Solutions for Improving the Safety of Aviation Communication

An Investigation of Pilots’ and Air Traffic Control Officers’ Opinions on Aviation English

Dissertation submitted in partial fulfillment of the requirements for the MA Applied Linguistics and TESOL

Gareth John Williams

March 2016
Abstract

This dissertation has investigated the opinions and insights of pilots and air traffic control officers regarding various aspects of the global state of Aviation English. 288 participants have completed an online survey and a further 4 participants have been interviewed in more depth. The study has found that certain opinions and insights vary between native speakers and non-native speakers but that there is no variation in their opinions on job security, pay and work hours. Furthermore, non-native speakers have reported no decrease in job security as a result of language proficiency requirements. With respect towards English as lingua franca, interviewees have revealed the potential for native speakers to have a personal responsibility towards successful communication whereas interviewees see insufficient language proficiency as a systemic problem. Recommendations that have arisen out of these insights are reported in the final section of this dissertation. In particular the study finds support for the idea of aviation insurance companies using their influence on aviation companies, so that they begin to use only ICAO recognized Aviation English tests.
Acknowledgements

The author would like to acknowledge the invaluable assistance of the following people. Without their support this dissertation would not have been possible.

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<td>Air Traffic Control Officer</td>
</tr>
<tr>
<td>ELPAC</td>
<td>English Language Proficiency for Aeronautical Communications Test</td>
</tr>
<tr>
<td>ESP</td>
<td>English for Specific Purposes</td>
</tr>
<tr>
<td>ICAEA</td>
<td>International Civil Aviation English Association</td>
</tr>
<tr>
<td>ICAO</td>
<td>International Civil Aviation Organization</td>
</tr>
<tr>
<td>LPR</td>
<td>Language Proficiency Requirements</td>
</tr>
<tr>
<td>NNSs</td>
<td>Non-native English Speakers</td>
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<tr>
<td>NNS</td>
<td>Non-native English Speaking</td>
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<tr>
<td>NSs</td>
<td>Native English Speakers</td>
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<tr>
<td>NS</td>
<td>Native English Speaking</td>
</tr>
<tr>
<td>PRICESG</td>
<td>Proficiency Requirements in Common English Study Group</td>
</tr>
<tr>
<td>RELTA</td>
<td>Royal Melbourne Institute of Technology English Language Test for Aviation</td>
</tr>
<tr>
<td>RTF</td>
<td>Radiotelephony</td>
</tr>
<tr>
<td>SPSS</td>
<td>Statistical Package for the Social Sciences (software)</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
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Table 20: Distribution of respondents for whether native speakers should mitigate speech vs. native/non-native speakers

Table 21: Adjusted z scores of each cell for native speakers should mitigate speech vs. native/non-native speakers
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Chapter 1: Introduction

English is the international language of aviation. Successful interactions in English are a key factor in the safety of aviation communication. The International Civil Aviation Organization (ICAO) sets Language Proficiency Requirements (LPRs) for global aviation. ICAO is a department of the United Nations (UN) and is mandated to support the development of a safe, efficient, secure, economically sustainable and environmentally responsible civil aviation sector by coordinating cooperation between its member states. In 2003, ICAO adopted the recommendations of the Proficiency Requirements in Common English Study Group (PRICESG) regarding minimum LPRs. To this end, ICAO announced that all of its member states’ pilots and air traffic control officers (ATCOs) must reach a level 4 on the newly created ICAO Rating Scale (see Appendix A) by 2008. This deadline was then extended to 2011.

According to the LPRs, pilots and ATCOs must be tested and achieve a level 4 in every one of the language descriptors of the ICAO Rating Scale (Moder, 2013; Seiler, 2009). ICAO recommends that candidates who achieve a 4 should be tested again within 3 years (Tiewtrakul & Fletcher, 2010), candidates who achieve level 5 should be tested again after six years and level 6 candidates would not require any further testing throughout their career (Kim & Elder, 2009).

The central hypothesis of this study is that there is a problem of language proficiency in aviation communication and that the pressure LPRs puts on non-native speakers (NNSs) adversely impacts their engagement with improving their language proficiency. In order to explore this hypothesis, several key questions were established:

1. What are the language requirements for pilots and air traffic controllers? Are there problems of communication in the aviation industry?
2. What attitudes do NNSs and native speakers (NSs) hold about minimum language proficiency requirements in aviation?
3. Do minimum language proficiency requirements in aviation increase job insecurity among NNSs? If yes, does this adversely impact NNSs’ engagement with improving their language proficiency?
4. What do NNSs’ and NSs’ opinions reveal to us on how to best improve aviation communication?

The overarching purpose of this study is to investigate avenues for improving aviation communication. The scope of the data collection is, therefore, as broad as practically possible. The second chapter is a wide-ranging literature review of authors’ opinions and research regarding a variety of topics on the broader subject of Aviation English. Chapter three is a description and justification of the data collection methods of this study. In chapter four, these results will be reported on and the implications discussed. Conclusions and recommendations follow in chapter five.
Chapter 2: Literature Review

2.1 Method of Gathering Literature

The literature review commenced with a list of references provided by Dr. Barbara Clark, a researcher for the Civil Aviation Authority in the United Kingdom (UK) (Gaskell, 2013). This list of references was scanned for a specific combination of key words and phrases. Those readings that met the criteria were targeted for the literature review of this study. The key words are best represented by a table that includes two columns:

<table>
<thead>
<tr>
<th><strong>Column A</strong></th>
<th><strong>Column B</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>aviation</td>
</tr>
<tr>
<td>ESP</td>
<td>air-ground communication</td>
</tr>
<tr>
<td>language</td>
<td>aeronautical</td>
</tr>
<tr>
<td>linguistics</td>
<td>ICAO</td>
</tr>
<tr>
<td>grammar</td>
<td>plane</td>
</tr>
<tr>
<td>vocabulary</td>
<td>cockpit</td>
</tr>
<tr>
<td>EL2 (English as a second language)</td>
<td>airplane</td>
</tr>
<tr>
<td>L2 (second language)</td>
<td>aircraft</td>
</tr>
<tr>
<td>discourse</td>
<td>pilot</td>
</tr>
<tr>
<td>ICAEA</td>
<td>ATC (air traffic control)</td>
</tr>
<tr>
<td>oral proficiency</td>
<td>ICAEA</td>
</tr>
</tbody>
</table>

Table 1: List of key words for locating relevant Aviation English books and articles

Those readings whose title included a combination of at least one key word or phrase from both columns were deemed as meeting the criteria for the literature review. ICAEA (The International Civil Aviation English Association) is included in both columns to reflect the assumption that any article with ICAEA in the title is relevant to this literature review.

Henry Emery, the author the Macmillan published Aviation English curriculum “Check your Aviation English” (Emery, 2010), was asked about which essential titles should be included in the literature review. Mr. Emery provided a link to an exhaustive list of around 330 Aviation English articles, books, dissertations and conference proceedings. This list was generated by Natalia Guerreiro on her website entitled “Aviation English Hub” (Guerreiro, 2015).

Randolph (2009) recommends a cascading technique to search out relevant readings for a literature review. This technique involves examining the reference lists of the readings identified in an initial search. This process is then repeated for any articles subsequently identified until “saturation” is reached. This is the point as described by Randolph (2009) where it can be assumed there are no more relevant readings in the field of study.

2.2 Historical context

Literature on the subject of Aviation English divides into two distinct time periods. These time periods fall on either side of the announcement by ICAO in 2003 that all of its member states’ pilots and air traffic controllers must reach a level 4 on the newly created ICAO language
proficiency scale by 2008, a deadline since extended to 2011 (Garcia, 2015). The vast majority of this literature review draws upon work done since the ICAO language proficiency requirements were announced. This is not to say that significant and important work was not completed before this time, but that the LPRs have had a fundamental influence on studies since then.

2.3 Scope and quality of the literature

The body of literature relating to Aviation English is growing and has made particular progress in the last 15 years. It is, however, a relatively small area of applied linguistics. Regardless, it remains vitally important to situate this dissertation in the limited context of the current literature. Some judgment regarding the quality of some of that research should be attempted. This literature review has sourced 16 articles from peer-reviewed linguistic oriented journals. Six of those come from a single issue of the Australian Review of Applied Linguistics.

These articles are displayed in Table 2 below.

<table>
<thead>
<tr>
<th>Language Testing</th>
<th>Q1¹</th>
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<tbody>
<tr>
<td>(Alderson, 2010), (Kim &amp; Elder, 2015)</td>
<td></td>
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<table>
<thead>
<tr>
<th>Annual Review of Applied Linguistics</th>
<th>Q1</th>
</tr>
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<tbody>
<tr>
<td>(Alderson, 2009)</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>TESOL Quarterly</th>
<th>Q1</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Farris, Trofimovich, Segalowitz, &amp; Gatbonton, 2008)</td>
<td></td>
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<table>
<thead>
<tr>
<th>Language Assessment Quarterly</th>
<th>Q1</th>
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<tbody>
<tr>
<td>(Emery, 2014)</td>
<td></td>
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<table>
<thead>
<tr>
<th>English for Specific Purposes</th>
<th>Q1</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Wang, 2007), (Sullivan &amp; Girginer, 2002), (Knoch, 2014)</td>
<td></td>
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<table>
<thead>
<tr>
<th>English World-Wide</th>
<th>Q1</th>
</tr>
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<tbody>
<tr>
<td>(Philps, 1991)</td>
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<table>
<thead>
<tr>
<th>World Englishes</th>
<th>Q1</th>
</tr>
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<tbody>
<tr>
<td>(Tajima, 2004)</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Australian Review of Applied Linguistics</th>
<th>Q2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Huhta, 2009), (Estival &amp; Molesworth, 2011), (Kim &amp; Elder, 2009), (Moder &amp; Halleck, 2009), (Read &amp; Knoch, 2009), (VanMoere, Suzuki, Downey, &amp; Cheng, 2009)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: List of Aviation English articles from peer reviewed journals (SCImago, 2007)

Furthermore, an examination of the literature based solely upon number of citations is problematic as only eight articles in this literature review have 20 or more citations. High quality studies have been completed recently enough that they have not yet attracted as much attention as older articles. This is of particular relevance because ICAO member states were only required to meet language proficiency requirements by 2011, consequently, more recently published research may be more significant considering these recent developments.

¹ * Q1 means that the journal is in the top quartile of journals according to this rating organization, Q2 means that the journal is in the second quartile.
2.4 Themes in the literature

In order to present the reader with some sort of judgment on the quality of all of the work in the various areas that the literature addresses, an alternative approach to citation numbers is needed. Therefore, the solution to the challenge of providing the reader with a coherent picture of current literature is to group articles thematically from broad categories to more specific. This also provides organization to the subsequent discussion of the literature.

These themes are displayed in Table 3 below:

<table>
<thead>
<tr>
<th>Broader Themes</th>
<th>Specific Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examining Aviation English</td>
<td>Defining Aviation English</td>
</tr>
<tr>
<td></td>
<td>Aviation English as Lingua Franca</td>
</tr>
<tr>
<td></td>
<td>Applied Linguistics theory With Reference to Aviation English</td>
</tr>
<tr>
<td>Aviation English as it Relates to Safety</td>
<td>Cognitive Workload Affecting Language Oroficiency</td>
</tr>
<tr>
<td></td>
<td>Examination of Accidents Where Language Was a Contributing Factor</td>
</tr>
<tr>
<td></td>
<td>Language Proficiency of NNS pilots</td>
</tr>
<tr>
<td>Language Proficiency Requirements and</td>
<td>LPR (ICAO scale)</td>
</tr>
<tr>
<td>Implementation</td>
<td>Criticism of LPRs</td>
</tr>
<tr>
<td></td>
<td>LPR Testing</td>
</tr>
<tr>
<td></td>
<td>Criticism of LPR Testing</td>
</tr>
<tr>
<td></td>
<td>Attitudes to LPR and testing</td>
</tr>
<tr>
<td>Pedagogical Considerations of Aviation English</td>
<td>Aviation Language Syllabus Design</td>
</tr>
<tr>
<td></td>
<td>Teaching Methods</td>
</tr>
</tbody>
</table>

Table 3: List of themes explored in the literature review

2.5 Examining Aviation English

2.5.1 Defining Aviation English

One of the most common themes in the literature is defining exactly what Aviation English is. Radiotelephony (RTF) is used to communicate between an ATCO and a single aircraft. Other aircraft in the area can listen in on this interaction but only one transmission can be broadcast at a time. If two transmissions are relayed at the same time, they will cancel each other out.

At the outset, it is important to understand ICAO's differentiation of phraseology and “plain language”. Phraseology is a strictly proscribed set of vocabulary that is constrained by interactional rules, limited grammar, and some specially adapted phonology (Moder, 2013). Phraseology is primarily used for routine interactions. “Plain language” is used in those situations where phraseology is not sufficient (Barshi & Farris, 2013; Emery, 2014; Kim & Elder, 2009). The specifications for plain language are less well defined but guidelines from ICAO
prioritize clear, precise and concise language (Lopez, Condamines, JosselinLeray, ODonoghue, & Salmon, 2013).

It is tempting to define Aviation English in terms of ICAO’s “plain language”, however, the reality is a little more complicated. ICAO’s directive to use “plain language” requires both Aviation and General English depending on the needs of the situation at hand. Bullock’s (2015) diagram illustrates this well.

It is the stance of this dissertation that phraseology is a sub-language derived from English. It is thoroughly suitable for routine RTF communications and for a limited array of non-routine communications. Phraseology is a subset of Aviation English, which is in turn a subset of General English. ICAO’s specification of “plain language” will draw upon both Aviation English and General English domains and will be used when phraseology is insufficient for the needs of the moment.

Another useful departure point for how the literature discusses Aviation English is to note two broad trends in the literature: descriptive and prescriptive discussions.

Prescriptive discussions propose definitions, concepts or models of Aviation English arrived at through reasoning and the author’s knowledge of aviation communication with reference to the author’s knowledge of English. Such an approach can focus on the form of Aviation English (e.g., lexis and grammar) (Boschen & Jones, 2004; Breul, 2013; Bullock, 2015; McGrath, 2011; Moder, 2013; Philips, 1991), its functions (Emery, 2014; Garcia, 2015; Kim & Elder, 2009; Knoch, 2014; Kukovec, 2008), its context of use (Almeida, 2010; Howard, 2008) or a combination of these (Farris, 2007; Mitsutomi & O’Brien, 2003).

Descriptive discussions of Aviation English are derived by reporting on the direct observation of communication between pilots and controllers. Again, the author can observe the form of Aviation English (Lopez, Condamines, & JosselinLeray, 2011; Pavlinović, Boras, & Francetić, 2013), its functions (Falzon, 2009; Farris et al., 2008; Makarov & Voskoboynikov, 2011; Moder &
Halleck, 2009), its context (Monteiro, 2012) or a combination of these (Sullivan & Girginer, 2002).

2.5.2 Aviation English as Lingua Franca

NNSs constitute the majority of English spoken around the world (Kachru, 1992). This reality indicates that there is no “ideal” version of English and it is more realistic for learners to achieve a standard of proficiency sufficient enough so that they can successfully communicate with an international audience. The goal then, is not to achieve native-like fluency but instead to learn to communicate successfully with an international audience. Since communication success is a mutual interaction between listener and interlocutor (Kim & Elder, 2009), responsibility also lies with NSs to mitigate their speech so that an international audience can understand (Alderson, 2009; Estival & Molesworth, 2011; Mitsutomi & O’Brien, 2003; Tiewtrakul & Fletcher, 2010). This also seems to indicate that it is irrelevant whether a language proficiency rater is a native speaker or not (Seiler, 2009) as long as the tester is of sufficient proficiency to adequately assess a speaker’s language proficiency. It also raises the question of whether tests might be more valid if they included interactions with NNSs.

An important issue raised by Garcia (2015) is whether NSs should be automatically considered good at communicating in English. If the answer to this question is “No” then investigation of the literature reveals a variety of potential strategies to address that deficit.

Kim and Elder (2009) believe the solution is in training. This training should include simplification of speech and avoidance of redundant information, paraphrasing of utterances when these are found to cause problems of comprehension, and more judicious deployment of available language resources, including the existing aviation phraseology repertoire. Cookson (2009) agrees, stating that NSs should learn to avoid idioms and repair interactions when accents are interfering with understanding. Hazrati (2015) states that any such training must be completed in the context of multicultural communication.

Tajima (2004) writes that improvements can be made when NSs have sufficient exposure to an international audience. He cites the example of one American pilot who reported learning to become more adept at communicating with Chinese and Japanese personnel in particular. McGrath (2011) gives even more specific suggestions for improvement. He recommends a systematic review of all ICAO phraseology and adjusting the grammar to its simplest form, e.g. using the imperative instead of negative statements.

Monteiro (2012) identifies the need for more research and that data should be shared more openly through fostering international cooperation. The goal of this dissertation is to gather and share data in the context of acknowledging Aviation English’s status as lingua franca.

2.5.3 Applied Linguistics Theory With Reference to Aviation English

The literature attributes relatively less attention to associating applied linguistics theories to the field of Aviation English. Significant exceptions include work by Mitsutomi and O’Brien (2003), Huhta (2009), Monteiro (2012), and Breul (2013).
Huhta (2009) discusses Bachman and Palmer’s (1996) framework of test usefulness as a function of reliability, construct validity, authenticity, interactivity, impact and practicality. In order to understand what combination of priorities should be attributed to each factor, the overall purpose of the test must be considered. Huhta applies this theory to an evaluation of an Aviation English test developed in Finland with the conclusion that this particular test does not completely fulfill its purpose. Such a commendably honest and forthright assessment of an Aviation English test seems to concur with Alderson’s (2010) concerns about the state of Aviation English testing.

Breul (2013) introduces Relevance Theory; the theory that every utterance is dependent on pragmatic inference for the recovery of what was the utterance’s intended meaning. In other words, the linguistic meaning of a sentence is only part of the input used by listeners to reach their understanding. Much of the meaning is also derived from listeners’ context and assumptions (both general assumptions about the world, and specific assumptions related to the context at hand). Furthermore, listeners will alight upon the meaning that makes the most sense at the time, i.e. the one that fulfills their assumptions. This theory implies that any assumed robustness in ICAO phraseology may be deceptive.

It is perhaps more appropriate to gauge the robustness of ICAO phraseology in broader theoretical terms such as Grice’s (1991) cooperative principle: that successful communication must fulfill certain maxims of quantity, quality, relation and manner. Monteiro (2012) finds a high degree of correlation between Grice’s cooperative principle and ICAO directives for optimal communication.

This approach is particularly relevant to defining ICAO’s “plain language” more clearly. If communication beyond phraseology is successful according to ICAO’s directives, and therefore also to Grice’s cooperative principle, then the language used could be considered “plain language.” This approach also provides further weight to the argument that Aviation English should be considered as lingua franca, with responsibility for successful communication lying equally with interlocutor and audience.

Mitsutomi and O’Brien (2003) and Seiler (2009) link Aviation English as lingua franca to Kachru’s (1992) description of the three circles of English users. These users come from the inner circle (countries such as the UK, the United States of America (USA), Australia etc, which are considered to be English speaking countries), the outer circle (countries such as Nigeria, India, the Philippines etc, where English is widely used but shares official or unofficial language status with languages other than English) and the expanding circle (just about everywhere else in the world). The users of English that form the outer and expanding circle greatly outnumber those users from the inner circle with implications for language proficiency goals.

Regardless of whether we might argue Kachru’s model is a simplistic representation of the global use of English, Mitsutomi is right to link this influential theory to Aviation English. Summoning Kachru’s 3-circle model brings the communication friction caused by global aviation into sharp focus by displaying the vast number of types of legitimate English used globally and the wide variety of contexts in which they appear. Because Aviation forces interactions between people from every one of Kachru’s 3 circles, the model also helps to reveal the relevance of this dissertation’s focus on comparing the views of NSs and NNSs towards Aviation English.
2.6 Aviation English as it Relates to Safety

2.6.1 Cognitive Workload Affecting Language Proficiency

A number of high quality data-driven articles have been written on the subject of the effect of cognitive workload upon language proficiency during RTF communications (Barshi & Farris, 2013; Farris et al., 2008; Howard, 2008; Sexton & Helmreich, 2000; Tiewtrakul & Fletcher, 2010). The consensus is that an increase in cognitive workload during RTF communication increases language misunderstandings and error. Furthermore, Sexton and Helmreich (2000) found that messages with shorter words were less easily misunderstood than those with longer words. Howard (2008) also found that longer messages were more likely to be followed by a language misunderstanding. Farris et al. (2008) agree, recommending that air traffic controllers limit the number of instructions they deliver with each transmission. During high workload conditions (including non-routine situations), two instructions was optimum for native speakers and one instruction for non-native speakers. All three findings are interesting in light of the fact that pilots are more likely to revert to plain language in emergency situations (Breul, 2013; Moder, 2013). The findings imply that at the time pilots’ and air traffic controllers’ language needs to be most accurate (i.e., in non-routine situations), it is more likely to be less so.

2.6.2 Examination of Accidents Where Language Was a Contributing Factor

The literature routinely mentions the fact that ICAO has identified seven disasters occurring from 1976 to 2001 that were the direct result of poor communication. However, Boschen and Jones (2004) also cite 35 crashes between 1971 and 2002 that occurred at least partially as a result in a breakdown in communication.

Incidents that are examined in more detail in the literature include:

- A Garuda airways jet couldn’t be efficiently evacuated as a result of poor cabin crew language proficiency (Tajima, 2004).
- A Turkish Airlines plane crashed in Paris because a ground worker couldn’t read an English warning notice instructing that a cargo door be fully sealed (Tajima, 2004).
- An aircraft in Colombia crashed because the English NS crew could not communicate effectively with local air traffic controllers (Boschen & Jones, 2004; Campbell-Laird, 2004; Tajima, 2004).
- In New York a Colombian crew failed to state “fuel emergency” and crashed as they were not given landing priority (Alderson, 2009; Boschen & Jones, 2004; Campbell-Laird, 2004; Tajima, 2004). Hazrati (2015) also cites differing cultural values regarding communication as a contributing factor of this crash.
- In Tenerife, the worst accident in the history of aviation occurred, in part, because of the misuse of a single grammatical item (Alderson, 2009; Boschen & Jones, 2004; Campbell-Laird, 2004; Cookson, 2009; Farris, 2007; Monteiro, 2012; Philps, 1991; Tajima, 2004)
- A crash in the USA might have been avoided if the air traffic controller had been more direct about an unexplained descent, rather than using the colloquial “How are things coming there?” (Tajima, 2004)

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A mid-air collision near Zagreb may have been avoided if the pilot of one of the aircraft had not switched to Serbo-Croatian at a critical moment (Cookson, 2009).

The consensus in the literature is that crashes are the culmination of many factors. Language proficiency, when it plays a role, is only ever one of multiple contributing factors (Mathews, 2004). Korean pilots interviewed by (Kim & Elder, 2015) have argued that the role of English proficiency (or lack thereof) in aviation accidents is overstated by ICAO. The degree to which linguistic proficiency plays a role is difficult to assess because black box recorders of routine flights are regularly recorded over (Campbell-Laird, 2004). This means there is no globally integrated record of near misses. It is the stance of this dissertation that such a database should be set up so that language related near misses can be routinely analyzed.

2.6.3 Language Proficiency of Non-native Speaking (NNS) Pilots

Three studies relate directly to the language proficiency of NNS pilots. Farris (2007) found that NNSs were affected more during periods of high cognitive workload than native speaking (NS) pilots. Furthermore, she found that the lower the NNSs’ proficiency, the higher the potential for misunderstandings. In particular, NNSs’ fluency was most severely affected. Tiewtrakul and Fletcher (2010) reported similar findings after conducting a study at an international airport in Thailand. The pilots that were discovered to have the most misunderstandings were NNSs using English to communicate.

Taking a slightly opposing viewpoint, possibly informed by considerations of English as lingua franca, Estival and Molesworth (2011) had NNSs and NSs rank various radio communicative tasks in order of difficulty. They found no difference in NNSs’ and NSs’ opinions on the difficulty of these tasks. NNSs and NSs both identified understanding other pilots as the most difficult task. Estival and Molesworth conclude that although NNS language proficiency may contribute to communication problems there is little evidence to suggest they are the primary reason. This is an opinion echoed by Korean pilots interviewed in Kim’s (2015) study.

It is the stance of this dissertation that focusing solely on the language proficiency of NNSs is counterproductive and misinformed. However, common sense dictates that minimum language proficiency in Aviation English must remain nonnegotiable (Patel-Carstairs, 2013). The language proficiency of NNS pilots and ATCOs is a neglected area of Aviation English. The current study will gather more information on this subject by asking NNS pilots and air traffic controllers to self assess their language ability with reference to the ICAO Rating Scale.

2.7 Language Proficiency Requirements and Implementation

Much of the literature is focused on explaining LPRs and the testing procedures that administer to them. Naturally these discussions often relate to ICAO’s rating scale and the criticisms of it. Fewer discussions focus on the attitudes of pilots and ATCOs to these requirements.
2.7.1 Language Proficiency Requirements (and the ICAO Rating Scale)

The ICAO rating scale has six language criteria: Pronunciation, Structure, Vocabulary, Fluency, Comprehension, and Interactions (Emery, 2014; Kukovec, 2008). The scale measures pilots’ and ATCOs’ speaking and listening skills in the use of radiotelephony and common English related to the domain of aviation (Balogh, Bernstein, Suzuki, Subbarayan, & Lennig, 2006; Downey, Suzuki, & VanMoere, 2010). Testing of ICAO’s standardized phraseology is separate from the testing of language proficiency (Garcia, 2015).

Of the six language criteria, only vocabulary and comprehension refer to a specific purpose by declaring the need to communicate and understand ‘common, concrete, or work-related topics’ (Moder & Halleck, 2009). Each of these language criteria is rated from 1 (Pre-elementary) to 6 (Expert) (Kim & Elder, 2015; Knoch, 2014). Pilots’ and ATCOs’ overall levels are determined by the lowest score across all of the six language criteria (Emery, 2014; Kim & Elder, 2015; VanMoere et al., 2009).

Since 2011, ICAO has stipulated that all aviation personnel operating in environments where the controller and pilot do not share the same native language must demonstrate proficiency in English (Barshi & Farris, 2013). As of 2011, all ICAO member states have reported meeting their language proficiency requirements (Kim & Elder, 2015).

2.7.2 Criticism of the LPRs

In 2009, Van Moere reported that little information had been provided by ICAO about the development and theoretical rationale for its rating scale (VanMoere et al., 2009). Alderson (2009) agreed that there was a lack of empirical validation of the rating scale. Two years later however, Alderson (2011) pointed out that ICAO has taken some steps to support the implementation of LPRs. Such steps include the release of the “Manual on the Implementation of ICAO Language Proficiency Requirements” (ICAO, 2010) and running numerous international workshops on the LPRs. Nonetheless, Alderson (2011) also argued that ICAO generally recognizes the weaknesses of the LPRs but that the situation remains irresolvable in the medium term. In 2014, Emery reiterated that there was still no empirical validation of ICAO’s rating scale (Emery, 2014).

Knoch’s (2009) study focused on what priorities pilots placed upon the various aspects of the ICAO rating scale. The study found that pilots value different factors than linguists when measuring language proficiency. In particular, the pilots valued technical knowledge highly, seeing it as an intrinsic part of a speaker’s language proficiency.

Kim and Elder (2015) investigated the attitudes of Korean pilots towards the ICAO Rating Scale and found that there was strong opposition to the ICAO policy. Pilots reported these attitudes under three main themes. First, ICAO has assumed that English proficiency is the cause of many airline accidents. Second, the policy unfairly targets senior pilots who have a lot of experience and good safety records without necessarily meeting the LPRs. Third, many pilots interviewed believe that language proficiency of NNSs is not as significant a contributing factor as NSs who deviate from standard phraseology. Kim also studied what pilots thought of the rating scale, finding that they agreed with comprehension and interactions but disagreed with structure and fluency.

Garcia (2015) recommends that the intervals between testing should be shortened. A pilot’s level 4 language proficiency could decay to level 3 during the 3-year period between language
proficiency tests. Garcia also criticizes ICAO’s rating scale on the basis that it does not meet the special needs of Aviation English. These criticisms include the rating scale’s reference to non-verbal cues, its valuing of idiomatic speech, and its reference to complex grammatical structures. Garcia recommends that LPR revisions should be based upon actual language use, rather than prescriptive language.

The literature indicates a growing body of research that points to the limitations of ICAO’s rating scale. This study does not criticize ICAO’s rating scale directly on the basis that progress can be made towards the implementation of LPRs with this instrument. This is not to say that the LPRs shouldn’t be revised in the future but that this study prefers to focus on what can be done with the current tools available.

2.7.3 LPR Testing

Downey et al. (2010) note that LPR tests are either developed for a specific domestic audience or to test aviation on an international test-taker population. To assist institutions with test design, ICAO released its “Manual on the Implementation of ICAO Language Proficiency Requirements (Second Edition)” (ICAO 2010). According to guidelines included in this manual, a compliant test must satisfy the following ICAO requirements (ICAO, 2010):

- The test must be a proficiency test of speaking and listening.
- The test must be based on the ICAO rating scale and holistic descriptors.
- The test must test speaking and listening proficiency in a context appropriate to aviation.
- The test must test language use in a broader context than in the use of ICAO phraseologies alone.

Aviation language tests are high stakes (Alderson, 2010) and ICAO’s policy on LPR testing is impacted on by the necessary concessions of political expediency (Moder, 2013). For example, ICAO does not have a mandate to dictate how each member state goes about testing their staff for language proficiency (Seiler, 2009). In 2010, Prinzo, Campbell, Hendrix, and Hendrix (2010) made 16 recommendations on the basis of interviews with pilots who work in international contexts. The very first of these recommendations was that ICAO needed to develop and support standardized Aviation English tests. Fortunately, as of 2015, ICAO has recognized two Aviation English tests: the English Language Proficiency for Aeronautical Communications Test (ELPAC) and the Royal Melbourne Institute of Technology English Language Test for Aviation (RELTA) (ICAO, 2015). This is a positive step towards Alderson’s (2006) recommendation that ICAO monitor the quality of language tests used in aviation to ensure they follow accepted professional standards.

Aviation English tests are not for ab initio pilots and ATCOs (Emery, 2014). This means Aviation English tests should be used to establish whether test-takers meet a benchmark standard. These tests should not be used to track the progress of language development. Dusenbury and Bjerke (2013) found that commercially available tests such as Pearson’s Versant Test were more appropriate for ab initio pilots and these types of tests could reliably predict whether ab initio pilots would graduate flight school.
2.7.4 Criticisms of LPR Testing

Campbell-Laird (2004) points out that with each ICAO member state creating its own means of assessing English language proficiency, hopes for a truly global standard of oral English language performance remain doubtful. Moder and Halleck (2009) note that ICAO’s guidelines on test development have limited effectiveness in achieving such a global standard. They point out that those guidelines do not specify whether tests should focus on English for General Purposes about aviation topics or more narrowly on English relevant to effective pilot-controller communication. Furthermore, they believe that the aviation language testing situation has been driven more by politics and expediency than by best practices in language test design and validation procedures.

In 2010, Alderson (2010) reported on a survey of the quality of aviation language testing. He found a considerable variation in quality of responses and surmised that this reflected a variation in the quality of the tests themselves, with many institutions demonstrating an equally low awareness of appropriate procedures for test development, maintenance and validation.

Crucial to all of these criticisms is the recent development of ICAO recognizing two Aviation English tests in 2015. The solution to variable test quality and unfocused guidelines for developing tests is to only use those tests that ICAO has recognized. However, ICAO does not have a mandate to insist on certain Aviation English tests. ICAO can recommend but it cannot dictate. The next challenge for ICAO is to encourage its member states to use the tests that it has recognized. It is this area in particular that this study seeks to address by investigating the attitudes of pilots and ATCOs towards LPRs and LPR testing. The dissertation aims to ascertain if there is resistance to LPR testing from the aviation staff themselves, or if there is the possibility that the aviation industry’s system itself presents resistance to LPRs.

2.7.5 Attitudes to LPRs and LPR Testing

Given the emergent nature of literature on the subject of limitations and weaknesses in LPR testing and the ICAO rating scale, it seems natural that there is only a limited body of work that addresses the attitudes and beliefs of pilots and ATCOs towards LPRs and LPR testing. However, some more recent studies focus on attitudes of the people most affected by language proficiency requirements and implementation. Examination of work by Kim (2013), (2015), Garcia (2015), Alderson (2011) and Prinzo et al. (2010) shows that there is indeed a line of inquiry developing in this area.

However, there is a limit to this work. Kim’s work focuses on Korean pilots’ perspectives (Kim, 2013; Kim & Elder, 2009, 2015). Garcia’s (2015) study focuses on Brazilian test creators’ perspectives. Prinzo focuses on the attitudes and opinions of US pilots operating in an international context (Prinzo et al., 2010). Alderson’s (2011) information, while from a broader population, is derived largely from an informal examination of web based chat rooms, emails and other correspondence. There appears to be no principled study that takes into account the attitudes of a wider cross section of the aviation industry.

The current dissertation seeks to assist in this area by collecting the opinions of pilots and air traffic controllers, both NS and NNS who are working under the auspices of a wide variety of aviation authorities.
2.8 Pedagogical Considerations of Aviation English

The literature pays less attention to the subject of teaching Aviation English than other aspects of Aviation English. Furthermore, much of the literature available on this subject is less data driven than the literature on other themes.

2.8.1 Aviation English Syllabus Design

Aviation English is best seen as English for Specific Purposes (ESP) and therefore, Aviation English syllabus design should be examined through the lens of ESP. If the core of ESP is needs analysis (Munby, 1978) then it is not surprising to find the literature consistently identifies needs analysis as the central concern of Aviation English syllabus design (Bratanić, 1999; Bullock, 2015; Wang, 2007).

The literature identifies the need for English teachers to learn as much as they can about the subject domain (Sarmento, 2011; Sullivan & Girginer, 2002; Wang, 2007). They also need to cooperate closely with subject matter experts (Long, 2015; Sullivan & Girginer, 2002). Another primary concern of Aviation English syllabus design is content selection (Mathews, 2007; Paramasivam, 2013). McGrath (2011) proposes that teachers create a compendium of simplified phrases useful for cockpit communication.

Moder (2013), however, believes that the job of the syllabus designer is to mirror the target language situation as closely as possible. Both Emery (2008) and Kukovec (2008) concur, stating that Aviation English should be taught in the context of job requirements. (Paramasivam, 2013) also agrees, proposing that a task-based or genre-based syllabus is ideal.

2.8.2 Teaching Methods

Closely related to the subject of syllabus design is that of teaching methods. Syllabus design concerns itself with content selection and ordering, and with assessment. Methodology concerns itself with what actually happens in the classroom in order to deliver the syllabus.

The literature consistently recommends that English language learning activities should be focused on communication skills in an aviation context (Bratanić, 1999; Bullock, 2015; Emery, 2008; Farris et al., 2008; Makarov & Voskoboynikov, 2011; Uplinger, 1997). Farris et al. (2008) and Bullock (2015) in particular give good advice on classroom activities that simulate the special requirements of pilots and ATCOs. To this end, Makarov and Voskoboynikov (2011) also recommend the use of computer games that simulate aviation communication. Shawcross (2004) agrees with computer-assisted language learning but warns that technology augments rather than replaces teachers.

Both Bullock (2015) and Turner (2011) believe that language activities should be pitched at a level slightly higher than the student’s current proficiency. Wang (2007) identifies the teaching of collocations as a key function of learning Aviation English. Paramasivam (2013) favors “task-based” activities in the classroom: following a cycle of students’ attention being drawn to a language item, to learning that item and then automatizing the use of that item in real-time.
conditions. Mell (2004) also adheres to the idea that students need to have their awareness drawn to the function of the language that they are learning.

None of the literature focuses on collecting pilots’ and ATCOs’ opinions on their English learning preferences. This dissertation seeks to gather information on pilots’ and ATCOs’ opinions on whether they would like to study more English and how much time they would be willing to devote to learning English.

2.9 Literature Review Summary

The understanding that ICAO has identified language proficiency as a contributing factor to seven disasters from 1976 to 2001 looms over the literature. It is easy to assume that this problem is only about NNSs’ language proficiency. This is the subtext to the various authors who take alternative views: for example, that NSs contribute to communication problems by not mitigating their speech to international audiences or that there are problems with the ICAO rating scale itself.

It is the stance of this study that, although the reality of Aviation English as lingua franca has important implications for the safety of Aviation English communication, minimum standards of English proficiency are non-negotiable. The central hypothesis of this study is that there is a problem of language proficiency in aviation communication and that the pressure language proficiency requirements puts on NNSs adversely impacts their engagement with improving their language proficiency.

This study surveyed the opinions of pilots and air traffic controllers on the subject of language proficiency requirements. The study used this data to reveal insights into whether there is a perception of a problem with language proficiency in the aviation industry and how an examination of pilots’ and ATCOs’ opinions might reveal potential solutions to improving aviation communication.

The primary means of gathering the required data was a questionnaire distributed to NS and NNS, pilots and ATCOs. After a preliminary review of the quantitative data, qualitative data was gathered through semi-structured interviews. The next section of the dissertation will examine the data collection methods, the participants and the data analysis methods in greater detail.
Chapter 3: Methodology

3.1 Mixed Methods Rationale

This study deploys both quantitative and qualitative research approaches. Quantitative studies are best suited for testing a theory or explanation (Cresswell, 2003). Qualitative studies are exploratory in nature and useful when the researcher is addressing a new topic or problem (Cresswell, 2003). Therefore, this study's mixed methods inquiry includes quantitative data as retrieved from online surveys completed by 288 pilots and ATCOs and qualitative data from 104 minutes of interviews with 4 participants. This mixed methods approach was based on the assumption that collecting diverse types of data best provides an understanding of the research questions.

The study design is sequential; the quantitative data were examined first and the qualitative interviews followed. As it turned out, the quantitative data revealed no support for the central hypothesis of the study: that language proficiency requirements were decreasing NNSs' job security. Therefore, the qualitative interviews that followed were of increased importance to the exploration of alternatives to the original hypothesis. The themes and insights discovered in the interviews were triangulated with the various data collected in the questionnaires.

3.2 Questionnaire Methodology

3.2.1 Questionnaire Rationale

A survey was chosen to best achieve the goal of gathering data on NSs’ and NNSs’ opinions of language proficiency requirements. The survey was designed to compare the opinions of NSs and NNSs in order to ascertain whether NNSs were under particular pressure from language proficiency requirements. NNSs were asked directly if language proficiency requirements were increasing their job insecurity. Furthermore, general attitudes about job security, pay and working hours were compared between NSs and NNSs in order to ascertain if NNSs were under any particular pressure. Combined opinions of NSs and NNSs were examined to provide insight into the overall state of Aviation English in the aviation industry.

3.2.2 Questionnaire Draft Design

A first draft of the questionnaire was provided to an Aviation English expert. Feedback revolved around the limited central hypothesis of the study: that LPRs were contributing to job insecurity and that this was adversely impacting NNSs' engagement with improving their language proficiency. As a result, a variety of other NS and NNS opinions were sought on the subject of Aviation English in order to attempt to reveal ways to improve Aviation English communication. This was an important adjustment because, as it turned out, the central hypothesis of the study was not reflected in the questionnaire responses.
3.2.3 Questionnaire Piloting

Four aviation professionals (three NS and one NNS) piloted a paper version of the questionnaire on November 30th 2015. Each participant was asked to complete a paper version of the questionnaire and record how long it took to complete.

The times reported were: 20 minutes, 25 minutes, 28 minutes and 30 minutes. It was noted that a long survey might be aborted by significant numbers of participants before they are finished. The questionnaire was edited of questions that were felt to have less relevancy and then the survey was placed online. Two aviation professionals (one NS and one NNS) piloted the online version of the questionnaire on December 10th, 2015. The times reported were 13 minutes and 16 minutes.

Feedback from one NS participant also included that many of the questions were aimed at NNSs (for example, “In the last 5 years, has your job security decreased as a result of English language requirements?”) and were therefore irrelevant to him. Furthermore, he stated that if he felt even mildly irritated by such questions then future participants, who don’t know the author, might become irritated enough to abort the questionnaire. As a result of this feedback, the online questionnaire was designed to direct NSs away from those questions that were considered irrelevant to them.

The online version of the survey was then made available to various participants of the ICAO Interregional English Language Proficiency Workshop, which the author attended on the 9th to the 11th of November 2015, in Kuwait. Nicole Barrette, a technical specialist (training and licensing standards) of the ICAO pointed out that one question referred to ICAO endorsing aviation English language tests, when in fact ICAO doesn’t endorse any test, they only recognize them. This advice was well received and the question was changed immediately. It was suggested by another Aviation English expert that there be an option for retired pilots and air traffic controllers to be able to participate in the survey. This option was, therefore, also included in the questionnaire with the proviso that retired participants have at least 10 years experience.

On the basis of this feedback and after relevant changes were made, it was decided to make the questionnaire go “live” on December 12th 2015 and invitations to participate began to be distributed.

3.2.4 Questionnaire Participant Selection

The primary method of distributing invitations to participate was through a professional networking website. This website allows the user to search its database of professionals using key words to describe their career. Key words could include, for example, “pilot”, “air traffic controller”, “777 pilot”, “A380 pilot” etc. In this way, aviation professionals could be identified and an invitation to connect to the author’s profile made. As each invitation to connect to the author’s profile was accepted, the aviation professional would be provided with a link to the survey and an invitation to participate in the study.

There were therefore, three steps to participant selection:

1. Identification of an aviation professional
2. Invitation to connect to the author’s profile
3. Connection completed and personalized link to the survey sent
This process provided an element of dynamism and flexibility to the selection of participants. For example, initially it was surmised that NNSs would be least likely to complete the survey. As it turned out the opposite was true and by the 25th of December 2016 more invitations were being distributed to NSs to attempt to compensate for this.

Ideally a study of this kind would generalize to the entire global population of pilots and air traffic controllers. However, the approach to selecting participants must be seen as non-random and opportunistic. Therefore there is no reason to be confident that this sample reflects the global population. For example, because selection of participants was conducted through a professional networking website, it is reasonable to surmise that, of the pilots who have responded, most identify themselves as commercial pilots as opposed to private pilots. Furthermore, it is impossible to know whether the distribution of NS and NNS respondents (either pilot or ATCO) reflects the global distribution of these populations.

It is worth repeating that any of the conclusions in this study are simply conclusions about the group of pilots and ATCOs that were surveyed. These results should not be implied as providing insight into the entire global population of pilots and ATCOs. However, the information gathered in this study can provide insight into avenues of further study and stimulate the development of testable hypotheses.

3.2.5 Questionnaire Data Collection

288 participants completed all or part of a 28-question survey posted online between the 12th December 2015 and the 16th of February 2016 (see Appendix B). Participants reported coming from 54 different countries (See Appendix C). Responses were collected from 207 NNSs and 81 NSs. Of the 188 participants who answered the question, “Are you now working as a pilot or as an air traffic controller?” 37.8% of respondents answered “pilot” and 62.3% answered “Air Traffic Control Officer.” The NS respondents are split evenly between pilots and ATCOs whereas the NNSs are skewed towards ATCOs.

The distribution of respondents is displayed in Figure 2 on the next page:
There are two reasons for the disparity between responses to whether the participant is NS or not (288) and responses to whether the participant is a pilot or an ATCO (188). First, the pilot/ATCO question comes at the end of the survey and therefore, suffers the most from participants who fail to complete the survey. Second, the wording of the pilot/ATCO question is unfortunate, as it does not account for those participants who were formally pilots or ATCOs. Retired pilots and ATCOs could, therefore, legitimately complete the survey and then not be asked to provide information as to whether they were ATCOs or pilots.

3.2.6 Methodology of Questionnaire Data Analysis

The software package Statistical Package for the Social Sciences (SPSS) was used to deploy chi-squared tests to analyze the questionnaire data. The chi-squared test is a non-parametric test suitable for ordinal data (e.g. ordered categories like “never”, “sometimes”, “usually” and “never”) and categorical data (e.g. native speaker or non-native speaker) (Pallant, 2010). Chi-squared tests are used to explore the relationship between two categorical variables. Assumptions of chi square tests include that the data is independent (respondents can only
appear in one category or group), that the data from one subject cannot influence the data from another and that at least 80% of the cells have 5 or more expected respondents (Pallant, 2010).

In order to begin a chi-squared test, a null hypothesis and an alternative hypothesis must be stated. The null hypothesis is generally the absence of whatever relationship is hypothesized between the variables. Most (but not all) of the comparisons made in this study are comparing NS and NNS responses to various questions. Therefore for the purposes of this study, unless otherwise stated, the null and alternate hypotheses were as follows:

The null hypothesis $H_0$ is that there is no relationship between the native/non-native speaking status of the respondents and the opinions they express.

The alternative hypothesis $H_1$ is that there is a relationship between the native/non-native speaking status of the respondents and the opinions they express.

Chi-squared tests provide a Pearson Chi-square value and its associated significance value ($p$ value), which shows whether the two variables demonstrate a statistically significant difference between each other. The $p$ value is considered statistically significant if it is below the $\alpha$ (conventionally set at 0.05). The effect size of this difference is reported using “Cramer’s $V$” with results being classified as small, medium or strong depending on the degrees of freedom (Pallant, 2010). To find the degrees of freedom, we must look at the table of variables and multiply the number of rows minus one by the number of columns minus one (Beasley & Schumacker, 1995).

Post hoc analysis should be conducted when it is important to determine where exactly in the data the difference resides (Sharpe, 2015) (Beasley & Schumacker, 1995). Otherwise, the researcher can only state there is a difference somewhere in the entire set of responses to the questions – not specifically which responses are different. To do this, standardized residual scores (adjusted $z$ scores) are calculated for each cell. A residual is the difference between the observed and expected value for a cell (Sharpe, 2015). Adjusted $z$ scores above +/- 1.96 are considered significant (Sharpe, 2015) The $z$ scores in this study were converted into $p$ values for each cell using an online calculator (Stangroom, 2015). “Type 1” errors occur when a null hypothesis is erroneously rejected. In order to minimize the chance of a “Type 1” error, $p$ values of each cell must be compared to an adjusted $\alpha$ (a “Bonferroni” adjusted $\alpha$) which is the original $\alpha$ multiplied by the number of cells being inspected (Sharpe, 2015). Type 2 errors occur when a null hypothesis is mistakenly retained.

### 3.3 Interviews Methodology

#### 3.3.1 Interviews Rationale

A preliminary inspection of the quantitative data revealed no support for the central hypothesis of the study. NNSs reported no decrease in job security as a result of LPRs (see question 8, in chapter 4.1.2) and furthermore, there was no statistical difference between NNSs’ and NSs’ attitudes towards job satisfaction, pay or working hours (see questions 13-18, in chapter 4.1.3). It was therefore of increased relevance to conduct focused interviews on four participants in order to gain a better insight into these unexpected results. The qualitative data could also provide further insight into the various other opinions on Aviation English that were gathered through the quantitative survey.
3.3.2 Interview Participants

Ultimately, the purpose of the interviews was to examine how NNSs’ and NSs’ opinions might inform the improvement of aviation communication. To this end, a semi-structured interviews format was chosen. Four participants agreed to the interviews; two NNSs and two NSs.

Descriptions of each participant are displayed in table 4 below:

<table>
<thead>
<tr>
<th>Nationality</th>
<th>Participant 1</th>
<th>Participant 2</th>
<th>Participant 3</th>
<th>Participant 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>Brazilian</td>
<td>UK</td>
<td>Italian</td>
<td></td>
</tr>
<tr>
<td>Native/ Non Native</td>
<td>Native Speaker</td>
<td>Non Native Speaker</td>
<td>Native Speaker</td>
<td>Non Native Speaker</td>
</tr>
<tr>
<td>Pilot (Type)/ATCO</td>
<td>Pilot (777)</td>
<td>Pilot (777)</td>
<td>Air Traffic Controller</td>
<td>Pilot (Helicopter)</td>
</tr>
<tr>
<td>Current/ Retired</td>
<td>Current</td>
<td>Current</td>
<td>Retired</td>
<td>Current</td>
</tr>
<tr>
<td>Context of Participant’s Aviation English Use</td>
<td>International</td>
<td>International</td>
<td>Local (UK)</td>
<td>Local (Italy)</td>
</tr>
<tr>
<td>Applied Linguistics Expertise</td>
<td>None</td>
<td>None</td>
<td>MA Applied Linguistics</td>
<td>Aviation English Tester</td>
</tr>
</tbody>
</table>

Table 4: Descriptive information of participants in qualitative interviews

3.3.3 Interviews Data Collection

Participants were asked 8 questions relating to the state of Aviation English in the aviation industry and how best to improve that state (see Appendix D). The interviews were conducted face to face via Skype and were from 17 to 39 minutes long each. Four interviews totaling 104 minutes were conducted and transcribed from the 15th of January 2016 to the 21st of February 2016.

3.3.4 Methodology of Interview Data Analysis

Completely structured interviews might usefully be described as a series of fixed questions and forced responses where the questions are asked with the exactly same words and in the same order for each participant (Liamputtong & Ezzy, 2006). Completely unstructured interviews are more like conversations with no prior assumption on the behalf of the researcher as to what all of the possible questions and answers might arise out of it (Liamputtong & Ezzy, 2006). The interview used in this study is best described as semi-structured. Semi structured interviews that include the same questions for each participant but also require development through conversation lie somewhere on a continuum between each of the types of interviews outlined above (Wisker, 2001). Each interview consisted of pre-selected questions but the interviewees were allowed complete scope to interpret and respond to each question. Questions were open
ended and asked in the spirit of “not knowing” the answers, i.e. in each interview the participant was respected as an expert on the opinions of pilots and ATCOs towards Aviation English.

It is a positive aspect of an interview that interviewees speak at length without interruption or direction from the author (Liamputtong & Ezzy, 2006). During these interviews this allowed for rich and varied responses and, at times, unexpected topics and avenues were raised. This approach resulted in varying lengths of interviews as each participant made different choices about what to talk about and for how long.

It has been noted that such a non-interventionist approach does not avoid bias (Liamputtong & Ezzy, 2006). Interviewees are inclined to direct attention toward what they think the interviewer will understand rather than what most fully explains the complexity of their knowledge (Thorne, 2008). Even when silent, the interviewer influences the interviewee by keeping distance and minimizing their responses. The pre-selection of questions is another obvious source of bias. It is the stance of this dissertation that bias is inevitable and the only relevant method of handling it is to acknowledge that it is there. Any conclusions or recommendations derived from these interviews, therefore, must be delivered tentatively and cautiously.

The next chapter of the dissertation will report on the data gathered through the course of this study. The first part of the next chapter will report on the quantitative data gathered from the online survey. Implications of these data will be addressed before the qualitative data is presented. Finally, the implications of the interviews will be discussed by triangulating those data with the survey results.
Chapter 4: Results

4.1 Quantitative Data Results

4.1.1 Organization of Survey Data Presentation

The quantitative data collected from the questionnaires will be presented in three sections.

- Non-native Speakers’ Attitudes Towards Language Learning

This section will report on data collected from a section of the questionnaire that was filled out exclusively by NNSs. All but one of the sets of responses are simple frequency counts. The last set of responses references the ICAO rating scale (see Appendix A) to compare NNSs’ self assessment of language proficiency with their reported levels achieved through external assessment. The results show that respondents are self assessing lower than the scores they achieve through external assessment.

- Non-native Speakers’ and Native Speakers’ Attitudes Compared

The second section is concerned with comparing the attitudes and opinions of NNSs and NSs. The results found no difference in NSs’ and NNSs’ opinions on job security, pay or work hours. Responses to a variety of other questions about Aviation English show small to medium variation in opinions between NS and NNS respondents.

- Pilots and ATCOs Combined Native/Non-native Views

The final section combines NSs’ and NNSs’ responses to questions relating to the state of Aviation English in the aviation industry as a whole. These sets of responses are presented as simple frequency counts.
4.1.2 Non-native Speakers’ Attitudes Towards Language Learning

This section of the analysis will report the findings of questions relating to NNSs’ attitudes towards language learning. Only NNSs were directed to this part of the questionnaire, NSs did not participate in it. The questions are numbered from 1-10.

1. Have you taken any English language classes or tuition in the last 12 months?

![Chart](image)

**Figure 3: Distribution of respondents showing proportion of non-native speakers who have attended English language classes in the last 12 months**

Of the 207 responses to this question, 169 (81.6%) were negative and 38 (18.4%) were positive. Future studies might be advised to investigate the percentage of NNSs who are paying for their own studies. These data may also be usefully examined next to question four where 17 of 42 NNS respondents who indicated they wouldn’t take free English lessons said it was because they are of sufficient level or already retired. Future studies might be advised to investigate why NNSs are not studying English.
2. (If respondents answered “Yes” to question 1) How many weeks did you study for?

Of those who answered, “Yes” to question one, 36 completed this question. Therefore, of the 207 non-native speakers who responded to this survey only 12 (5.8%) reported taking more than 6 weeks of English language training in the last 12 months.
3. (If respondents answered “Yes” to question 1) How many hours did you study per week?

![Bar chart showing distribution of respondents' English language class attendance in hours per week.]

Figure 5: Distribution of respondents showing non-native speakers’ English language class attendance in hours per week

Of those who answered, “Yes” to question one, 35 completed this question. The most common answer was “12 or more hours” studied per week, however, almost half (48.6%) of the respondents indicated they studied less than 8 hours per week.
4. If your company gave you free English lessons, would you choose to study?

Of the 207 participants who reported being NNSs, 205 answered this question. 136 (66.3%) indicated in the affirmative, 42 (20.5%) indicated in the negative and 27 (13.2%) responded with “Don’t know.” Where NNS pilots and ATCOs have indicated they wouldn’t take up free language courses 15 of the 21 reasons provided revolve around the fact that their language skills are already of a high enough standard. Two more replied that they wouldn’t because they are retired.

It is useful to make a comparison between the numbers of NNSs in this sample who would take English language courses if they were free, compared with the numbers who have chosen to take English language courses in the last 12 months.

18.4% of the NNSs in this sample group have taken English language courses in the last 12 months. 66.3% of the non-native speakers in this sample group would take English language courses if they were free.

These data appear to offer support for the idea that if companies offered financial support for language learning, more NNSs would begin language classes than are currently taking them.
5. (If respondents answered “Yes” to question 4) How many hours would you choose to study each week?

![Bar chart showing distribution of respondents showing number of hours of free English classes non-native speakers would choose to attend]

Figure 7: Distribution of respondents showing number of hours of free English classes non-native speakers would choose to attend

Of the 136 respondents who responded in the affirmative to question five, 115 completed this question. Of those, 97 (84.3%) indicated they would prefer to study for less than 8 hours per week.
6. (If respondents answered “Yes” to question 4) Look at your answer to the above questions. How many months do you think you would need to study at that rate to get a better Aviation English test mark? (For example, going from a 3 to a 4, or from a 4 to a 5...)

![Bar chart showing distribution of respondents showing number of months non-native speakers believe they need to improve their English significantly.](image)

**Figure 8: Distribution of respondents showing number of months non-native speakers believe they need to improve their English significantly**

Of the 106 participants who answered this question, 91 (85.8%) would expect to see improvement in their language ability within 7 months of beginning an English language course. Whether this is a reasonable expectation is not clear from these data. 84.3% of respondents to question 5 indicated they would be willing to study for 7 hours or less. 7 months, or 30 weeks, of study at 7 hours per week would equal to about 210 hours of study. ICAO have stated that many students might progress from a high level 3 to a level 4 on their rating scale within this timeframe (ICAO, 2009). However, they also state that many students might take longer – up to 400 hours. Furthermore, 58.5% of the respondents in this sample believe they could make progress within 5 months. Half of the respondents to question 5 also indicated they would only be willing to commit a maximum of 3 hours per week to studying. It is hard to imagine students making significant progress with less than 100 hours of study. Further research is recommended in two key areas: what are NNS pilots’ and ATCOs’ *precise* expectations for how long it takes to make progress according to the ICAO rating scale and what are NNS pilots’ and ATCOs’ actual progress rates according to the same scale?
7. Do you think you would pass an Aviation English test (score 4 or higher) if you were tested today?

![Distribution of respondents for numbers of non-native speakers who believe they are currently level 4](image)

Figure 9: Distribution of respondents for numbers of non-native speakers who believe they are currently level 4

Of the 162 respondents to this question, 143 (88.3%) indicated that they believed they would pass an Aviation English test without studying. Only 5 (3.1%) participants believed they would fail an Aviation English test and 14 (8.6%) answered, “Don’t know.”
8. In the last 5 years, has your job security decreased because of English language requirements?

Figure 10: Distribution of respondents for numbers of non-native speakers who believe their job security has diminished due to LPRs

Of the 161 participants who answered this question, 16 (9.9%) answered in the affirmative, 128 (79.5%) answered, “No” and 17 (10.6%) answered, “Don’t know.” These data provide no support for the central hypothesis of this study: that language proficiency requirements in Aviation increase job insecurity among NNSs. If the respondents do not believe that LPRs are decreasing their job security then it makes no sense to investigate how this adversely impacts their engagement with improving their language proficiency. On the contrary, as the results in question 4 show, NNS respondents are typically ready to take English classes if they feel they need them, and if they are provided for free.
9. If you failed an Aviation English test (scoring a 3 or lower) would you lose your job?

Of the 163 respondents to this question, 64 (39.3%) indicated they would probably or definitely lose their jobs for failing an Aviation English test. 70 (43%) respondents indicated that they would definitely not, or be unlikely to, lose their jobs if they failed an Aviation English test. Future studies might be advised to investigate what the typical processes are for NNSs if they fail an Aviation English test.

Figure 11: Distribution of respondents for non-native speakers’ opinions on whether failing an Aviation English test would make them lose their job
10. (Respondents are presented with a copy of the ICAO rating scale – see Appendix A) Using this diagram, what is your lowest level in any of the 6 categories?

![Bar chart showing self-assessment of ICAO levels](image)

**Figure 12: Distribution of respondents for “Using this diagram, what is your lowest level in any of the 6 categories?”**

This question is deliberately asked at an early stage of the questionnaire before the respondents are asked what ICAO score they have achieved through external testing (see question 28). This is in order to maintain independence between each set of data. The results of this question indicate that 90.4% of respondents self assess their ICAO level at 4 or higher.

However, the distribution of respondents who self assess at ICAO 4, 5 and 6 appears different from the distribution of ICAO 4.5 and 6 scores that NNS respondents report achieving on external tests (see question 28). It appears that these respondents tend to self assess their language proficiency lower than what they score on their tests. It is useful to use a chi-squared test of independence to compare these two sets of data. Only the ICAO grades of 4, 5 and 6 are compared so as to not violate the assumption of a chi-squared test that each cell expects at least 5 respondents.

The distribution of respondents is displayed in Figure 13 on the next page:
The distribution of respondents is displayed below:

<table>
<thead>
<tr>
<th>Grade</th>
<th>ICAO 4</th>
<th>ICAO 5</th>
<th>ICAO 6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Assessed</td>
<td>53</td>
<td>55</td>
<td>33</td>
<td>141</td>
</tr>
<tr>
<td>Tested</td>
<td>34</td>
<td>61</td>
<td>68</td>
<td>163</td>
</tr>
<tr>
<td>Total</td>
<td>87</td>
<td>116</td>
<td>101</td>
<td>304</td>
</tr>
</tbody>
</table>

Table 5: Distribution of respondents for ICAO levels vs. self assessment/externally tested

The null hypothesis $H_0$ is that there is no relationship between the ICAO scores and whether those scores were self assessed or externally assessed.

The alternative hypothesis $H_1$ is that there is a relationship between the ICAO scores and whether those scores were self assessed or externally assessed.
The ICAO level of each group of respondents differed by whether the levels were self-assessed or whether the levels were externally assessed: $c^2 (2, N = 304) = 15.1, p = .001$. The p value is calculated below the $\alpha$ set at 0.05 and thus the null hypothesis is rejected. Given a “Cramer’s V” value of 0.223 and two degrees of freedom, there is a medium effect size (Pallant, 2010). In other words, there is a moderately sized relationship between the respondents’ scores and whether respondents’ scores were self-assessed or externally assessed and it is statistically unlikely that the relationship is as a result of chance.

This initial chi-squared test does not implicate any particular ICAO grade level for deviation. However, visual inspection of the data appears to indicate that ICAO levels 4 and 6, in particular, deviate significantly depending on whether they are self assessed or externally assessed. In order to improve the accuracy on this estimation of significance, a post hoc analysis was conducted.

Using SPSS, an adjusted standardized residual score (or adjusted z score) was calculated for each cell of table 1. This is the degree to which each cell count deviates from the expected count – adjusted for the count number in each cell (Sharpe, 2015). Adjusted z scores above +/- 1.96 are considered significant (Sharpe, 2015).

The adjusted z scores for each cell are displayed in Table 6 below:

<table>
<thead>
<tr>
<th>Grade</th>
<th>ICAO 4</th>
<th>ICAO 5</th>
<th>ICAO 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Assessed</td>
<td>3.22</td>
<td>0.28</td>
<td>-3.38</td>
</tr>
<tr>
<td>Externally Tested</td>
<td>-3.22</td>
<td>-0.28</td>
<td>3.38</td>
</tr>
</tbody>
</table>

Table 6: Adjusted z scores of each cell for ICAO levels vs. self assessment/externally tested

In order to minimize the risk of a type 1 error within each cell (incorrectly concluding that the null hypothesis is false for that cell), a “Bonferroni” adjusted $\alpha$ value was used. This was calculated as the $\alpha$ value 0.05 divided by the number of cells to be inspected: $0.05/6 = 0.0083$ (Beasley & Schumacker, 1995) (Pallant, 2010) (Sharpe, 2015). The adjusted z scores were converted to p values so that they might be compared to the “Bonferroni” adjusted $\alpha$.

These p values are displayed in Table 7 on the next page.
Comparing these values to the Bonferroni adjusted $\alpha = 0.0083$ shows that there is a significant deviancy from the norm in the ICAO 4 cells. By reviewing ICAO 4 in table 6, we can see that this deviancy is negative when externally tested and positive when self assessed. In other words, the number of instances where these non-native speakers self assessed at ICAO 4 is higher than should be expected, and where they are externally tested it is lower than expected. There is also a statistically significant deviancy from the norm in the ICAO 6 cells: lower numbers than expected self assessed at this level, and higher numbers than expected reported being externally tested at this level.

This study makes no causal claims of, for example, whether the relationship is because the reported levels achieved in tests are too high or whether the respondents’ self-assessment is too low. However, they can’t both be right. Either the respondents’ self-assessments are too low, their reported test scores are too high, or both categories of data are inaccurate.
4.1.3 Non-native Speakers’ and Native Speakers’ Attitudes Compared

11. Do you think you should improve your Aviation English ability?

![Distribution of respondents for opinions on whether respondents need to improve their Aviation English vs. native/non-native speakers](image)

Of the 235 respondents who answered this question, 21.9% of NSs answered, "Yes" while 69.8% of NNSs answered in the affirmative.

The distribution of respondents is displayed in table 8 below:

<table>
<thead>
<tr>
<th></th>
<th>Do you think you should improve your Aviation English ability?</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Native Speaker</td>
<td>16</td>
<td>53</td>
</tr>
<tr>
<td>Non Native Speaker</td>
<td>113</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>129</td>
<td>93</td>
</tr>
</tbody>
</table>

Table 8: Distribution of respondents for opinions on whether respondents need to improve their Aviation English vs. native/non-native speakers

Although the difference between NSs and NNSs is unsurprising, the NNSs’ results seem to provide more information about NNSs’ opinions on language learning. The findings from these questions suggest that the majority of NNS respondents of this survey believe they should
improve their Aviation English (see question 11), but equally a majority (81.6% see question 1) haven’t taken English classes in the last 12 months and a major catalyst for the majority (66.3% see question 4) starting might be if their company provided free lessons.

However, a major disclaimer to this potential conclusion is what the respondents to this survey believe Aviation English to be. Do the respondents mean phraseology, plain language or General English – or some combination of these?

12. How long did it take you to get pilot or ATC work after you got licensed?

![Bar chart]

Figure 15: Distribution of respondents for time taken to find employment after getting licensed vs. native/non-native speakers

Of the 63 NSs who answered this question, 54 (85.7%) indicated that they found work in under a year. Of the 157 NNSs who answered this question, 98 (62.4%) indicated the same. It is informative to conduct a chi-squared test on this difference.
The distribution of respondents is displayed in table 9 below:

<table>
<thead>
<tr>
<th></th>
<th>Distribution of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less than one year</td>
</tr>
<tr>
<td>Native Speaker</td>
<td>54</td>
</tr>
<tr>
<td>Non Native Speaker</td>
<td>98</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
</tr>
</tbody>
</table>

Table 9: Distribution of respondents for time taken to find employment after getting licensed vs. native/non-native speakers

A chi-squared test was used to compare NSs’ and NNSs’ responses to this question.

The null hypothesis $H_0$ is that there is no relationship between the native/non-native speaking status of the respondents and how quickly they found work after initially becoming licensed.

The alternative hypothesis $H_1$ is that there is a relationship between the native/non-native speaking status of the respondents and how quickly they found work after initially becoming licensed.

In order to avoid violating the assumption of a minimum of 5 answers for each question, the results were compiled under two categories: less than one year, and one year or longer.

Compiling the results in this way revealed the following data:

<table>
<thead>
<tr>
<th></th>
<th>Less than 1 year</th>
<th>1 year or longer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native Speaker</td>
<td>54</td>
<td>9</td>
<td>63</td>
</tr>
<tr>
<td>Non-native Speaker</td>
<td>98</td>
<td>59</td>
<td>157</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>68</td>
<td>220</td>
</tr>
</tbody>
</table>

Table 10: Distribution of respondents for time taken to find employment after getting licensed vs. native/non-native speakers

The time it took each group of respondents to find work after becoming licensed differed by whether the respondents were native speakers or non-native speakers, $c^2 (1, N = 220) = 11.4, p = .001$. The $p$ value is calculated below 0.05 and thus the null hypothesis is rejected. Given a “Cramer’s V” value of .228 and one degree of freedom, there is a small effect size (Pallant, 2010). In other words, there is a small sized relationship between how long it took NSs and NNSs to find work and it is statistically unlikely that the relationship is as a result of chance.
13. Please rank your job security now:

![Bar chart showing job security rankings for native and non-native speakers.](chart.png)

**Figure 16: Distribution of respondents for job security vs. native/non-native speakers**

Of the 223 pilots and ATCOs who answered this question, 181 (81.2%) reported a job security ranking of “quite secure” or “very secure.”
The distribution of respondents is displayed in table 11 below:

<table>
<thead>
<tr>
<th></th>
<th>Very secure</th>
<th>Quite secure</th>
<th>Neither secure nor insecure</th>
<th>Quite insecure</th>
<th>Very insecure</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native Speaker</td>
<td>27</td>
<td>24</td>
<td>9</td>
<td>2</td>
<td>2</td>
<td>64</td>
</tr>
<tr>
<td>Non-native Speaker</td>
<td>51</td>
<td>79</td>
<td>24</td>
<td>3</td>
<td>2</td>
<td>159</td>
</tr>
<tr>
<td>Total</td>
<td>78</td>
<td>103</td>
<td>33</td>
<td>5</td>
<td>4</td>
<td>223</td>
</tr>
</tbody>
</table>

Table 11: Distribution of respondents for job security vs. native/non-native speakers

A chi-squared test was used to compare the results between NSs and NNSs. In order to not violate the chi-squared assumption of a minimum number of expected responses for each cell, only the answers “very secure”, “quite secure” and “neither secure nor insecure” were compared.

The null hypothesis $H_0$ is that there is no relationship between the native/non-native speaking status of the respondents and their reported job security.

The alternative hypothesis $H_1$ is that there is a relationship between the native/non-native speaking status of the respondents and their reported job security.

The job security reported by each group of respondents does not differ by whether the respondents were native speakers or non-native speakers, $c^2(2, N = 214) = 2.8, p = .243$. The p value is calculated above 0.05 and thus the null hypothesis is retained. In other words, there is no relationship between these respondents’ job security and their native/non-native speaker status.

This result might be interpreted as providing some support to the results of question 8, where (79.5%) of non-native speakers reported that LPRs haven’t increased their job insecurity. If LPRs were increasing NNSs’ job insecurity then we might see a difference between NNSs’ and NSs’ current reported job security.
14. Is job security for people doing your job now better or worse than 5 years ago?

![Bar chart showing the distribution of respondents for opinions on industry job security vs. native/non-native speakers.]

Figure 17: Distribution of respondents for opinions on industry job security vs. native/non-native speakers

Of the 222 respondents to this question, 64 were NSs and 158 were NNSs. As a group, the responses appear to show a normal distribution around the response “Neither better nor worse.”

The distribution of respondents is displayed in table 12 below:

<table>
<thead>
<tr>
<th></th>
<th>Is job security for people doing your job now better or worse than 5 years ago?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A lot better</td>
</tr>
<tr>
<td>Native Speaker</td>
<td>8</td>
</tr>
<tr>
<td>Non-native Speaker</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>36</td>
</tr>
</tbody>
</table>

Table 12: Distribution of respondents for opinions on industry job security vs. native/non-native speakers

A chi squared test of independence revealed no statistical difference between NSs’ and NNSs’
responses, $c^2 (5, N = 222) = 4.4, p = 0.496$. The p value is calculated above 0.05 and thus the null hypothesis is retained. In other words, there is no relationship between these respondents’ opinions on industry job security and their native/non-native speaker status.

15. Please rank your pay satisfaction now:

![Bar chart showing pay satisfaction levels for native and non-native speakers]

**Figure 18**: *Distribution of respondents for pay satisfaction vs. native/non-native speakers*

There were 220 responses to this question, of which 64 were from NSs and 156 from NNSs. Only 36 (16.4%) reported being either quite dissatisfied or very dissatisfied with their pay satisfaction.
The distribution of respondents is displayed in table 13 below:

<table>
<thead>
<tr>
<th></th>
<th>Very satisfied</th>
<th>Quite satisfied nor dissatisfied</th>
<th>Quite dissatisfied</th>
<th>Very dissatisfied</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native Speaker</td>
<td>14</td>
<td>35</td>
<td>11</td>
<td>3</td>
<td>64</td>
</tr>
<tr>
<td>Non-native Speaker</td>
<td>30</td>
<td>64</td>
<td>30</td>
<td>24</td>
<td>156</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>99</td>
<td>41</td>
<td>27</td>
<td>220</td>
</tr>
</tbody>
</table>

Table 13: *Distribution of respondents for pay satisfaction vs. native/non-native speakers*

A chi-squared test of independence revealed no statistical difference between NSs’ and NNSs’ responses, $c^2 (4, N = 220) = 7.8, p = 0.100$. The p value is calculated above 0.05 and thus the null hypothesis is retained. In other words, there is no relationship between these respondents’ pay satisfaction and their native/non-native speaker status.

16. Is pay for people doing your job now better or worse than 5 years ago?

![Bar chart showing distribution of respondents for pay satisfaction vs. native/non-native speakers.]

Figure 19: *Distribution of respondents for opinion of industry pay rates vs. native/non-native speakers*

Of the 222 responses to this question, 64 were from NSs and 158 were from NNSs. As a whole, answers appear consistently distributed around the “neither better nor worse” response.

The distribution of respondents is displayed in table 14 on the next page:
<table>
<thead>
<tr>
<th></th>
<th>A lot better</th>
<th>A little better</th>
<th>Neither better nor worse</th>
<th>A little worse</th>
<th>A lot worse</th>
<th>Don’t know</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native Speaker</td>
<td>6</td>
<td>27</td>
<td>13</td>
<td>8</td>
<td>8</td>
<td>2</td>
<td>64</td>
</tr>
<tr>
<td>Non-native Speaker</td>
<td>17</td>
<td>40</td>
<td>40</td>
<td>35</td>
<td>22</td>
<td>4</td>
<td>158</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>67</td>
<td>53</td>
<td>43</td>
<td>30</td>
<td>6</td>
<td>222</td>
</tr>
</tbody>
</table>

Table 14: Distribution of Respondents for opinion of industry pay rates vs. native/non-native speakers

A chi squared test of independence revealed no statistical difference between NSs’ and NNSs’ responses, $c^2 (5, N = 222) = 7.2, p = 0.208$. The p value is calculated above 0.05 and thus the null hypothesis is retained. In other words, there is no relationship between these respondents’ opinions of industry pay rates and their native/non-native speaker status.
17. Please rank your satisfaction with your work hours now:

![Distribution of respondents for satisfaction with working hours vs. native/non-native speakers](image)

Figure 20: Distribution of respondents for satisfaction with working hours vs. native/non-native speakers

220 pilots and ATCOs responded to this question. 63 were NSs and 157 were NNSs.

The distribution of respondents is displayed in table 15 below:

<table>
<thead>
<tr>
<th></th>
<th>Very satisfied</th>
<th>Quite satisfied</th>
<th>Neither satisfied nor dissatisfied</th>
<th>Quite dissatisfied</th>
<th>Very dissatisfied</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native Speaker</td>
<td>11</td>
<td>21</td>
<td>18</td>
<td>9</td>
<td>4</td>
<td>63</td>
</tr>
<tr>
<td>Non-native Speaker</td>
<td>34</td>
<td>65</td>
<td>28</td>
<td>24</td>
<td>6</td>
<td>157</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>86</td>
<td>46</td>
<td>33</td>
<td>10</td>
<td>220</td>
</tr>
</tbody>
</table>

Table 15: Distribution of respondents for satisfaction with working hours vs. native/non-native speakers

A chi squared test of independence revealed no statistical difference between NSs’ and NNSs’ responses, $c^2 (4, N = 220) = 4.3, p = 0.370$. The p value is calculated above 0.05 and thus the null hypothesis is retained. In other words, there is no relationship between these respondents’ satisfaction with work hours and their native/non-native speaker status.
18. Are work hours for people doing your job now longer or shorter than 5 years ago?

Of the 215 respondents to this question, 62 were NSs and 153 were NNSs.

The distribution of respondents is displayed below:

<table>
<thead>
<tr>
<th>Distribution of Respondents</th>
<th>A lot longer</th>
<th>A little longer</th>
<th>The same</th>
<th>A little shorter</th>
<th>Don’t know</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native Speaker</td>
<td>9</td>
<td>18</td>
<td>30</td>
<td>2</td>
<td>3</td>
<td>62</td>
</tr>
<tr>
<td>Non-native Speaker</td>
<td>22</td>
<td>41</td>
<td>71</td>
<td>12</td>
<td>7</td>
<td>153</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>59</td>
<td>101</td>
<td>14</td>
<td>10</td>
<td>215</td>
</tr>
</tbody>
</table>

Table 16: Distribution of respondents for opinion of industry working hours vs. native/non-native speakers

A chi squared test of independence revealed no statistical difference between NSs’ and NNSs’ responses, $c^2 (4, N = 215) = 1.6, p = 0.814$. The p value is calculated above 0.05 and thus the null hypothesis is retained. In other words, there is no relationship between these respondents’ opinions on work hours and their native/non-native speaker status.
19. Should Native Speaking pilots and ATCOs be required to take Aviation English tests?

Figure 22: Distribution of respondents for whether Native Speakers should be required to take Aviation English tests vs. native/non-native speakers

Of the 63 NS respondents to this question 40 (63.5%) answered yes. Of the 155 NNS respondents to this question 120 (77.4%) answered yes.

The distribution of the respondents is displayed in table 17 below:

<table>
<thead>
<tr>
<th></th>
<th>Distribution of Respondents</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Native Speaker</td>
<td>40</td>
<td>21</td>
</tr>
<tr>
<td>Non-native Speaker</td>
<td>120</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
<td>43</td>
</tr>
</tbody>
</table>

Table 17: Distribution of respondents for whether native speakers should be required to take Aviation English tests vs. native/non-native speakers
The responses to this question were examined with a chi-squared test.

The opinion on this question differed by whether the respondent was NS or NNS, \( c^2(2, N = 218) = 11.3, p = .004 \). The p value is calculated below 0.05 and thus the null hypothesis is rejected. Given a “Cramer’s V” value of .227 and two degrees of freedom, there is a medium effect size (Pallant, 2010). In other words, there is a moderately sized relationship between the native/non-native speaking status of the respondents and their opinion. Furthermore, it is statistically unlikely that the relationship is as a result of chance.

In order to establish where exactly in the data the difference lies, a post hoc analysis was conducted. Using SPSS, adjusted z scores were calculated for each cell of table 17. Adjusted z scores above +/- 1.96 are considered significant (Sharpe, 2015).

The adjusted z scores for each cell are displayed in Table 18 below:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native</td>
<td>-2.1</td>
<td>3.2</td>
<td>-1.4</td>
</tr>
<tr>
<td>Non-native</td>
<td>2.1</td>
<td>-3.2</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Table 18: Adjusted z scores of each cell for native speakers should be required to take Aviation English tests vs. native/non-native speakers

In order to minimize the risk of a type 1 error within each cell a “Bonferroni” adjusted \( \alpha \) value was used. This was calculated as the \( \alpha \) value 0.05 divided by the number of cells to be inspected: \( 0.05/6 = 0.0083 \) (Beasley & Schumacker, 1995) (Pallant, 2010) (Sharpe, 2015). An online calculator (Stangroom, 2015) was used to convert these adjusted z scores to p values so that they might be compared to the “Bonferroni” adjusted \( \alpha \).

These p values are displayed in Table 19 below:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native</td>
<td>0.035729</td>
<td>0.001374</td>
<td>0.161513</td>
</tr>
<tr>
<td>Non-native</td>
<td>0.035729</td>
<td>0.001374</td>
<td>0.161513</td>
</tr>
</tbody>
</table>

Table 19: p values of each cell for native speakers should be required to take Aviation English tests vs. native/non-native speakers

Comparing these values to the Bonferroni adjusted \( \alpha \) 0.0083 shows that these NSs and NNSs specifically differ on their “No” answers to this question. NSs were more likely than NNSs to report that NSs should not be required to take Aviation English tests.
20. Should Native Speakers speak Aviation English to Non Native Speakers in the same way as they speak Aviation English to other Native Speakers?

Of the 215 respondents to this question, 62 were NSs and 153 were NNSs. NNSs were more likely to respond, "No" to this question (37%) than NSs (16%).

The distribution of respondents is displayed below:

<table>
<thead>
<tr>
<th>Distribution of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td>Native Speaker</td>
</tr>
<tr>
<td>48</td>
</tr>
<tr>
<td>Non-native Speaker</td>
</tr>
<tr>
<td>85</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>133</td>
</tr>
</tbody>
</table>

Table 20: Distribution of respondents for whether native speakers should mitigate speech vs. native/non-native speakers

A chi-square test was used to determine whether the difference between NSs’ and NNSs’ opinions was non random.
The opinions expressed on this question differed by whether the respondents were NS or NNS: $c^2 (2, N = 215) = 9.8, p = 0.008$. Noting that the p value is lower than the $\alpha$ set at 0.05 mandates the rejection of the null hypothesis. With a “Cramer's V” value of .213 and two degrees of freedom, a medium effect size is detected (Pallant, 2010).

In order to establish where exactly in the data the difference resides, a post hoc analysis was conducted. Using SPSS, adjusted z scores were calculated for each cell of table #. Adjusted z scores above +/- 1.96 are considered significant (Sharpe, 2015).

The adjusted z scores for each cell are displayed in Table 21 below:

<table>
<thead>
<tr>
<th>Adjusted z scores of each cell</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Don’t know</td>
</tr>
<tr>
<td>Native</td>
</tr>
<tr>
<td>3.0</td>
</tr>
<tr>
<td>-3.0</td>
</tr>
<tr>
<td>-0.2</td>
</tr>
<tr>
<td>Non-native</td>
</tr>
<tr>
<td>-3.0</td>
</tr>
<tr>
<td>3.0</td>
</tr>
<tr>
<td>0.2</td>
</tr>
</tbody>
</table>

Table 21: Adjusted z scores of each cell for native speakers should mitigate speech vs. native/non-native speakers

In order to minimize the risk of a type 1 error within each cell a “Bonferroni” adjusted $\alpha$ value was used. This was calculated as the $\alpha$ value 0.05 divided by the number of cells to be inspected: 0.05/6 = 0.0083 (Beasley & Schumacker, 1995) (Pallant, 2010) (Sharpe, 2015).

An online calculator (Stangroom, 2015) was used to convert these adjusted z scores to p values so that they might be compared to the “Bonferroni” adjusted $\alpha$.

These p values are displayed in Table 22 below:

<table>
<thead>
<tr>
<th>p values of each cell</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Don’t know</td>
</tr>
<tr>
<td>Native</td>
</tr>
<tr>
<td>0.0027</td>
</tr>
<tr>
<td>0.0027</td>
</tr>
<tr>
<td>0.841481</td>
</tr>
<tr>
<td>Non-native</td>
</tr>
<tr>
<td>0.0027</td>
</tr>
<tr>
<td>0.0027</td>
</tr>
<tr>
<td>0.841481</td>
</tr>
</tbody>
</table>

Table 22: p values of each cell for native speakers should mitigate speech vs. native/non-native speakers

Comparing these values to the Bonferroni adjusted $\alpha$ 0.0083 shows that there is a significant deviancy across all of the yes and no answers. In other words, other than the “Don’t know” responses, the answers differ according to whether the respondents were NS or NNS. Of these respondents, NNSs are more likely than NSs to believe that NSs need to mitigate their speech for an international audience.
21. Do Native Speaking pilots and ATCOs need to become better at how they speak Aviation English to Non Native Speakers?

![Distribution of respondents for whether native speakers need to improve speech to non-native speakers vs. native/non-native speakers](image)

Figure 24: Distribution of respondents for whether native speakers need to improve speech to non-native speakers vs. native/non-native speakers

Of the 212 respondents to this question, 62 were NSs and 150 were NNSs. Although a majority of NSs (58.1%) believe that NSs need to become better at speaking Aviation English to NNSs, significantly more NNSs (69.8%) had the same opinion. A chi square test can check for the statistical significance of this difference.

The distribution of respondents is displayed below:

<table>
<thead>
<tr>
<th></th>
<th>Distribution of Respondents</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Native Speaker</td>
<td>36</td>
<td>16</td>
</tr>
<tr>
<td>Non Native Speaker</td>
<td>112</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>148</td>
<td>32</td>
</tr>
</tbody>
</table>

Table 23: Distribution of respondents for whether native speakers need to improve speech to non-native speakers vs. native/non-native speakers

The opinions expressed on this question differed by whether the respondents were NS or NNS: \( c^2 (2, N = 212) = 8.5, p = 0.015 \). Noting that the \( p \) value is lower than the \( \alpha \) set at 0.05 mandates the rejection of the null hypothesis. With a “Cramer’s V” value of .200 and two degrees of freedom, a small effect size is detected (Pallant, 2010). This is to say that there is a slight difference in NSs’
and NNSs’ responses to this question.

In order to establish where exactly in the data the difference lies, a post hoc analysis was conducted. The adjusted z scores for each cell are displayed in Table 24 below:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native</td>
<td>-2.4</td>
<td>2.8</td>
<td>0.3</td>
</tr>
<tr>
<td>Non-native</td>
<td>2.4</td>
<td>-2.8</td>
<td>-0.3</td>
</tr>
</tbody>
</table>

Table 24: Adjusted z scores of each cell for native speakers need to improve speech to non-native speakers vs. native/non-native speakers

In order to minimize the risk of a type 1 error within each cell a “Bonferroni” adjusted α value of 0.0083 was used. An online calculator was used to convert these adjusted z scores to p values so that they might be compared to the “Bonferroni” adjusted α. These p values for each cell are displayed in Table 25 below:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native</td>
<td>0.016395</td>
<td>0.00511</td>
<td>0.764177</td>
</tr>
<tr>
<td>Non-native</td>
<td>0.016395</td>
<td>0.00511</td>
<td>0.764177</td>
</tr>
</tbody>
</table>

Table 25: p values of each cell for native speakers need to improve speech to non-native speakers vs. native/non-native speakers

Comparing these values to the Bonferroni adjusted α 0.0083 shows that there is a significant difference in the no answers. The null hypothesis is retained for the “Yes” answers. This raises the possibility of a Type 2 error. It might be arguable that since the results for NSs and the results for NNSs are mirrored, a Bonferroni adjusted α needs to only divide the original α by 3. This is because it could be argued that only 3 cells need to be inspected to know the p values of the other 3. This would give the Bonferroni adjusted α as 0.05/3 = 0.016667. Thus we would be required to reject the null hypothesis for the “Yes” answers, by a very slim margin. However, this study will err on the side of caution, preferring the risk of a Type 2 error to the risk of a Type 1 error.

The “no” answers differ according to whether the respondents were NS or NNS. Of these respondents, NSs are more likely than NNSs to believe that NSs don’t need to improve their Aviation English communication to an international audience.
22. Are Non Native Speaking pilots and ATCOs disadvantaged by Aviation English tests?

[Graph showing distribution of respondents for whether non-native speakers are disadvantaged by Aviation English tests vs. native/non-native speakers]

Figure 25: Distribution of respondents for whether non-native speakers are disadvantaged by Aviation English tests vs. native/non-native speakers

208 pilots and ATCOs responded to this question, including 61 NSs and 147 NNSs. Only 10 (16.4%) of NSs answered yes to this question whereas 65 (44.2%) of NNSs answered yes. A chi-squared test was used to check whether there were statistically significant differences of opinion between NSs and NNSs on this question.

The distribution of respondents is displayed below:

<table>
<thead>
<tr>
<th></th>
<th>Distribution of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Native Speaker</td>
<td>10</td>
</tr>
<tr>
<td>Non-native Speaker</td>
<td>65</td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
</tr>
</tbody>
</table>

Table 26: Distribution of respondents for whether non-native speakers are disadvantaged by Aviation English tests vs. native/non-native speakers

The opinions expressed on this question differed by whether the respondents were NS or NNS: $c^2 (2, N = 208) = 18.5, p < 0.001$. Noting that the p value is lower than the $\alpha$ set at 0.05 mandates the rejection of the null hypothesis. With a “Cramer's V” value of .298 and two degrees of freedom, a
A moderate effect size is detected (Pallant, 2010). This is to say that there is a moderate difference across all NSs’ and NNSs’ responses to this question.

In order to establish where exactly in the data the difference lies, a post hoc analysis was conducted. The adjusted z scores for each cell are displayed in Table 27 below:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native</td>
<td>-3.8</td>
<td>1.0</td>
<td>3.3</td>
</tr>
<tr>
<td>Non-native</td>
<td>3.8</td>
<td>-1.0</td>
<td>-3.3</td>
</tr>
</tbody>
</table>

Table 27: Adjusted z scores of each cell for non-native speakers are disadvantaged by Aviation English tests vs. native/non-native speakers

In order to minimize the risk of a type 1 error within each cell a “Bonferroni” adjusted α value of 0.0083 was used. An online calculator was used to convert these adjusted z scores to p values so that they might be compared to the “Bonferroni” adjusted α. These p values for each cell are displayed in Table 28 below:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native</td>
<td>0.000145</td>
<td>0.317311</td>
<td>0.000967</td>
</tr>
<tr>
<td>Non-native</td>
<td>0.000145</td>
<td>0.317311</td>
<td>0.000967</td>
</tr>
</tbody>
</table>

Table 28: p values of each cell for non-native speakers are disadvantaged by Aviation English tests vs. native/non-native speakers

Comparing these values to the Bonferroni adjusted α 0.0083 shows that the difference lies within the “Yes” and “Don’t know” answers. NNSs were more likely than NSs to answer “Yes” and are less likely to answer “Don’t know” to this question.
4.1.4 Pilots and ATCOs Combined Native/Non-native Views

23. Have you ever communicated with an on duty pilot or ATC controller who you think would fail an Aviation English test (score 3 or lower)?

![Bar chart showing distribution of respondents for pilots and ATCOs experiencing level 3 on the job]

Of the 209 pilots and ATCOs who responded to this question 161 (77.0%) responded, “Yes.” Future studies might be advised to investigate how often this occurs.

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>161</td>
</tr>
<tr>
<td>No</td>
<td>35</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>209</td>
</tr>
</tbody>
</table>

Table 29: Distribution of respondents for pilots and ATCOs experiencing level 3 on the job
24. Do you know anyone who has failed an Aviation English test?

![Figure 27: Distribution of respondents for pilots and ATCOs who know someone who has failed an Aviation English test](image)

Of the 209 pilots and ATCOs who answered this question 135 (64.6%) responded in the affirmative.

25. If yes, did that person lose his/her job?

![Figure 28: Distribution of responses for whether failure of Aviation English test equates to loss of employment](image)

Of the 136 people who answered yes to the previous question, 103 (75.7%) answered, “No” to this question, indicating that these respondents report that a majority of people who fail Aviation English tests do not lose their job. This provides further support to question 8 where LPRs were being reported as not having an effect on job security. Future research should investigate the organizational systems that are in place for those who fail Aviation English tests.
26. Do you know anyone who has failed an Aviation English test and, after, taken a different test to get a higher mark?

![Bar chart showing distribution of respondents for pilots and ATCOs who know someone who has failed an Aviation English test and, after, taken a different test to get a higher mark.]

Figure 29: *Distribution of respondents for pilots and ATCOs who know someone who has failed an Aviation English test and, after, taken a different test to get a higher mark.*

Of the 206 total responses to this question, 75 (36.4%) reported knowing someone who had failed an Aviation English test and afterwards, taken a different test for the purposes of getting a higher mark.
27. Have you ever taken an Aviation English test before?

![Bar chart showing distribution of respondents for whether pilots and ATCOs have taken an Aviation English test before.]

Figure 30: Distribution of respondents for whether pilots and ATCOs have taken an Aviation English test before

Of the 207 pilots and ATCOs who answered this question, 61 were NS and 146 were NNS. NNSs were more likely to have taken an Aviation English test than NSs. The distribution of respondents is displayed in table 30 below:

<table>
<thead>
<tr>
<th></th>
<th>Distribution of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Native Speaker</td>
<td>38</td>
</tr>
<tr>
<td>Non-native Speaker</td>
<td>129</td>
</tr>
<tr>
<td>Total</td>
<td>167</td>
</tr>
</tbody>
</table>

Table 30: Distribution of respondents for whether pilots and ATCOs have taken an Aviation English test before
28. What did you score on your Aviation English test?

![Figure 31: Distribution of reported ICAO language proficiency levels from external assessments](image)

Of the 167 respondents to this question, 38 were NSs and 129 were NNSs. The vast majority of NNSs reported scoring a 4 or higher, however, when these data are compared to those collected in question 10, there is a difference between externally assessed proficiency levels as compared to self-assessed.

The distribution of respondents is displayed in table 31 below:

<table>
<thead>
<tr>
<th></th>
<th>What did you score on your Aviation English test?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Native Speaker</td>
<td>0</td>
</tr>
<tr>
<td>Non-native Speaker</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 31: Distribution of reported ICAO language proficiency levels from external assessments
4.1.5 Summary of Quantitative Data

Summary of Section One:

81.6% of NNSs haven’t taken English classes in the last 12 months. Only 5.8% of NNSs report participating in more than 6 weeks of study in the last 12 months. Almost half of those who have studied did so for less than 8 hours per week. 66.3% of NNSs would join English classes if they were provided for free by their company. Of those 84.3% would prefer to study less than 8 hours per week and 85.8% would expect to see significant improvement in 7 months or less. 88.3% of respondents believe they’d pass an Aviation English test if they were tested today. Crucial to the central hypothesis of this study, 79.5% of respondents do not believe that LPRs have decreased their job security. Responses were distributed evenly on the question of whether respondents would lose their jobs in the event of them failing an Aviation English test. Respondents’ self-assessments of their ICAO language levels are lower than the results awarded to them from being externally assessed.

Summary of Section Two

NNSs are more likely than NSs to hold the opinion that they need to improve their Aviation English. Respondents’ time to achieving employment after becoming licensed differs slightly depending on whether they are NSs or NNSs. There are no measurable differences between NSs’ and NNSs’ opinions on job security, pay or work hours. NSs are more likely to report that NSs shouldn’t have to take Aviation English tests. NNSs are more likely to believe that NSs should mitigate their Aviation English communication when interacting with NNSs. NNSs are more likely to be of the opinion that NSs need to improve their Aviation English communication with NNSs. Likewise, NNSs are more likely to believe that NNSs are disadvantaged by Aviation English tests.

Summary of Section 3

77% of respondents report having communicated with an ATCO or pilot who was at a level of 3 or below. 64.6% of respondents report knowing someone who has failed an Aviation English test and of those, 75.7% reported that the person concerned did not lose their job. 36.4% of respondents know someone who has failed an Aviation English test and taken a different test for the purpose of getting a higher mark. 80.7% of all NNSs and NSs reported having taken an Aviation English test with NNSs being more likely to have done so. The majority of respondents report scoring at least the minimum ICAO operational proficiency standard.

4.1.6 Implications of Surveys

There is evidence in these surveys to support the assertion that there is a problem with global Aviation English proficiency. The majority of respondents have interacted with an ATCO or pilot in a professional capacity who they believe is not operating at the minimum ICAO level 4. Furthermore, the majority of respondents know someone who failed an Aviation English test
and, in most cases, that person did not lose their job. No data were collected on organizational procedures in place to re-train pilots and ATCOs who fail Aviation English tests. One method of avoiding loss of employment on this basis would be to take a different test in order to get a higher mark. 36.4% of respondents report knowing someone who has done exactly that.

The central hypothesis of this study is that LPRs are decreasing NNSs’ job security and that this is impacting their engagement with improving their language proficiency. However 79.5% of the NNS respondents in this study report that LPRs do not decrease their job security. This is not proof against the hypothesis because the sample of respondents is non-representative of the global population. However, these NSs’ and NSSs’ also show no difference in opinions regarding job security, pay and work hours. Furthermore, the majority of NNSs surveyed indicate being prepared to improve their English if their company is prepared to pay for it.

The next section of the dissertation will explore the results of the interviews and triangulate this information with insights provided by the questionnaires. The implications of combining data from both surveys and interviews will then be discussed in further detail.

4.2 Qualitative Data Results

Two themes that emerge from these interviews are the idea of NSs’ personal responsibility for successful communication and the idea of responsibility for language proficiency existing at a systemic level beyond the NNS individual.

4.2.1 NSs’ Personal Responsibility for Successful Communication

The one area where the interviewees consistently reference individual responsibility is when they discuss the role that NSs have in improving Aviation English communication. One NS comments, “I think that’s on us as native speakers, in setting proper standards.” Three of the four participants use words like “awareness”, “duty”, and “responsibility” to describe NSs’ responsibility for communicating with an international audience. NSs’ awareness of international English is a theme three of the participants return to:

“...the main duty of the native speaker is, when you talk about when you interact with anyone that’s not native, it’s to be aware of that.”

“That's a big role and a lot of people don't realize it.”

“I think we also have to be aware as teachers and trainers involved in this that English is not Cambridge English or Harvard University English or Melbourne University English, English is a language that’s used by many different cultures and communities worldwide.”

One NNS interviewee mentions NS ATCOs who make no attempt to mitigate their speech: “...they have absolutely no awareness so they talk to the Chinese or the Korean pilots as if they were talking to their friends in the neighborhood.” However, both NS participants of the interviews indicated they were conscious of the need to mitigate their speech, with one even stating, “...we could be a detriment.” The data gathered from question 20 of the survey indicated NS respondents were more likely to believe that NSs don’t need to mitigate their speech to NNSs, and NNSs were more likely to believe that they do.
The interviews also indicate differences in NS and NNS stances but those differences are subtle. For example, the NNSs tended to speak in terms of what NSs should do:

“...native speakers they help by being supportive, by being patient, by speaking a little bit slower by trying to be as clear as they can...”

NSs, on the other hand, spoke in terms of what they shouldn’t do, for example:

“...not using slang and not using idiomatic expressions...”

“...you can speak too fast, you can use phraseology that is too nuanced...”

Perhaps from personal experience the NSs are more aware of what doesn’t work, and NNSs are more cognizant of their experiences where communication has been successful. This raises the question of whether, in terms of English as lingua franca, it is the NNSs who have more insight into how interlocutor and audience can successfully communicate. Two interviewees, one NS and the other NNS, raise this very point by citing examples of when NSs at ICAO level 6 have in fact been, less successful at communicating than NNSs of a “lower” level.

To this end, if NSs are to take a personal responsibility towards improving their communication with an international audience they might be advised to begin that process of improvement by consulting with NNSs. Understanding English as lingua franca is to understand that proficiency is one aspect of successful communication. Mitigation of speech and interactions management are others. The next section of this chapter will address the systemic nature of the challenge of NNSs’ language proficiency.

4.2.2 Responsibility for Language Proficiency Exists at a Systemic Level Beyond the NNS Individual

The general consensus from the participants in these interviews is that Aviation English proficiency needs to improve. In the succinct words of one NNS interviewee: “I think it’s kind of weak.” One example raised is of an international airport’s air traffic control that identifies a particular airline by the unintelligibility of their pilots’ call signs. Another participant warns that language proficiency in certain regions is an accident waiting to happen. Two interviewees specifically call into question the reliability of tests, where pilots are awarded a level 4 on the ICAO rating scale but cannot communicate at this level. These comments in particular can be viewed next to the discovered difference between NNSs’ self assessments and their externally assessed levels. It is not possible to make a causal claim about which of these sets of scores is inaccurate – but the comments support the possibility that the external assessments are too high.

Responsibility for the problem of language proficiency is most often identified at a level beyond the individual. One of the participants refers to a lack of a “culture of English” in the aviation companies he is involved with – speaking in the same sense as one might speak of a “culture of safety.” He asks the question; if pilots don’t have to use English in local contexts, why would they? Other participants echo the concerns of their peers for certain regions of the world, speaking of cultural barriers such as loss of face and shame. One participant mentions “Band-Aid” procedural solutions to an underlying lack of commitment to improving English use.

At no point is the personal responsibility of the individual mentioned as a solution to Aviation English proficiency. Aviation English proficiency is spoken of in terms of organizational,
systemic, cultural or institutional factors. Ultimately, these participants believe that a solution to the problem of Aviation English proficiency must be achieved at a systemic level. But which comes first? Do individuals influence the organization, the system, the culture and the region? Or are these over-arching factors fundamentally driving the individual?

A potential answer to this question may emerge by comparing data from the questionnaires. The majority of NNS respondents have not studied English at all in the last 12 months. However, the majority would study English if their company provided it for free. These results stimulate the question of whether there is resistance above the individual, at a systemic level, rather than a lack of willingness amongst the individuals within that system. Notice that there are two beneficial facets of a company providing English classes for free. First, it removes the financial obstacle from the individual, making it easier for NNSs to engage. Secondly, and perhaps more importantly, it signals clearly that the company prioritizes English language learning. This would signal a change in the “culture of English.” A change that, as one interviewee mentions, must “come from the head (of an organization).” This view is echoed by another interviewee who speaks approvingly of a particular aviation authority: “...they were so committed to (English) that there was no native language allowed in any of the operational communication, all memos, all contacts, all manuals, all training, all internet, was all communicated in English and that’s what I mean by committed to the language.”

The danger in this analysis is to infer general conclusions from triangulating a non-representative questionnaire with a handful of interviews. However, although we cannot infer universals from this research, we can infer potential lines of inquiry.

Identifying new avenues to explore and research is an important function of this study. Furthermore, the utility of a study from non-representative data goes beyond simply facilitating future research. Of course, solutions that are identified from non-representative data are not universal truths. However, solutions revealed from non-representative data may at least appeal to notions of common sense and of reasoning. We must remain cautious of those solutions, but we must not close our eyes to them either.

The interviewees offer a range of solutions to the perceived problem of Aviation English proficiency. Again, these solutions are framed beyond the individual by making reference to stakeholders, aviation schools, and ICAO itself. Sometimes these references are as broad as possible, for example, “...we need to create the culture and implement the training for pilots and controllers and everyone in the environment of aviation.” Two interviewees note that Aviation English should be learned before and during flight school – again, such an approach raises the profile of English language learning as a priority. Another participant sees the solution in terms of auditing and oversight, with the “threat” of sanctions as a punitive response to “violations” of communication standards. Two participants also note that learning English is not a short-term commitment, which seems somewhat at odds with the data revealed in question 6 of the survey where 85.8% of respondents believed they could make significant progress within a limited time frame.

The common feature of the obstacles and solutions identified by interviewees to improving Aviation English proficiency is that they are systemic. This insight is supported by data from question 4 in the survey that indicates the majority of NNS respondents are ready to join free English classes if they feel they need it. Is it possible that NNS pilots and ATCOs are ready to raise the standard of Aviation English, but systemic obstacles stand in their path? Perhaps a systemic problem requires a systemic solution.
The final question our interviewees were asked was what role did they think aviation insurance companies might have in the improvement of Aviation English in the aviation industry. Positive responses are recorded from every participant:

“Oh my gosh, well, they have a profound affect...”

“...I think that’s a great avenue to pursue this.”

“That could I would say affect the English level of companies...”

“I think it’s a valid point...”

“Well... wow, that’s a good question...”

“...so insurance companies can be a push forward...”

One candidate states that insurance companies had a fundamental effect on vastly improving Korean safety during the late 1990s: “So yeah, that was an initiative that insurance companies took.”

Using insurance companies to address the problem of Aviation English proficiency appears to appeal to these interviewees on the basis that it is a systematic answer beyond the level of the individual. For example, three participants raise the theme of profitability as a company’s central motivation:

“...money obviously drives the whole of the system.”

“...of course, it’s all about money, you know, so insurance companies want to be safer because they don’t want to pay the cost of an accident.”

“...lots of companies understand things only when they’re forced to, or when they have to...”

The implications of how insurance companies might be involved in improving Aviation English communication are discussed in the next section.

4.2.3 Implications of Interviews with Reference to Surveys

Recently ICAO has recognized two Aviation English tests: the RELTA and the ELPAC (ICAO, 2015). One of the interviewees questions the transparency of this recognition process, and although this is a valid concern, the fact remains that it is far easier to hold ICAO’s recognition process to account than it is to validate the hundreds of questionable Aviation English tests currently in use around the world. It seems logically simpler to find a way for organizations to only use ICAO recognized tests than it is to educate and police the efforts of more than 190 aviation authorities to choose or create their own tests.

ICAO does not have a mandate to compel any aviation authority to solely endorse ICAO recognized tests (Seiler, 2009). Ultimately, aviation authorities are sovereign over their own airspace. However, outside pressure has in the past been brought to bear if a particular company’s aviation safety becomes dire enough for international cooperation to be withdrawn from that company. From 1988 to 1998, Korean Air was up to 17 times more likely than other major airlines to crash (Gladwell, 2008). In 1999, Delta Air Lines and Air France both refused to continue code sharing with Korean Air (Thomas, 2002) and the US Department of Defense
directed its personnel to avoid using this airline (Kirk, 2002). In the same year, the CEO of Korean Air noted the need for a systemic overhaul of the organization (Thomas, 2002) and this was achieved to the point where Korean Air was receiving international awards for safety by 2006 (Gladwell, 2008). In light of the interview participants’ comments about profitability, it is perhaps significant to note that Korean Air’s remarkable turnaround in safety had a markedly positive effect upon their finances (Kirk, 2002). Although one of the interviewees attributes the above achievements directly to insurance companies, it should be noted that reference to insurance companies’ role in the case of Korean Air has not been uncovered in the literature.

Regardless, it seems worthwhile asking whether insurance companies could have a similar systemic influence in achieving better Aviation English proficiency by raising the premiums of companies that don’t use ICAO-recognized Aviation English tests. This systemic solution bypasses the need for ICAO to bring pressure on individual aviation authorities. Insurance companies are in a crucial position to financially influence the airlines directly (Jackson, 2011). In the past, insurance companies have not had the capacity to evaluate the various tests endorsed by aviation authorities around the globe. This situation has changed with the recent recognition by ICAO of the ELPAC and the RELTA.

4.2.4 Hypothetical Case Study

It is worth examining a hypothetical case study of two airlines (Company A and Company B) who face the decision of whether to switch to only acknowledging language proficiency levels as measured by ICAO-recognized Aviation English tests. Both companies are national carriers for NNS countries.

Each of the companies needs to weigh up the cost of higher insurance premiums against the cost of training their staff, as well as the necessity of rotating out some staff whose proficiency levels are not high enough.

Company A runs an internal audit and estimates that most of their staff is compliant (ICAO level 4). The cost of training or rotating out non-compliant staff is less than the increase in insurance premiums, or at least it will be recouped quickly. This company switches to making all of their staff use ICAO-recognized tests and the company enjoys lower premiums.

Company B assesses their staff and concludes that a large number are non-compliant (ICAO level 3 and below). The cost of training and rotating out non-compliant staff is too high so they decide to pay the higher insurance premium and continue to use non-recognized tests to locate operational staff.

Company B’s future strategy should be an ongoing cost/benefit analysis. They have the option to invest in language training over the long term but avoid the more expensive replacement of non-compliant staff in the short term. Eventually, their staff would become compliant and they too could switch to ICAO-recognized tests. It is also worth noting that the longer it takes for Company B’s staff to become compliant the longer Company A has a competitive advantage over them.

As one of the interviewees points out, however, there might be myriad unintended consequences of insurance companies taking this approach. For example, those pilots and ATCOs that score their operational status using ICAO-recognized tests would become more valuable. As more staff get proficiency scores according to ICAO-endorsed tests, accuracy will likely improve and
therefore, grades as a whole may come down. Making the grading system more accurate (by using ICAO-endorsed tests) might shrink the number of pilots who are reported as assessed at each level (a supposition potentially supported in limited fashion by the results of the survey where NNS self-assessments were found to be lower than their externally assessed levels). The consequence of all this could potentially be an increase in labor costs – which, just like increased oil prices, would need to be passed on to the customer.
Chapter 5: Conclusion

A minimum standard of English within the aviation industry must surely remain non-negotiable. However, it is important to see this requirement in the context of Aviation English as lingua franca. Regarding Aviation English as lingua franca throws light on a variety of valid concerns with regards to LPRs and the process by which ICAO has striven to improve the safety of Aviation through addressing linguistic concerns.

Consulting those who are most affected by the LPRs is an essential step towards improving communication. Such consultation is a necessary but not sufficient condition of improving aviation communication. The question is fundamentally, what steps can be taken with the current tools at hand, to improve communication within the Aviation industry? This study has shown the answer to that question may lie at a systemic level.

If the civil aviation industry’s articulated and manifested values prioritize Aviation English then it creates certain expectations in the minds of the individuals within that system. This creates a virtuous circle of continuous improvement in language proficiency. ICAO started this process when they established the rating scale in 2003 and then required member states to adhere to LPRs by 2011. They have achieved valuable momentum in this direction.

This study has explored a wide variety of issues and opinions on the subject of Aviation English. The results of the study suggest an equally wide variety of recommendations including:

• Having aviation insurance companies include the use of ICAO recognized Aviation English tests in their calculations of charging premiums to airlines.

• Training NSs in improving understanding of their role in achieving successful communication with an international audience.

• Continuing research into the ICAO rating scale and its application.

• Improving the transparency of ICAO’s process for recognizing Aviation English tests.

• Setting up a comprehensive global database of aviation “near misses” to which linguistic factors have contributed.

It is important to address the possibility of faults within the LPR system, whether in the ICAO rating scale itself, the transparency of ICAO’s process of test recognition, or the lack of awareness among NSs of English as lingua franca. However, pursuing such avenues need not be done at the exclusion of having aviation insurance companies use the currently available ICAO standards and tools to improve aviation communication. Such a step can be taken with immediate and significant effect.

It is hoped that this study provides insight into further avenues of research into Aviation English. It is equally hoped that the study provides concrete recommendations that may directly contribute to the safety of aviation communication.

Word Count (Main Text + Abstract) = 19363
Chapter 6: References


79


Garcia, A. (2015). *What do ICAO Language Proficiency Test Developers and Raters Have to Say about the ICAO Language Proficiency Requirements 12 Years after their Publication?* (MA in Language Testing), Lancaster University, Lancaster.


Kukovec, A. (2008). Teaching aviation English and radiotelephony communication in the line with the newly established International Civil Aviation Organization language proficiency requirements for pilots. *Inter Alia, 1.*


## Appendix A: ICAO Rating Scale

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>PRODUCTION</th>
<th>STRUCTURE</th>
<th>VOCABULARY</th>
<th>FLUENCY</th>
<th>COMPREHENSION</th>
<th>INTERACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert 0</td>
<td>Pronunciation, stress, rhythm, and intonation, though possibly influenced by the first language or regional variation, almost never interferes with ease of understanding.</td>
<td>Both basic and complex grammatical structures and sentence patterns are consistently well controlled.</td>
<td>Vocabulary range and accuracy are sufficient to communicate effectively on a wide variety of familiar and unfamiliar topics. Vocabulary is clear, nuanced, and sensitive to register.</td>
<td>Able to speak at length with a natural, effortless flow. Varies speech flow for stylistic effect, e.g. to emphasize a point. Uses appropriate discourse markers and connectors continuously.</td>
<td>Comprehension is consistently accurate in nearly all contexts and includes comprehension of linguistic and cultural subtleties.</td>
<td>Interacts with ease in nearly all situations. Is sensitive to verbal and non-verbal cues and responds to them appropriately.</td>
</tr>
<tr>
<td>Extended 5</td>
<td>Pronunciation, stress, rhythm, and intonation, though influenced by the first language or regional variation, rarely interferes with ease of understanding.</td>
<td>Basic grammatical structures and sentence patterns are consistently well controlled. Complex structures are attempted but with errors which sometimes interfere with meaning.</td>
<td>Vocabulary range and accuracy are sufficient to communicate effectively on common, concrete, and work-related topics. Paraphrases consistently and successfully. Vocabulary is sometimes idiosyncratic.</td>
<td>Able to speak at length with relative ease on familiar topics but may not vary speech flow as a stylistic device. Can make use of appropriate discourse markers or connectors.</td>
<td>Comprehension is accurate on common, concrete, and work-related topics and mostly accurate when the speaker is confronted with a linguistic or situational complication or an unexpected turn of events. Is able to comprehend a range of speech varieties (dialect and/or accent) and speakers.</td>
<td>Responses are immediate, appropriate, and informative. Manages the speaking/listening relationship effectively.</td>
</tr>
<tr>
<td>Operational 4</td>
<td>Pronunciation, stress, rhythm, and intonation are influenced by the first language or regional variation but only with some difficulty.</td>
<td>Basic grammatical structures and sentence patterns are used creatively and are usually well controlled. Errors may occur, particularly in unusual or unexpected circumstanc</td>
<td>Vocabulary range and accuracy are usually sufficient to communicate effectively on common, concrete, and work-related topics. Can often paraphrase or rephrase in choice of language but the meaning is less clear. Vocabulary is sometimes idiosyncratic.</td>
<td>Produces stretches of language at an appropriate tempo. There may be occasional loss of fluency or transition from rehearsed or formulated speech to more spontaneous speech, but this does not prevent effective communication. Can make limited use of discourse markers or connectors. Errors are not distracting.</td>
<td>Comprehension is mostly accurate on common, concrete, and work-related topics when the accent or variety used is sufficiently intelligible for an international community of users. May fall short when confronted with a linguistic or situational complication or an unexpected turn of events. Comprehension may be slow or occur in fragments.</td>
<td>Responses are usually immediate, appropriate, and informative. Can initiate and maintain exchanges with reasonable ease on familiar topics and in predictable situations. Generally moderate with an unusual range of variation with unexpected turn of events.</td>
</tr>
<tr>
<td>Pre-operational 3</td>
<td>Pronunciation, stress, rhythm, and intonation are influenced by the first language or regional variation and frequently interfere with ease of understanding.</td>
<td>Basic grammatical structures and sentence patterns associated with predictable situations are used in controlled situations. Errors frequently interfere with meaning.</td>
<td>Vocabulary range and accuracy are often sufficient to communicate effectively on common, concrete, or work-related topics, but range is limited and the word choice is often inappropriate. Isotopes are sometimes distracting.</td>
<td>Produces stretches of language that are well controlled, and pausing and pacing are often inappropriate. Pauses or hesitations in language processing may prevent effective communication. Fillers are sometimes distracting.</td>
<td>Comprehension is often accurate on common, concrete, and work-related topics when the accent or variety used is sufficiently intelligible for an international community of users. May fail to understand a linguistic or situational complication or an unexpected turn of events.</td>
<td>Responses are sometimes immediate, appropriate, and informative. Can initiate and maintain exchanges with reasonable ease on familiar topics and in predictable situations. Generally moderate with an unusual range of variation with unexpected turn of events.</td>
</tr>
<tr>
<td>Elementary 2</td>
<td>Pronunciation, stress, rhythm, and intonation are heavily influenced by the first language or regional variation and usually interfere with ease of understanding.</td>
<td>Shows only limited control of a few simple memorized grammatical structures and sentence patterns.</td>
<td>Limited vocabulary range consisting only of isolated words and memorized phrases. Can produce very short, isolated, memorized utterances with frequent pausing and a distracting use of fillers to express common words and to articulate less familiar words.</td>
<td>Comprehension is limited to isolated, memorized phrases when they are clearly enunciated, and slowly articulated.</td>
<td>Comprehension is limited to isolated, memorized phrases when they are clearly enunciated, and slowly articulated.</td>
<td>Response time is slow and often inappropriate. Interaction is limited to simple routine exchanges.</td>
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<tr>
<td>Pre-elementary 1</td>
<td>Performs at a level below the Elementary level.</td>
<td>Performs at a level below the Elementary level.</td>
<td>Performs at a level below the Elementary level.</td>
<td>Performs at a level below the Elementary level.</td>
<td>Performs at a level below the Elementary level.</td>
<td>Performs at a level below the Elementary level.</td>
</tr>
</tbody>
</table>

Appendix B: Online Questionnaire

1. Have you taken any English language classes or tuition in the last 12 months?
2. (If respondents answered “Yes” to question 1) How many weeks did you study for?
3. (If respondents answered “Yes” to question 1) How many hours did you study per week?
4. If your company gave you free English lessons, would you choose to study?
5. (If respondents answered “Yes” to question 4) How many hours would you choose to study each week?
6. (If respondents answered “Yes” to question 4) Look at your answer to the above questions. How many months do you think you would need to study at that rate to get a better Aviation English test mark? (For example, going from a 3 to a 4, or from a 4 to a 5...)
7. Do you think you would pass an Aviation English test (score 4 or higher) if you were tested today?
8. In the last 5 years, has your job security decreased because of English language requirements?
9. If you failed an Aviation English test (scoring a 3 or lower) would you lose your job?
10. (Respondents are presented with a copy of the ICAO rating scale – see Appendix A) Using this diagram, what is your lowest level in any of the 6 categories?
11. Do you think you should improve your Aviation English ability?
12. How long did it take you to get pilot or ATC work after you got licensed?
13. Please rank your job security now:
14. Is job security for people doing your job now better or worse than 5 years ago?
15. Please rank your pay satisfaction now:
16. Is pay for people doing your job now better or worse than 5 years ago?
17. Please rank your satisfaction with your work hours now:
18. Are work hours for people doing your job now longer or shorter than 5 years ago?
19. Should Native Speaking pilots and ATCOs be required to take Aviation English tests?
20. Should Native Speakers speak Aviation English to Non Native Speakers in the same way as they speak Aviation English to other Native Speakers?
21. Do Native Speaking pilots and ATCOs need to become better at how they speak Aviation English to Non Native Speakers?
22. Are Non Native Speaking pilots and ATCOs disadvantaged by Aviation English tests?
23. Have you ever communicated with an on duty pilot or ATC controller who you think would fail an Aviation English test (score 3 or lower)?
24. Do you know anyone who has failed an Aviation English test?
25. If yes, did that person lose his/her job?
26. Do you know anyone who has failed an Aviation English test and, after, taken a different test to get a higher mark?
27. Have you ever taken an Aviation English test before?
28. What did you score on your Aviation English test?
## Appendix C: Nationalities of Respondents to Questionnaire

<table>
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<th>Nationality</th>
<th>Count</th>
<th>Nationality</th>
<th>Count</th>
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</tr>
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Appendix D: Interview Questions

1. Can you please give me a brief synopsis of your aviation career? Where you have worked and what positions you have held?

2. How would you define Aviation English?

3. Do you believe that standardized phraseology is sufficient to communicate on every situation that may arise in cockpit communication?

4. How would you describe the state of Aviation English proficiency in the aviation industry?

5. How would you describe the state of Aviation English testing in the aviation industry?

6. How would you improve Aviation English proficiency in the aviation industry?

7. What role do Native Speakers have in the improvement of Aviation English communication in the aviation industry?

8. How would you improve Aviation English testing in the aviation industry?

9. What role do you think insurance companies could have in improving Aviation English proficiency in the aviation industry?
Appendix E: Consent Form

CONSENT FORM FOR RECORDING INTERVIEWEES

Dear Colleague,

Attitudes of air traffic controllers and pilots towards minimum English language requirements are currently not researched. The voices and opinions of air traffic controllers and pilots regarding Aviation English have not been studied. This dissertation seeks to change this inadequacy. I therefore ask you to complete the following form to allow me to record you during an interview.

Thank you
Gareth Williams
Aviation English Specialist

Participation in this study will involve a short (30 minute) interview with me. I hope to record the interviews for my research, but only if you allow me to. The recordings will only be used for the purpose of writing my dissertation.

Participation in this study is completely voluntary. If you give your permission now, but change your mind later, you can withdraw your permission at any time. The recordings will be treated as confidential. Your name will not be mentioned in any publication or presentation that includes this material.

If you permit me to record your participation, please sign your name below.

I give permission for the interview to be recorded, and for the information to be used solely for research purposes. I understand that the information will be treated as confidential (my name will not be revealed) and I can withdraw my consent at any time.

Name: ___________________________   Signature: _______________________
Nationality: _____________________   Age: ___________________________

THANK YOU AGAIN FOR PARTICIPATING IN THIS STUDY!

If you have any questions or concerns about the study please feel free to contact me at:
  gjw23@student.ac.le.uk

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Appendix F: Interview Sample (Edited to protect the participant’s identity)

So this is an interview with __________. I’m pronouncing that correctly? Good ok. And we’re just here to discuss __________’s attitudes and opinions and beliefs about Aviation English and the state of Aviation English in the aviation industry.

So I thank __________ very much for being here today and for providing us with his time and his insights. So __________ I don’t want to direct the conversation too much, I do have questions for you if required but I think that we will get a richer approach to this study if we let you just express your thoughts and opinions as you see them. So how would you like to start? How about you tell us a little bit about your aviation career so far?

Ok I started here in the United States in the Midwest out of... uh, first of all I have to say I have a non, a little bit of a non standard path, career path because of... here in the States you either have a military or you go into a civilian life with a aviation angle. But I got my licenses after I graduated from the University of Notre dame with a Bachelors degree in liberal arts of all things. But I wanted to be a pilot, it was something I wanted as a kid, but there was no opportunity at that time, for anybody that had eyesight less than 20/20. And after I was <incomprehensible> opportunity started opening up, they started realizing those requirements at the big airlines so I decided to pursue that. I got my licenses in 1987 through Northwest Michigan College and then I flight instructed as a civilian flight instructor with a small airplane just for about a year and then I moved on to flying my first airline commercial job was with Midway Commuter in 1989 flying small <incomprehensible> 28 and then after 6 months leading up to a larger aircraft with that company until, and that was the Embrauer 120, until November of 1991 when it went out of business and then I moved on to a, shortly within 3 weeks, a smaller commuter but the airplane as a captain of about until 1993 and then I got my first jet job in the Boeing 727 with ATA known at that time as American TransAir. Later it changed its business name. And I flew for them as an airline pilot. They did international charter mostly with the US Department of Defense and also had scheduled service based out of Chicago and Indianapolis. So my flying was in for 15 almost 16 years and moved to the triple, correction in the Boeing 757 shortly after so I ended up being a captain with them from 1997 until they failed in 2008. So 11 years as a captain with large Boeing commercial airliners and flying internationally. I did a fair amount of global all over the world taking US troops and their various places it’s amazing when you start getting in to this business just how far reaching the US military is. So I flew a lot of international at that time. Then when they went under I was a chief pilot for a small air ambulance company in Kansas City. My only options as a 15 year veteran flying big jets was and stay in the US was either take a smaller job or start all over as a first officer due to the union the airline union system here in the United States there’s no lateral moves for experienced captains. I resisted going overseas to find jobs which most of my colleagues did because I wanted to stay stateside but I finally succumbed, I missed flying the big airplanes and so in 2010 I left for Africa, for Ethiopian Airlines for 2 years. And then from there I had an opportunity to get onto the 777 and fly for Korean Air and that was actually exactly 4 years ago. I have completed a 4 year anniversary this month with Korean Air flying Boeing 777. And so the last six, six and a half years have been flying contract airline pilot for foreign carriers. So I’ve seen a lot of the world at this point now. Pretty much all except for Antarctica.

Right, right that sounds fantastic. It’s an amazing career; varied and some rich experiences that you’ve achieved. I note that you said one of your companies that you were working for went under in 2008. Would you have linked that with the Global Financial Crisis?
Absolutely. That was in April of 2008 and they were the first ones to succumb to that and there were some other financial pressures. They needed some credit and credit had been easily and readily available to the airlines and they just stumbled into the beginning of all the banks and the financial system tightening up and not giving any credit at that time. So they didn't have too much cash on hand, and they succumbed.

My ears pricked up at that because the initial theory that this study was investigating was in fact that Aviation English proficiency requirements have added a layer of compliance to pilots and air traffic controllers globally to jobs that have already been squeezed since the Global Financial Crisis. So that was the theory, sounds good on paper, and then of course when the data came in it turns out that, no, actually that hasn’t been the case. Which is one of the reasons that we do these interviews. Because we get these unexpected results from the quantitative data and we seek to investigate other avenues by speaking to people such as yourself.

So I would like to ask you how would you define the term Aviation English?

Aviation English is a term for a lexicon of words that is used to break down into its most concise and rudimentary form the necessary language needed to communicate between pilots and controllers, firstly, and then pilot to pilot in international cockpits. I’d have to think about that one I’m not much for thinking of my feet.

That’s ok, that’s a fine answer, thank you for that __________, I appreciate your insight.

Do you believe that standardized phraseology is sufficient to communicate in every situation that may arise in cockpit communication?

No, I do not. The standard set are considered and I think the FAA set this whole philosophy up. Government entities, the ICAO set minimums as a threshold to meet but I think for real functionality you have to go beyond those standards. Especially since those standards can be easily compromised. Which I was surprised I’ve been seeing that in some of the Asian airlines as they struggle to meet that. I can't say I was a linguist or anything but I did take a linguistics class and I know that for maybe many of the Asian cultures their languages and their brains are hardwired against speaking particularly English. Their sounds and grammatical construction makes it difficult for them, plus their culture doesn't allow them to experiment, practice without looking weak or, you know, of course without losing face. And that's a very very important part of their culture so those factors working against them and really mastering a language if they don’t, you know, have a talent for it, or are easily proficient.

Yeah sure, well thank you for that. That’s a very interesting insight. Which brings me neatly to the next question: How would you describe that state of Aviation English proficiency in the aviation industry?

Well in the established countries that have been having aviation, you know, they've got a system in place, a culture in place, and a process for that, they seem to do well, such as the European nations. Obviously English is spoken outside of the aviation in those countries.

I would say that in Latin America that although they may know and speak English pretty well in those countries they speak their own language quite a bit against the rules. And so with a national who knows that he’s speaking to a Spanish speaking controller he’ll want you to speak Spanish which then those of us... and as an aside I do speak more than one language, I speak Spanish fluently and then I also speak some Italian, and a little a bit of German, just a few words,
and interestingly enough my wife right now is Ethiopian so picking up that is our children. Anyway the Spanish pilots or controllers are much into Spanish and leaving the rest of the aircraft in the sky out of the know about whatever situational awareness there can be had. So that’s a <incomprehensible> it’s annoying, I find myself translating for other pilots especially in the terminal areas things change rapidly.

Now the Pacific region, the Chinese, and the other countries that are developing in a larger aviation industry as its emerging and growing, they’re having trouble, and English is a very difficult circumstance there. There’s been some violations and there’s a little bit of tension between those different countries as they make accusations officially to each other based on some of these incidents that may arise. And they make a big deal about missing calls and having to repeat themselves and whatnot, their culture doesn’t allow for that sort of thing. So these get heightened on an escalating basis. I know the Koreans complain against the Chinese and vice versa... the Japanese also. And it’s interesting that a lot of incidents that they’ll try to address stem from a basic communication issue and they just use bandaid tactics or techniques or, how do I want to say this... resolve their problems they overlook the underlying cause.

And what would you describe the underlying cause to be?

...a lack of commitment to really learning English as the primary language of their business. I think the Japanese, they have a history with the US of further back than the Koreans and since World War 2 the relationship there was more as victor vs uh... you know, then in the ICAO the Japanese were forced, they seem to have a better standard I would like to say. The Japanese are a lot more structured than the Koreans. The Koreans are a lot more structured than the Chinese. The Vietnamese are picking up but their basic language allows for better English however their pronunciation is very difficult to understand for a native speaker like me. Malaysians do pretty well, Singaporeans are very adept at it but those cultures are a little bit different from the northern Asian cultures. But in my experience the Koreans and the Japanese, forgive me the Chinese, they don’t, the Chinese I know will put a, they’ll have maybe an international pilot in the cockpit, they’ll put a jumpseater who speaks both languages in between, and the co-pilot will not speak a lick of English. So you’ve got this three-way communication going inside the cockpit in addition to the necessary communications outside to the controllers, so I’ve heard of that set up. So it’s a nightmare, an accident waiting to happen. The Koreans in my personal experience often have trouble doing communications and they’ll chalk that up to some systemic process and then issue a memo or edict that we must change our process when all of us know it’s because they have a substantial percentage that just can’t speak conversational English at a level 4 basis. Level four is the minimum standard. So it can get very frustrating. And they’ll employ linguists and bring them from Canada, US or Australia and then those poor guys are hand tied. They figure well I can do a lot of good and help here but the system and the culture does not allow for them to make much of an impact. So it’s really interesting you’ll look at training videos and things like this that they’re done in English and of course they’re also done in Korean and the majority of that is learned in Korean by the national because they have this option and naturally with an option to listen to a training video or some sort of company communication in their own language. The Ethiopians, they were so committed to it that there was no native language allowed in any of the operational communication all memos all contacts all manuals all training all internet was all communicated in English and that’s what I mean by committed to the language.

I see, it’s an excellent answer. I thank you very much for that. Can I also ask you, how would you describe the state of Aviation English testing in the aviation industry?
Well being an English speaker I never experienced that until very late in my career when I went to work for the Koreans. Now, I actually had to take an English test which seemed ridiculous to me and I thought, the Ethiopians looked at me, talked to me, saw where I was born and raised and trained and they took it for granted <incomprehensible> as English proficient. And the English language, the lexicon, especially on a legal basis, proficient means expert, but go to Asia and they don’t understand that it doesn’t have a categorization which is <incomprehensible> to what proficient means, you know, in the strictest sense. So they don’t understand as a <incomprehensible> level 6 or 5, it says proficient, that means I am expert, I’m as proficient as an expert can be. So I go take the test, much of it is recorded I passed out and then I have an interview and guess what, I’m being evaluated by a level 3 or lower to evaluate me on my native language. And I gained a level out of it! Because I needed to ask a question to clarify there were some nuances in the question they were asking that they don’t realize that I picked up on and I’m a naturally curious person, so do you mean this or that on a very nuanced basis, they were like oh he asked a question he doesn’t understand. Well a native speaker would have picked that up as being even more you know educated and proficient in his language than most people. I mean, I’ve got a Bachelor in Arts and Literature of all things from a very respected university in this country so I was appalled, for me it was ludicrous it was you know it was almost well let’s say dreamlike.

**Ok, this my be a bit of a punt for me, but I’m gonna ask you, how would you improve**

**Aviation English proficiency in the aviation industry?**

As long as there’s humans there’s gonna be corruption and whatever standards one sets there’s gonna be people trying to circumvent standards, or corrupt them. So it matters basically with what I’ve seen going on in the Asian situation or you know Latin America where they may be able to speak perfectly well but they don’t opt to do that because it’s just easier. So but I’ve never heard of, other than the complaints between two countries you know appealing to the ICAO or something like that, I’ve never heard of any kind of violations or threats or any kind of sanctions against any company or pilot that’s done something inappropriate. Once you get past the test that says that, it just goes, so I guess I’m making excuses, but I guess I’d start with better policing standards and the testing facilities. And having the ICAO, since they’re the governing body of international relations between the airlines, having the ICAO set up some sort of committee, and an auditing practice, with some sort of authority to sanction for issues that arise from stemming from communication problems. And certainly the threat of that will <incomprehensible> the culture is based upon that kind of stipulation and motivation. <incomprehensible> there may be a lot of industry initiatives that arise from that. <incomprehensible> Unfortunately. That’s the first thing, uh, you know and maybe more emphasis on identifying languages because of Asian linguists and studies that say that certain languages don’t correlate with each other, you know, there’s no underlying history, you know, English had a lot of Latin so Latin languages and English have some intersection there. Also the western culture, idea of thinking, the works of the English grammar is better understood but the Asian cultures they’re different, in fact when I went there they made a big point of showing a video about how we understand them, so I was more understanding and tolerant of their lack of English. So they put up a 30 minute, actually an hour course on the differences in their philosophy and mental ideas and how they perceive of <incomprehensible> versus how westerners do. And they are at a disadvantage because the airplanes they fly are designed and engineered by western minds and the western mind assumes a certain resourcefulness of the operator and so they’re at a disadvantage on that basis and also English and so they would probably resent the fact of being identifying as having a bit more difficulty learning English but if we’re really gonna be honest with ourselves you know certain linguists can identify languages that just don’t mix <incomprehensible> they need a bigger emphasis <incomprehensible>. I don’t know if that can politically survive as an option or not.
Well I think that you’re absolutely right, there needs to be a lot of honesty and forthrightness to solve these problems which ICAO have actually identified 7 accidents that have occurred since 1976 that cost the lives of 1400 plus people that are directly contributed to by English proficiency.

Well I wasn’t aware of that. It's not surprising. And I think things get more fully complicated in Asia as there are still growing pains as the aviation in the airspace in the controller system is exploding in numbers without the infrastructure being really sped up and in China, although they are employing a lot of foreigners, right now, they’re going gangbusters training pilots, now English is very difficult and it takes a lot of time and commitment and a lot of practice to learn that to the necessary levels to let them to fly to an airspace. So something is going to happen over there, so it’s unfortunate, that’s my view.

I’m gonna ask you a couple of last questions, these are slightly more leading questions so if you feel like you don’t really have the answer or you don’t feel comfortable answering it please don’t worry about it...

First of all what role do Native Speakers have in the improvement of aviation English communication in the aviation industry?

Well on an administrative basis I think they’re essential we set the bar, the standard, I mean everyone looks to us to proficiency there it’s possible to attain, but also we could be a detriment, if we don’t as flying internationally, in the international community, realize that we’re talking to, communicating with people that are not using English as their first language, it can be daunting and difficult and you can speak too fast, you can use phraseology that is too nuanced and so native speakers have a responsibility to realize and when they’re traveling internationally they’re using English that they make concerted effort at standardizing things on a professional basis. That’s a big role and a lot of people don’t realize it even, and between you and me, if I’m in the US, I notice we’re one of the biggest offenders of that we do not even our phraseology, since many controllers don’t even encounter foreigners and even at the international terminals where they are encountering foreigners they’re a very small percentage of their operation and they There are a few exceptions where they’ve emphasized to the controllers of being better at it especially encountering some of the foreigners. They like Los Angeles and Seattle but New York and Philadelphia and many of the interior terminals and airspace it’s just abhorrent. And then of course pilots are also bad at that from the US. I notice that the UK and the Australians are to a lesser extent the Australians, no offense… are you a kiwi?

No offense, well done! Not many people guess that.

Well I had some colleagues who were kiwis and I think I read something that you mentioned that you were from New Zealand originally. You know as a country population wise relatively small so you know there’s not a certain arrogance that we might have here in the States, about our country and aviation so, I’m a little bit embarrassed when I’m listening to the poor foreigners trying to fit in and understand and controllers are just using their bad language, you know, and a lot of not standard phraseology, short cuts, we could be a lot better as native speakers on that front and as far as helping train, I think that’s on us as well as native speakers, in setting proper standards. Ok, when I’m not sure I get a bit long winded.

Haha, no that was fantastic. If I may, I would like to ask you the most pointed question I have for you this morning, and it is very much a leading question, so, let’s see: what role
do you think insurance companies could have in improving Aviation English proficiency in the aviation industry?

Oh my gosh, well, they have a profound affect on pretty much all fronts because money obviously drives the whole of the system. I know they had a profound effect on in making the Koreans change after they had a rash of accidents in the ‘90s. And they forced them to hire certain percentage of foreign pilots who spoke English. So yeah, that was an initiative that insurance companies took and it was not necessarily English but it was a you know western you know technical proficiency sort of thing that they wanted them to change and they actually hired an American company and the consultants from an American airline to try and <incomprehensible> them into changing things so they could satisfy the insurance companies’ needs. They went to fully trained, so none of the training is done by Korean nationals so that was an example, but it wasn't specifically for English it was just to stop accidents, you know, they saw a lot poor technique with pilots. And if they wanted to focus, insurance companies could have a profound effect as money talks and you have to have insurance to operate in these foreign lands that require a certain amount of insurance coverage, so to get a landing permit to land in Europe or the United States, they would be a first line of defense, they wouldn’t necessarily need to go to the ICAO that would be the secondary line, or umbrella, <incomprehensible> I think that’s a great avenue to pursue this.

Yeah if you could get the insurance companies to do that, that would be profound, but there's some outfits I’m sure that would say, ok, how much? Take the hit and if I think this through they have to train pilots and the pilots have to meet these standards and if the pilots do not meet these standards and they’ve got to train proficient pilots on a technical basis but not linguistically then they then have to hire a pilot from a pool of applicants, will have to hire other, you know, raise their salaries to people who do have that proficiency and then their costs go up dramatically on a per capita basis, so it could definitely, it remains to be seen there's a lot of unintended consequences.