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The Challenges of Pilot Language Training for Effective Aeronautical Communications in Multicultural Contexts

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Abstract

This paper discusses the main elements that account for effective aeronautical communication in multicultural contexts and identifies approaches that can offer support to these elements. Most exchanges are performed by people from different linguacultural backgrounds and, although Aviation English is the language to be used in operations, communication dynamics are supposed to require skills that go beyond language proficiency. Data were collected from a questionnaire answered by experienced pilots flying in international airspace, and results were analyzed both from a quantitative and a qualitative perspective. The main findings show some of the challenges faced by pilots who are non-native speakers of English regarding elements that should be observed in training practices.

Keywords: aeronautical communication, pilot language training, multicultural contexts

Introduction

Communication is of paramount importance in aviation safety, and language is one of the means available for this to take place. According to the International Civil Aviation Organization (ICAO) Document 9835 (2010), aviation English is the language to be used in aeronautical communications. It consists of phraseology, a set of pre-formatted sentences resulting from a combination of around 400 items and Plain English, as well as simple structures to be used when phraseology does not suffice (Pacheco, 2019; Clark, 2017). While language proficiency is imperative, full, and effective comprehension of communications in aviation as a non-technical skill goes beyond the understanding of issues at the linguistic level given that most participants in aeronautical communications are non-native speakers of English and may be unfamiliar with the cultural features underlying linguistic behavior (Monteiro, 2019). Awareness of this

linguistic diversity must therefore be accounted for in language training programs, especially at the academic level, where pilots are offered a wider range of multidisciplinary courses.

With that in mind, this article aims to answer the following questions:

1. What challenges do pilot language training programs face when addressing effective communications in multicultural contexts?
2. How can these challenges be met? In other words, what assumptions allow for a more effective approach to aeronautical communications?

The rationale behind this investigation was to explore and discuss elements that should be considered in effective aeronautical communications expected to take place in mostly multicultural contexts. The Language as a Human Factor Taxonomy (LHUFT) proposed by Mathews (2013) allows for a comprehensive understanding of language issues inherent to aviation because it factors in technical, procedural, and cultural features affecting aeronautical communications. Concepts such as intercultural awareness and competence are key to intercultural communications because they lead to reflections on linguistic behaviors that should be engaged in when aiming for effective communications.

At the level of collegiate pilots, academic language training must encompass linguistic as well as metalinguistic features that are pivotal for successful communications given that most exchanges are authored by non-native speakers of English. It is therefore important that the academic community be well informed about the required elements for effective communication to take place from the perspective of industry personnel.

To bridge the gap between specific language issues and underlying factors prior to—or directly involved in—communication dynamics, the methodological framework for this study consists of a questionnaire answered by pilots. The questions feature a reflexive approach to intercultural communication, expected difficulties and their extent, and possible solutions.

In the sections that follow, we present the most relevant theoretical concepts associated with the research questions, describe the questionnaire used for data collection, unveil the main findings, and analyze these in the light of the theoretical concepts previously proposed. Our conclusion points to the importance of intercultural awareness in aeronautical communications as a key factor for safety.

Literature Review

According to Yadav (2023), 1.35 billion people speak English for various purposes worldwide, of whom 66% are non-native speakers. Yadav (2023) claims that only 4% of all conversations taking place in English involve native speakers only. In aviation, 25% of speakers are said to be native speakers and 75% non-native (Borowska, 2016).

This diversity needs to be acknowledged in all contexts of aviation communication, from ATC X pilot exchanges to mechanics, engineers, and CEOs. Personnel interacting in this field should be trained to be aware of the wide array of lingua-cultural backgrounds that may be playing a role from the outset in each exchange so that they can employ a wider range of cognitive tools to deal with this diversity without impairing safety.

While all interactions between individuals are affected by human factors, most communications in aviation are performed by participants from different language backgrounds. Despite fundamental differences in linguistic and cultural outlooks, they must manage these to meet one mutual goal: communicating successfully. Achieving this goal depends on a minimum language standardization and common ground on lexicogrammar and pronunciation. But what else?

This section reviews the main theoretical concepts closely associated with the research questions and the best approaches to analyzing language use in aviation.

Intercultural Communications, Intercultural Awareness, and Intercultural Competence

Aviation English is the specialized language used in aviation by pilots, air traffic controllers, mechanics, flight attendants, and the entire array of personnel involved in aeronautical activities. It is based on English, but it is not a natural language: it must be learned by all participants regardless of their native language. This is a delicate issue: native speakers of any language tend to think that other people master their language as they themselves do at all required levels: syntactic, semantic, and pragmatic.. This assumption can be a threat to the quality of what is being communicated, and, in aviation, to safety (Mathews et al., 2019; Monteiro, 2019; Pacheco, 2018).

Recent studies show that native speakers tend to make more mistakes than non-native speakers in pilot X ATC communications (Dissanayaka et al., 2022; Molesworth & Estival, 2015). Dissanayaka et al. (2022) claim that this is because non-native pilots invest greater effort in learning aviation English than do native speakers. Elements such as accent, rate of speech, and information density account for much miscommunication, and non-native speakers appear to have better metalinguistic awareness of these factors as potential obstacles that can harm understanding because they had to go through foreign language learning training.

English is mostly taught as a Foreign Language (EFL). Speakers of other languages are commonly required to study EFL, which assumes that they will interact with native speakers. Therefore, curricula are designed with that purpose in mind. However, as argued above, this scenario does not appear to be prevalent. That is, there is a strong chance that conventional language training will include elements that may not be essential to a communication context in which performers are not native speakers of English.

The concept of English as a Lingua Franca (ELF) aims to address communication taking place in English between speakers from different lingua-cultural backgrounds (Jenkins, 2009), in

which English is learned for intercultural communication. According to Jenkins (2009), there is a naturally evolving linguistic process that can facilitate the exchange of meaning when certain forms turn out to be no longer helpful. Aviation English is taught within the English for Specific Purposes (ESP) domain, according to which students study English as it applies to domains. Thus, ESP does not focus solely on proficiency but also on language use (Paltridge & Starfield, 2013). From this perspective, pilots should understand that they need to have thorough appreciation of effective communication in aviation as a non-technical skill; in other words, the skills required to communicate effectively go beyond exact technicalities that may be part of the operation but are not limited to structural language proficiency and instead entail cultural features underlying the linguistic behavior. Thus, aviation training should be guided by language use as it emerges in the context that regulates the community of practice (Monteiro, 2019; Prado, 2021).

Acknowledging the possibility of various interpretations is one of the definitions of intercultural awareness (Borowska, 2013), a key concept in the present discussion. This involves the most basic and intrinsic steps in communication, including comprehension, where the spoken language, and in a particular accent, may take a toll on detailed assessment and therefore communicative effectiveness (Chen & Starosta, 1998). By engaging in a culture-general approach and reaching a broader view of the “global influence on human behavior” (Chen & Starosta, 1998, p. 34) through the lens of aviation, the aim is to examine how issues inherently tied to the industry affect its members. Shining a light on these concepts and providing practical examples may pave the way for developing interculturally aware and competent professionals.

According to Zhu (2011), intercultural awareness encompasses one’s individual culture but also others. Zhu (2011) argues that individuals in multicultural environments “should try by every means to cultivate empathetic concepts and precepts” (p. 116), introducing a sense of

intercultural empathy as an individual trait as a “prerequisite and assurance for effective cultural communication” (p. 117).

Intercultural competence is understood as the possession of some knowledge of various cultures and their products or as having an attitude of openness and tolerance towards conversational partners (Borowska, 2013). Jenkins (2009) argues that it is through mutual negotiation involving effort, including adjustments such as paraphrasing, repetition, and natural adaptations by all parties that we ensure mutual comprehension. Other examples of adjustment can involve echoing items considered errors by native speakers and avoiding local or idiomatic language.

Language as a Human Factor

Miscommunication in aviation has caused several unfortunate events. The Manual of Language Proficiency Requirements (ICAO, 2010) is an attempt to regulate the use of language in aviation. ICAO (2010) mandates that pilots from all member states flying in international airspace must comply with these requirements. Yet the document is not enough to ensure safety. Research into specific language issues is sorely needed if we are to optimize the best training and testing practices.

To address this concern, Mathews (2013) elaborated a taxonomy of communications that considers language as a human factor in aviation. The idea is to approach specific language factors that impact aeronautical operations within a broader framework encompassing closely associated technical, procedural, and cultural factors with its branches. More specifically, the cultural factor includes elements, such as power distance, safety, crew resource management (CRM) training, and situational awareness (or lack thereof) regarding language and cultural differences. This taxonomy serves as a reference model for representing parameters essential to analyzing communications and the use of language in high-stakes contexts.

Communication as a Non-Technical Skill

The definition of “technical skills” varies across professions. Each area has its own way of defining the set of technical skills needed for a fluent and safe operation of what the job entails. Through processes such as trial and error, interviews, questionnaires, and report analysis, many areas of specialized work can arrive at a set of non-technical skills, i.e., those that do not constitute the technical core of the operations of a given activity but cover many aspects of normal work routines. At both the individual and group levels, these skills can increase overall safety and may even refine the entire operation, prevent breakdowns, raise awareness, and help develop an efficient work environment. Across the entire professional spectrum but especially in high-risk occupations, widespread aspects of skills include decision-making, situation awareness, communication, team coordination, and stress and fatigue management (Flin et al., 2008). These, as well as other aspects, combine to create a wide spectrum of skills that carry the potential to further enhance safety and procedural assertiveness.

Methodology

To maximize data collection quality, an exploratory qualitative methodology was designed based on quantitative data to better outline the profiles and experience levels analyzed. The aim was to index issues related to intercultural communication as well as the level at which these influences work in multicultural aviation environments.

A digital form was created containing 10 questions. It was intended for pilots to fill out, with the premise of outlining a perspective based on these professionals’ opinion about the questions and issues presented. Potential respondents were approached through emails and social media. To assure anonymity, respondents voluntarily chose to participate or not. Questions 1 to 3 quantitatively collected objective data regarding flight experience at the current base country as well as previous countries respondents had experienced before. Questions 4 to 10 focused mostly

on qualitative data, encouraging reflection on intercultural communication difficulties involved in their operation and the extent to which these difficulties go (or do not go) beyond the flight deck. Additionally, the questionnaire asked respondents to briefly describe actions they already take to mitigate these difficulties. Based on Flin et al.'s (2008) concept of non-technical skills, respondents were also asked whether they believed intercultural communication was a non-technical skill.

Given that the questions could yield both quantitative and qualitative data, different approaches were used when processing results. Questions with possible Yes/No answers constituted quantitative data on cultural aspects involved in aeronautical environments, especially multicultural ones. Data elicited through Questions 1 to 3 further complemented qualitative data from Questions 4-10 in the analysis of difficulties and mitigating actions already taken by professionals active in the industry and to relate them to current literature on intercultural communication difficulties.

Both types of questions (open-ended and multiple-choice) made eliciting a wide variety of qualitative data possible. This yielded several factors not previously addressed in the literature review. Assessing unexpected factors affecting intercultural communication made it possible to highlight specific occasions where a cultural factor may not have been obvious but was involved in communications and operations, especially in exceptional situations.

Data collection took place between August and December 2022. The questionnaire was anonymous and developed on a digital platform, with a 10-minute completion limit. Thirty-four respondents from different backgrounds, and with varying flight experience, completed the form, taking an average of 7 to 10 minutes to do so.

Results

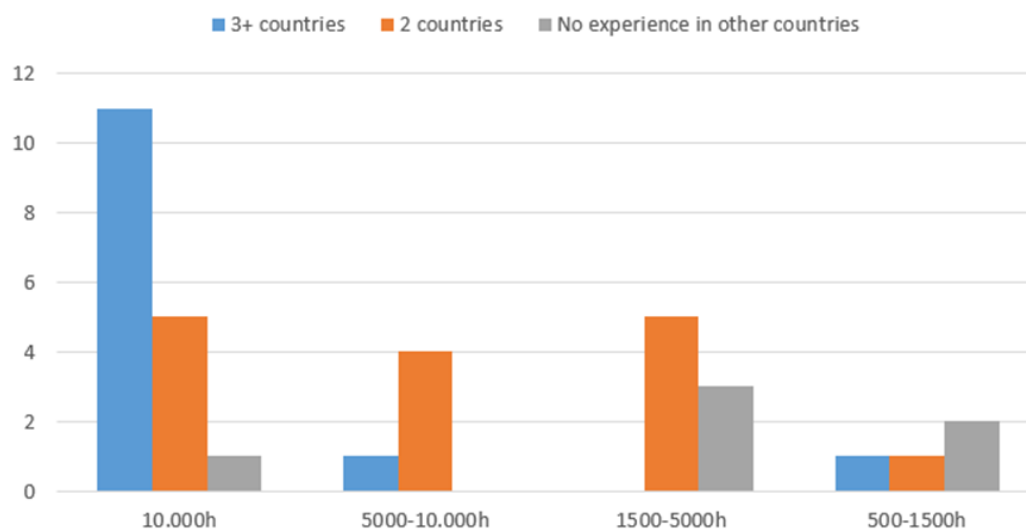
In this section, results will be presented according to the questions laid out in the questionnaire's order. Regarding Base Country and Previous Experience, of the 34 respondents, 15 were currently based in the United Arab Emirates (UAE), 11 in Brazil, 3 in Qatar, and the remainder in Hong Kong and the United States.

Of the 34 pilots, 22 reported that they had work experience in only one country, 7 had experience in at least 2 countries, and 5 had worked in at least 3 different countries. Previous countries in which the pilots had experience included various areas of the world, such as Canada, Brazil, The Netherlands, Qatar, Turkey, Indonesia, the US, and Taiwan, with many of these being widely known for often recruiting international crew members.

As regards to flight experience, of the 34 respondents, 17 reported having more than 10,000 hours of flight time, 5 reported between 5,000 and 10,000 hours, 8 reported between 1,500 and 5,000 hours, and 3 reported between 500 and 1,500 hours. Figure 1 shows pilot experiences in different countries, with flight experience in hours by individual pilots.

Figure 1

Experience in Other Countries and Flight Experience



When asked about intercultural communication difficulties, various issues were related by the respondents. However, different depths of detail were observed in the answers. Some pilots specifically cited problems, such as difficulty in comprehending due to strong accents, while 5 respondents mentioned accent as a difficulty. Speech pace was another recurring response, as in: “Speaking fast;” “Accent, slang, and speed;” and “Dealing with different accents.” Other intercultural difficulties emerging from the answers included the case of a pilot noting how miscommunication may be induced by “silent language and gestures.” According to this respondent, “Many cultures have differences in those aspects, so even if both speakers have good fluency in English, they can still miscommunicate [even] when using the right words.” As one pilot summarized it, “Wobbling heads [have] different meanings all over the globe,” while another respondent emphasized “understanding what the person means,” which aptly expresses the difficulty involved. Aside from non-spoken language, though an important communication tool, difficulties may derive from the improper use of standardized language such as Standard Phraseology in Aviation English, as noted by one pilot, who linked “accent and non-standard phraseology” as difficulties.

When prompted about actions the respondents took to mitigate intercultural difficulties in multicultural environments and thus prevent operational issues, different pathways emerged. Some respondents reported taking non-operational steps such as taking language classes, updating their communication skills, and as noted by one respondent, working to “quickly assess your interlocutor’s level of English to adapt your vocabulary and speed.” An introduction to the cultural background of other parties involved in the communication process may be key to ensuring comprehension and raising intercultural awareness.

Speech rate emerged as both an issue and as a way of ensuring successful and efficient communication. Speech rate related actions shine a light on how these professionals feel and

react when involved in a gradually degrading communicative event. Some answers involved requesting a slower speech pace or asking, “Say again.” On the other hand, some pilots proactively adopted approaches designed to prevent issues in transmission, thus eventually reducing reception difficulties. Such approaches included:

- “Ask to speak again and slow”
- “Ask to say again. Speak slowly so the other party may follow”
- “Speak slowly”
- “If you have any doubts, ask ‘Say again please’”
- “Crosscheck receiver’s understanding of information. Clarify received input.
Adapt verbal and nonverbal communication to culture”

More robust answers by respondents regarding interactions in multicultural aeronautical environments included well-established practices, such as:

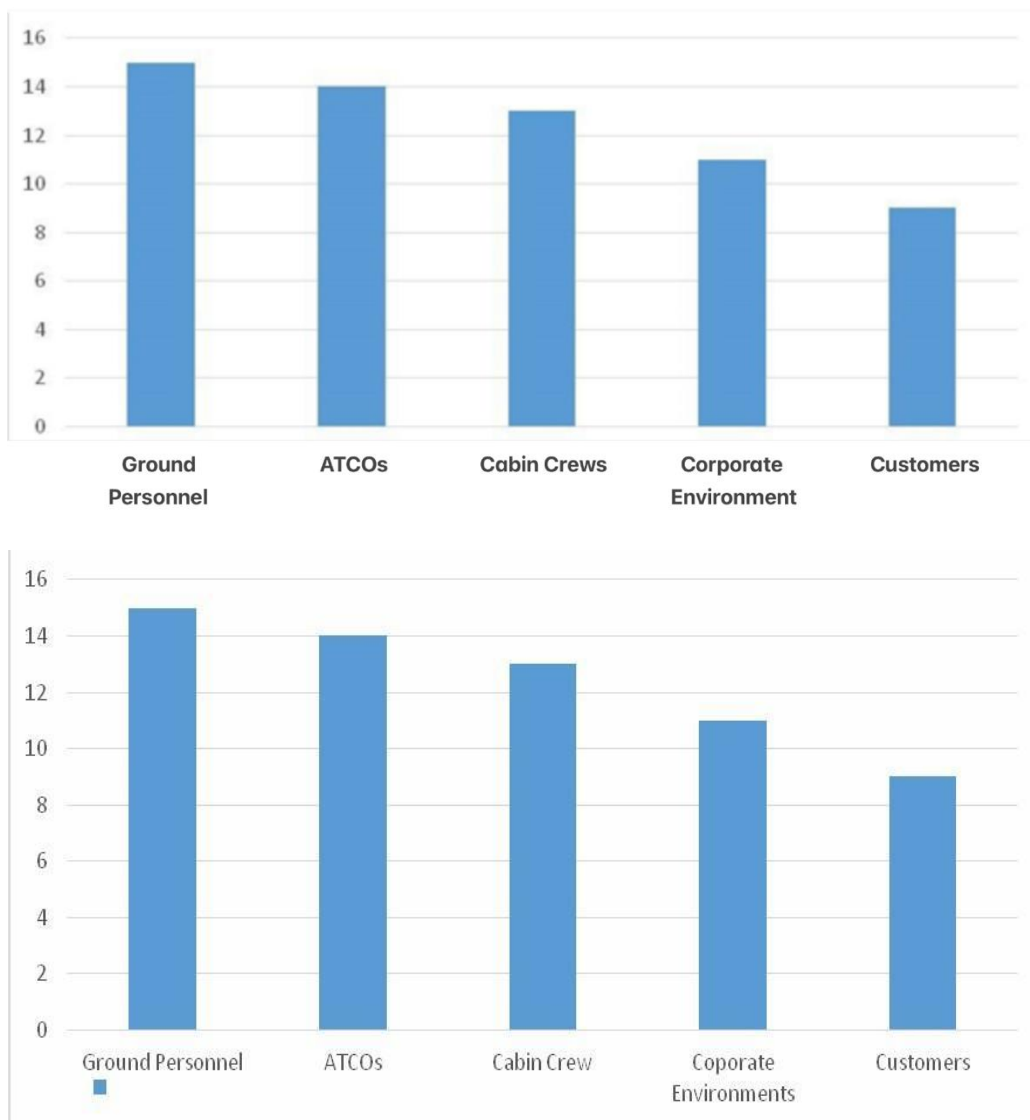
- “Using standard communication”
- “Std Call-Outs”
- “English Proficiency Test”
- “Use standard RT”
- Using “CRM as a tool for the benefit of safety.”

Of the 34 respondents, 30 believed that language and cultural differences are directly related to communication breakdowns or losses of situational awareness. They were asked about the importance of adopting intercultural communication skills and multicultural teamwork in aviation personnel training. Responses were on a scale from 1 (Not at All Important) to 5 (Very Important), of which respondents rated the importance of specific types of training. The average response was 4.40, a substantial amount.

Of the 34 respondents, 33 reported that intercultural interaction issues in multicultural contexts go beyond the flightdeck. To evaluate the extent of intercultural communication difficulties, we asked respondents whether they experienced any difficulties with the following groups: Cabin Crews, Ground Personnel, Air Traffic Control, the Corporate Environment, and Customers. Each respondent had the opportunity to select one of these, all of them, or none. Figure 2 shows how often respondents selected each group.

Figure 2

Intercultural Communication Difficulties Experienced with Different Aviation Groups



As the graph shows, communication difficulties with Ground Personnel stand out, and this should be addressed in communication and language training.

Lastly, based on Flin et al.'s (2008) notion of non-technical skills, we asked respondents whether they believed that intercultural communication was a non-technical skill. Of the 34 respondents, 31 answered "Yes."

Analysis and Discussion

This study covered a wide range of pilot profiles ranging from different levels of flight experience to different locations across 10 countries in different parts of the world.

When asked about intercultural communication difficulties in their work environment, pilots mentioned difficulties with different degrees of depth in terms of detail. Some of these emerged often given the relatively small size of the respondents. One answer—difficulty in comprehension due to strong or different accents—emerged 5 times, possibly due to lack of familiarity with accents (Jenkins, 2007; Merritt & Maurino, 2004). In a study by Orasanu et al. (1997), no fewer than 47 of 100 reports mentioned language or accent as a cross-cultural problem, by far the most frequent occurrence, and so it was proved in our research. Meanwhile, speech rate was mentioned 3 times as a problem by the respondents. Other difficulties related to language or accent included language proficiency and adaption to language, culture, and the country itself.

As mentioned by one respondent, the "inability to convey information clearly in a concise and accurate manner" seems to be closely tied not only to language proficiency and accent but also to non-spoken language, which, according to the respondents, varies a great deal in different locations. As one respondent commented, the concept of "local" is closely tied to culture, non-spoken language and codes, and expressions: "Wobbling heads [have] different meanings

throughout the globe.” In addition, every individual has a different way of expressing themselves and their cultural background (Assis & Pacheco, 2020; Hofstede, 1997).

Another pilot provided a more in-depth perspective on the connection between linguistic issues and individual interpretative approaches: “Most of our understanding comes from processing all the data received, then comparing [it] with our common basis.” Here, the relationship between this difficulty based on familiarity (Merritt & Maurino, 2004); or, in this case, their absence emerges because of the culturally distinct nature of the parties involved in the kind of degraded communication mentioned by the respondent. As expected, in environments with a lower frequency of intercultural conflicts, this issue appears to have a weaker influence as individuals with similar cultural foundations tend to maintain a reasonable level of reliability (Monteiro, 2012).

Monteiro (2012) characterized issues in intercultural communication that could be tied to intercultural communication problems, such as “first language interference” (p. 56) and “difficulties with prosodic properties of speech” (p. 56). The latter is potentially related to body language, when applicable, or all the voice features like pitch and tone. This corroborates with an observation from one of the respondents: “...even if both speakers have good fluency in English, they can still miscommunicate [even] when using the right words. In other cases, which are more common, we have different meanings for the same words depending on place and culture, so when people try to translate them, they can get it wrong.”

One key aspect that is particularly widespread as a difficulty in aviation, especially in multicultural environments, is the lack of adherence to the ICAO standard phraseology (ICAO, 2010). This issue has been thoroughly discussed in studies of communication in aviation (e.g., Borowska, 2013; Monteiro, 2012; Pacheco, 2018). Overall, communication issues derived from

the use of non-standard phraseology that can affect a variety of groups, even within a single culture or language.

Cross-cultural contact may in some cases result in difficulties, especially if some of the issues take a toll on proactiveness, which, when allied with the use of non-standard phraseology (Orasanu et al., 1997), may pose an even larger threat and pave the way for miscommunication events.

The fact that pilot errors on the flightdeck are likely to be linked to poor team communication and coordination rather than lack of technical proficiency (Cheng, 2014; Cooper et al., 1980) demonstrates once again the importance of effective communication as a key factor in the aeronautical world. This is confirmed by the results of this study, which show that 30 of the 34 respondents believe in the direct involvement of language and cultural differences in communication breakdowns or loss of situational awareness.

These 30 pilots were asked to rate the importance of the adoption of intercultural communication skills and multicultural teamwork in aviation personnel training on a scale of 1 (Not at All Important) to 5 (Very Important). Results show that the adoption of this kind of training was highly valued, with 16 of the 34 respondents selecting 5, the highest degree of importance on the scale.

Cross-cultural contact between different groups, such as crews, the corporate sector, airport ground personnel, and air traffic controllers, has become the norm in aviation (ICAO, 2004; Monteiro, 2012). One of the items in the questionnaire aimed to evaluate the extent of intercultural communication difficulties experienced by different groups in the aviation industry. The groups analyzed were Cabin Crews, Ground Personnel, Air Traffic Control, the Corporate Environment, and Customers. Results show that among the 34 respondents, Cabin Crews was the group that affected pilots the most with 27 reports, followed by Ground Personnel (26), ATCOs

(26), the Corporate Environment (18), and Customers (13). Meanwhile, 8 informants reported having had intercultural communication difficulties with all groups, thus reinforcing the view that intercultural communication issues may go far beyond intra-cockpit communication. This points to the need for language and communication practices to be added to training for communication for all aviation personnel, including aviation English training, beyond standard phraseology or aeronautical English.

Regarding mitigating effort and intercultural competence assessments, different responses emerged when pilots were asked about actions they already took to mitigate communicating difficulties. As for speech rate as a difficulty, it was also found that speech rate adjustments may be an alternative option for facilitating comprehension. This could be gathered from the explicit view that a slower speech rate may result in efficient comprehension, with pilots reporting that they either request a slower speech rate or proactively slow their own rate for others.

In fact, many of the responses show traces of intercultural competence and awareness. Important aspects of easing communication were proposed, including:

- “Quickly assess your interlocutor’s level of English to adapt your vocabulary and speed”
- “Know in advance, the culture I am going to work with, or even the background of the person who will be part of the team”
- “Trying to give a cultural background to the listener so that he might understand your expressions”
- “Increase acceptance of diversity”
- “Crosscheck receiver’s understanding of information. Clarify received input. Adapt verbal and nonverbal communication to culture”

- “Use standard RT”

These answers shed light on the fact that there are many interculturally aware and competent actors in the industry. One course of action for minimizing communication difficulties in multicultural environments could be encouraging widespread engagement with intercultural skills development and raising overall awareness of the problem within the industry. However, this study could not conclusively establish whether the development of these skills was individually triggered or the result of some form of training.

The pilots surveyed also pointed out widely adopted aviation industry procedures with potential for preventing poor communication. Standard Callouts, English Proficiency Tests, Standard Phraseology, and Crew Resource Management techniques are examples of approaches that appear to have been effective and result from a standard-oriented industry in terms of both operational procedures and communication, especially following the ICAO’s Document No. 9835 (2010), which set the standards for the use of English as the global aviation language.

A notable approach put forward by some respondents suggested more accommodating behaviors, with statements such as: “Sometimes no action to mitigate” and “As for accents, it’s also a matter of getting used to it.” As Merritt and Maurino (2004) noted, “Experience at the interface builds familiarity and reduces uncertainty” (p. 156). This view confirms the pilots’ statements, which despite the nature of adaptation as a cosmetic behavior, favor an accommodating approach or simply “getting used to it.” However, this is a potentially risky response as “cosmetic behaviors [may] crumble under stressful situations” (p. 156).

As for decision-making, this aspect may be affected by increases in cognitive effort that may result from multicultural environments and even artifacts from different cultures. In fact, levels of uncertainty are prone to grow when dealing with members of different groups (Cheng, 2014; ICAO, 2004; Monteiro, 2012). A higher level of cognitive effort also relates to stress and

fatigue management, suggesting that professionals acting in multicultural environments are prone to higher cognitive loads, which goes beyond their technical activities.

Regarding communication and team coordination, it has long been recognized that communication and team coordination are subject to cultural factors, including sub-components such as language, which also suggests that the dependence of technical performance on non-technical traits may have a direct impact on communicative effectiveness (Borowska, 2013; Cheng, 2014; ICAO, 2004; Jenkins, 2007; Mathews et al., 2019; Monteiro, 2012; Pacheco, 2018). In brief, intercultural communication fits neatly into the spectrum of non-technical skills that could—and should—be accounted for as a must-have trait for professionals in aeronautical settings.

Conclusion

The main purpose of this study was to address the challenges pilots face in maintaining effective aeronautical communication in multicultural contexts. One conclusion is that cultural factors and their inadequate management are part of the bigger picture and exert a degree of influence on communication effectiveness. The questionnaire used in this study, which addressed intercultural communication difficulties and actions taken to mitigate them, elicited current perspectives as well as hurdles associated with aeronautical communication. The results of the study show remarkable similarities with those of extant studies of language, culture, and intercultural communication.

The development of intercultural competence and awareness (Borowska, 2013; Chen & Starosta, 1998; Zhu, 2011) is a robust response to the need to improve aviation communications, both at the individual and institutional levels, as a proactive way of developing and practicing the facilitation of comprehension and, consequently, communication as whole.

While the number of respondents (34) is a limitation of the study, its findings are informative from both qualitative and quantitative perspectives even if further data gathering would enrich the data presented here. Future research on related topics is needed, especially investigations that would explore in more detail the interface between linguistics, human factors, and aviation safety.

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