The use of discourse analysis to enhance ESP teacher knowledge:
an example using aviation English

Patricia Sullivan\textsuperscript{a,\ast}, Handan Girginer\textsuperscript{b}

\textsuperscript{a}Office of English Language Programs, Department of State, Washington, DC 20547, USA
\textsuperscript{b}Andadolu University, School of Foreign Languages, Eskisehir 26470, Turkey

Abstract

Effective ESP programs require relevant materials, knowledgeable instructors, and teamwork with subject matter professionals. This report provides an example of one process used by a teacher–researcher to increase and expand each of these aspects. The process of data collection and data analysis, as described here, results in greater knowledge on the part of an instructor and leads to the development of enhanced course materials. The study was conducted for an ESP program in a Civil Aviation School in Turkey where students were in training to become pilots and air traffic controllers. Primary data included tape-recorded communication between pilots and air traffic controllers, observation in the airport tower, and questionnaires and interviews with Turkish pilots and air traffic controllers. The results, which comprised a basis for materials writers, indicate that even in such a restricted and globally monitored language as Airspeak, local variations exist in the use of greetings, the pronunciation of numbers, and the extended use of Turkish. © 2002 The American University. Published by Elsevier Science Ltd. All rights reserved.

1. Introduction

The impetus for this study came from a situation that one of the authors found herself in. She was asked to teach English to future pilots and air traffic controllers in Turkey, and, though she had had experience teaching English, she had little knowledge of the actual English language needs of her students. As she looked over...
the books she was given, she felt strongly that these standard English language books were neither appropriate nor sufficient. Her search for other material that focused on specific language needs of air traffic personnel, especially in this Turkish setting, yielded little. After discussing this situation and ways to become more familiar with the needs of her students, she decided to document actual language used by pilots and air traffic controllers at work in order to increase her awareness and provide a basis for materials development. Her decision was based, in part, on Hutchinson and Waters’ (1987, p. 57) comments about the lack of specific content knowledge of many ESP teachers, and the need for them to orient themselves to a new environment.

The purpose of this research report is to discuss the process this teacher–researcher used and to describe some of the findings. Though the situation described here relates specifically to aviation English, the process is applicable to other ESP situations.

2. Design of the study/data collection

New ESP instructors who are somewhat unfamiliar with the specific linguistic needs of their students often begin by looking at materials, either instructional or professional. They may also interview professionals or observe them at work. Such interviews, observation, and examination of written material represent common needs analysis procedures that became systematized in the 1970s, mainly based on Munby’s (1978) *Communicative Syllabus Design*. Munby’s work represented a shift in linguistics away from understanding the rules of English usage to discovering ways that language is used in communication (Widdowson, 1978). This trend led to much discussion in ESP, and in applied linguistics in general, about the use of authentic data (e.g. Hutchinson & Waters, 1987; Kramsch & Sullivan, 1996); that is, text originally written or spoken for “real life” purposes in a “real life” setting. We view the collection of authentic data as crucial to an ESP needs analysis as it can yield an insider’s view not otherwise apparent to the ESP teacher or the students, or maybe even to the professionals themselves.

The purpose of this study was to document standard discourse transactions between pilots and air traffic controllers (ATCs) at Ataturk International Airport in Istanbul, Turkey, and also to analyze local variations. The biggest initial hurdle in doing a study of this type is getting the data. This entails selection of whom to record, and in what settings and at what times. Not only do the speakers themselves need to give permission, but often permission needs to be obtained from administrators, managers, or other people in authority. For the situation described in this report, permission was first requested from the Turkish State Airport Administration office in Turkey’s capital city, Ankara, to gain access to the Air Traffic Control Center. Second, security clearance was requested from the Civil Defense Department at the airport in Istanbul. Third, the airport police department was contacted. And fourth, the deputy governor of Ataturk International Airport in Istanbul was asked to confirm the request. When these permissions were secured, the author was allowed to enter the tower and observe the ATCs at work. She was also allowed to
make copies of the tape recordings of communication between ATCs and pilots that occurred on the days she was there. The primary data, then, was a collection of unrehearsed and unplanned discourse that happened to occur during the time she was allowed to observe. Transcription of the taped recordings resulted in 178 pages containing 3968 lines of discourse. Though these transcripts formed the major portion of the data, the researcher also interviewed and gave questionnaires to Turkish ATCs and pilots to triangulate the data. Complete data included: (1) 9 h of recordings at the Ataturk International Airport Air Traffic Control Center taken on 6 and 7 January 1998; (2) observations in the Air Traffic Control Center at Ataturk International Airport on 6 and 7 January 1998 and between 9 and 15 March 1998; (3) questionnaires given to 25 Turkish pilots and 25 air traffic controllers; and (4) interviews with 10 Turkish pilots and 10 air traffic controllers.

3. Results

3.1. Background to the discussion

The linguistic code used by pilots and air traffic controllers is an English-language-based restricted code of speech that was developed in 1944 by the International Civil Aviation Organization (ICAO, 1985). Referred to as radiotelephony phraseology by aviation personnel, in linguistic and educational circles this code of speech is sometimes referred to as “Airspeak,” a term popularized by Robertson (1988). Unlike classroom discourse or spontaneous conversation, Airspeak is a highly specified and controlled language that is monitored internationally by ICAO and by the Federal Aviation Administration (FAA) in the United States.

3.2. The Turkish setting

Control of air traffic at Ataturk International Airport is divided among four types of controllers, depending on the altitude of the plane. At the highest altitude (between 46,000 and 17,000 feet), responsibility is with Area Control, also called Center Control. Before the plane begins to descend, the pilot contacts Approach Control, which is responsible for planes flying between 17,000 and 3000 feet. When the airplane is as low as 3000 feet, responsibility for communication is passed to the Tower. The ATCs in Tower Control communicate with the pilot until the plane lands. At that point, communication is only with Ground Control. There are, then, four different types of ATCs who communicate with the pilot during the landing procedure. The ATCs in Area (Center) Control and Approach Control speak to the pilot by radio and follow the movement through a radar screen. The Tower and Ground Control ATCs, who share the same space in Istanbul, also speak by radio, but are usually in visual contact with the planes.

In the control rooms, the ATCs sit closely together with their computer screens in front of them, talking not only to pilots, but also communicating with each other.
The pilots, on the other hand, are usually not communicating with other pilots, even though they can hear each other on their radios. They are mainly communicating individually with the ATCs. In these interactions, unlike in face-to-face conversations, the interlocutors usually cannot see each other. The discourse, however, shows little overlap, and few misunderstandings. Using Goffman’s (1981) terminology, we have termed this type of communication as successive one-to-one interaction with multiple ratified participants, both addressed and unaddressed. In these successive one-to-one interactions, the number of interlocutors varies. In one 90-min segment of recordings with ATCs in Area Control, which consisted of 800 lines of transcript, communication occurred with 43 pilots. During some of this 90-min period, only three or four pilots were communicating with the ATCs at one time, but during the busiest period, 13 planes were in communication with the ATCs at the same time.

At Atatürk International Airport, the controllers are all Turkish, but the pilots are from many different countries. In the collected nine hours of data, there is recorded communication from 278 pilots. Of these, more than half (160 pilots) work for airlines in Turkey. The next largest number (14) work for German airlines. The remaining 104 pilots are divided among airlines from 26 countries, mostly from either Central or West Asia. Only two (USA and England) represent countries in which English, the basis of Airspeak, is the native language.

3.3. Standard transactions

Most exchanges in this discourse were brief, and most were requests. A typical request by a pilot begins with a greeting, followed by an identification, then followed by the request. The ATC repeats the pilot’s identification and gives a response, which is confirmed by repetition from the pilot. A typical transaction follows.

**Pilot:** Good afternoon. Turkish triple three. Flight level two six zero. uh request descent.

**ATC:** Good afternoon Turkish triple three uh roger two six zero. Now cleared to descend level one niner zero. Proceed to Deniz intersection. Hold over Deniz.

**Pilot:** Descending one niner zero. Holding Deniz. Uh Turkish uh triple three.

The above exchange exemplifies the abbreviated syntax of Airspeak, the use of greetings and numbers, and the importance of repetition (readback). The data in this study indicate few instances of misunderstanding between the pilot and ATC, though sometimes numbers were repeated incorrectly. In these cases, further repetition and confirmation corrected the error and clarified the message. In these instances of repair, the exchanges were longer and more similar to conversational speech, as also reported by Morrow, Rodvold, and Lee (1994).

3.4. Variation

Though ICAO rules are quite specific in delineating language to be used, we found that there was variation from the rules in the way numbers were pronounced, in the use of greetings and closings, and in the use of Turkish.
Clearly, in Airspeak, understanding numbers, which are used for identification and directives, is crucial. ICAO rules state that numbers should be read individually; however, as shown in the example above, this is not always the case. Other examples in the data are #666 read as “triple six” rather than “six six six;” #2211 read as “double two double one” rather than “two two one one;” and #1931 read as “bir dokuz otuzbir” rather than “one niner three one.” Some of the differences in pronunciation of numbers may relate to ease of communication; i.e. it seems easier to say “triple six” than “six six six.” Pronunciation of numbers may also relate to the way numbers are grouped together in the speaker’s native language. In the third example above, for instance, the speaker used Turkish, grouping the number in the standard Turkish way (translated as “one nine thirty one”), rather than the standard Airspeak “one niner three one.” The importance of being aware of various ways to state numbers was brought out by one Turkish interviewee who said that when he was flying in United States he heard numbers such as 132.25 pronounced as “one thirty two and a quarter” rather than “one three two point two five.” The term “a quarter” was confusing to him when he began flying into the United States since it is non-standard in Airspeak.

A second area of variation in our data is the use of greetings and leave-takings. These openings and closings are not stipulated by ICAO, but they are commonly used anyway. One American pilot described the use of greetings as an international tradition, a sort of grace code. For greetings and closings, pilots and ATCs often use their native language or the language of the country they are flying in. While in our data the most common greeting was “good afternoon,” the Turkish “iyi günler” (good day) was also common.

Though ICAO rules state that pilots and ATCs should use only Airspeak to communicate, there are times when Turkish was used for extended utterances. An example follows:

\[\text{ATC: Havayolları üç bir beş yaklaşma. [Approach (Turkish) Airline three one five.]}\]
\[\text{Pilot: Buyurun efendim. [Go ahead, sir.]}\]
\[\text{ATC: Efendim sıfır altı talep ediyorsunuz mutabikmiyiz. [Sir, you request (runway) zero six, are we in agreement?]}\]
\[\text{Pilot: Anlaşılmadı efendim. [Say again, sir (it is not understood).]}\]
\[\text{ATC: Efendim sıfır altı talep ediyorsunuz mutabikmiyiz. [Sir, you request zero six, are we in agreement?]}\]
\[\text{Pilot: Sıfır altıyi talep ediyoruz efendim. [We request (runway) zero six, sir.]}\]
\[\text{ATC: Üç bir beş anlaşıldı efendim. Kuleyle yaptığımız koordinasyon sonunda sıfır altının uygun olmadığını söylediler üç altıya geleceksiniz. [Three one five, understood, sir. The result of our coordination with the tower is that they said zero six is not available and you are to come to (runway) three six.]}\]
\[\text{Pilot: Anlaşıldı. Üç altıya yaklaşacağız. [Understood. We will approach three six.]}\]
\[\text{ATC: Mutabik. [Agreed.]}\]

Though we found Turkish to be used to some extent throughout the data, most of it occurred between pilots and ATCs in Tower and Ground Control. This increased use of Turkish may relate, in part, to the critical nature of landing procedures, to the
Fact that there was often visual contact between the speakers (many of whom knew each other), or to the greater comfort level that comes with finally being on the ground. Though this use of Turkish may increase the level of understanding between Turkish pilots and ATCs, it has a drawback for the non-Turkish-speaking pilots in the area since they may be left out of important communication. In addition, the increased frequency and duration of Turkish can block out the opportunity for these non-Turkish speakers to communicate with the controllers.

4. Discussion

For pilots and ATCs-in-training, the formation of requests, the pronunciation and comprehension of numbers, an ability to listen to multiple interactions and quickly discern who is speaking to whom and when one is to intervene are crucial aspects of communication. In addition, knowledge of colloquial words and phrases other than those that represent the ICAO standard is important. In the interviews for this study, one pilot said she had had a difficult time understanding the word “chop” when it was used by American pilots, until she found out that it meant “turbulence” (the standard Airspeak term). Other phrases that pilots have heard that are not standard include “line up and wait” (instead of “taxi into position and hold”) and “with you” (instead of “on your frequency.”) In interviews, pilots and ATCs both stated that they needed to improve their conversational English, not just Airspeak, since they are called upon to communicate in situations in which Airspeak is insufficient. This correlates to the findings of Chatham and Thomas (2000) as well as of Morrow et al. (1994) who found that nonroutine transactions between pilots and ATCs contained more conversational English, more complex syntax, and more vague terminology than routine transactions. This use of English in nonroutine transactions can be particularly problematic if one or both of the interlocutors are not native English speakers since they may differ in their use of vocabulary and conversational discourse conventions.

The purpose of this study was to use discourse analysis as a way to enhance the knowledge of the ESP instructor and to apply this knowledge to the development of materials. Doing this involved teamwork with professionals in designing the study, getting permission to conduct the study, and analyzing the results. The results were beneficial not only to the instructor and to the new pilots in training, but to the professional pilots and ATCs who were recorded and interviewed. They gained more knowledge and understanding of their own discourse and were able to express their perspectives on important aspects of training. The findings of this study contributed to the development of new materials at the Civil Aviation School, which were based on recordings of actual pilots and ATCs. Focused activities for pilots and ATCs-in-training were also developed that incorporated the use of grace-codes in various European and Central Asian languages, the pronunciation of numbers, the practice of readback and repair of miscommunication, and improvement of comprehension and quick responses to multiple interactions. Other exercises continue to be developed from the rich data that were collected. The fact that these exercises are based
on data gathered from actual recordings from the local airport brings immediate relevancy to the classroom.

5. Conclusion

This report discusses the process taken by an ESP teacher who had little knowledge of the specific language needs of her students and who investigated those needs by working with professionals and analyzing their discourse. This process of discourse analysis can yield rich data but the task of transcription is time-consuming. In this study the observation and collection of taped data occurred over 2 days, but the ensuing transcription took months. The result, however, was hard data that can be reread and re-analyzed not only by the researcher but by any interested persons. In this case, data from the study indicate that even though the ICAO specifies the rules for Airspeak and monitors the language, there are variations in local use. There is also a continued need to develop vocabulary and conversational English skills for these non-native speakers of English for use within the professional setting. The process discussed in this report is applicable to other ESP settings since language in practice is inevitably open to local variation, even such a restricted and globally monitored language as Airspeak, and the collection of on-site data can provide a rich resource for materials development.

Acknowledgements

The authors would like to thank the many pilots and air traffic controllers in Istanbul, and also Gifford T. Jones, retired Northwest Airlines captain in Seattle, for their patience in answering our many questions about communication between pilots and air traffic controllers.

References

Patricia Sullivan is the Regional English Language Officer at the American Embassy, Kiev, Ukraine. As a Fulbright grantee from 1997 to 1999, she was the Director of the MATEFL program at Bilkent University, Ankara, Turkey. Her published works focus on discourse analysis and the appropriation of CLT in Vietnam and Turkey.

Handan Girginer teaches English in an intensive English program at Anadolu University in Eskisehir, Turkey. She has a special interest in English for pilots and air traffic controllers having taught in the Civil Aviation School for several years.