight schools and universities should strictly adhere to language proficiency standards set by aviation regulatory bodies, which is an essential component of maintaining safety.

5.6 Recommendations for Further Research

Considering the limitations indicated in this study, several recommendations for further research can be proposed. First and foremost, future research should aim for a larger and more diverse sample of ab-initio pilots in Turkey. Expanding the participant pool to include individuals from various institutions and backgrounds would contribute to a more representative study which will pave the way for broader generalizations of findings. Additionally, it is recommended to adopt a longitudinal design. This would involve tracking participants throughout their entire learning process and beyond, providing a broader perspective on the evolution of their language

proficiency. As for mitigating researcher influence, future studies could involve multiple instructors or employ a more distant observational role for the researcher. Moreover, exploration of additional variables, namely the curriculum design, instructional methods, and individual learning styles could also be investigated in future research to provide a more comprehensive understanding of the complexities involved in language proficiency development. Last but not least, Aviation English professionals in Turkey can collaborate and initiate research endeavors aimed at evaluating the efficiency of standards, assessments, and training methods. This collaborative effort can lead to valuable insights that contribute to the enhancement of language proficiency in aviation.

5.7 Conclusion

The study reveals significant concerns which might cause safety issues, particularly in speaking and listening skills, with a substantial number of students falling below the B2 level. Potential gaps in the current proficiency exam emphasized the necessity for a more comprehensive assessment of speaking skills, reevaluation of the curriculum and materials to establish a solid foundation in all four language skills. Participants identified speaking as the most challenging skill, highlighting the importance of addressing communicative competence. On a positive note, participants demonstrated a strong inclination to proactively address misunderstandings, adhering to the requirements of effective radio communication. However, maintaining fluent speech in emergency situations received the lowest mean score, indicating a perceived challenge among participants. Fluency-related issues were reported, both in Aviation English lessons and radio communication. Concerns about understanding different accents, particularly in recordings, were evident. Lack of knowledge and experience posed challenges in radio communication, impacting flight performance and safety awareness. Focus group interviews supported this, revealing concerns about fluency and emphasizing the need for attention in training. Additionally, difficulties in the initial phases of flight training were noted, with those completing ATPL theoretical classes finding the issue less problematic but anticipating challenges in their professional careers. Root causes behind the reported issues included language proficiency, cultural factors, fear of mistakes, teaching style, lack of practice materials, multitasking, workload, and noise. Negative consequences of language-related issues

included stress, negative effects on flight performance, and safety concerns. A significant majority of participants reported experiencing stress when unable to understand ATC or practice recordings, and some noted a subsequent impact on their flight performance and safety awareness.

In brief, the study highlights complex challenges faced by ab-initio pilots in Aviation English training, calling for tailored approaches. Pedagogically, it suggests improvements in proficiency exams, custom programs for ab-initio pilots, and better alignment of flight and language training. Emphasis on realistic fluency goals, stress management, and technology integration is crucial. Safety management-wise, it underscores strategic investments, standardized admission protocols, stress management, and continuous program updates as vital for maintaining safety standards in the aviation industry.

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