US Bangla Flight 211 Crash:

An Analysis of the Cockpit Voice Recorder Transcript

Radia Al Rashid

ID: 172013011

Department of English and Humanities

June 2021

US Bangla Flight 211 Crash:

An Analysis of the Cockpit Voice Recorder Transcript

A Thesis Submitted to

The Department of English and Humanities

University of Liberal Arts, Bangladesh

In Partial Fulfillment

of the Requirements for the Degree of

BA in English

Radia Al Rashid

172013011

Thesis Supervisor

Dr. Mahmud Hasan Khan

Associate Professor, Department of English and Humanities (DEH)

June 2021

CERTIFICATE OF APPROVAL

I hereby declare that this thesis is the student's own work and effort. All sources of information incorporated here have been duly acknowledged. This thesis has been submitted with my approval.

_Mahmud Hasan Khan__

Date: 08. 06. 2021

Mahmud Hasan Khan, PhD

Associate Professor

Department of English and Humanities

University of Liberal Arts, Bangladesh

DECLARATION

This thesis is a presentation of my original research work. Wherever contributions of others are involved, every effort is made to indicate this clearly, with due reference to the literature, and acknowledgement of collaborative research and discussions.

__Radia Al Rashid___

Date: 08. 06. 2021

Radia Al Rashid

Student ID

Department of English and Humanities

University of Liberal Arts Bangladesh.

Acknowledgements

I would like to express my deepest gratitude to the Almighty, for I was able to put my full effort into learning and applying my knowledge into the research along with the new field of study.

Next, I would like to thank my supervisor, Dr. Mahmud Hasan Khan, Associate Professor, Department of English and Humanities, University of Liberal Arts Bangladesh, for his constant support and positive attitude during the research process. His insightful feedback and suggestions throughout the time assisted me to enrich my thesis paper even more. Moreover, His valuable directions and motivating words have simplified the path of this research. I want to thank him for encouraging me to delve deeper into Aviation Linguistics and Conversation Analysis.

I want to thank my parents and siblings for always supporting and assisting me.

Last but not the least, I am also grateful to the Department of English and Humanities, for helping me to recognize my capabilities along with being so affectionate and devoted towards me and all the other students throughout this four year program.

Table of Contents

Certificate of approval ----------3

Declaration ---------- 4

Acknowledgements ---------- 5

Abstract ---------- 7

Chapter One: Introduction…….. 8

Chapter Two: Literature Review……. 11

Chapter Three: Methodology……... 18

Chapter Four: Data Analysis……... 24

Chapter Five: Conclusion……. 38

References---------- 40

Appendices---------- 44

Abstract

Communication plays a distinctly consequential role in the field of aviation. Involving a specialized version of English named Aviation English, the communicative aspects of this field go beyond the basic information exchange. It contributes to ensuring almost half of the overall safety of any aircraft flying in the sky. Considering the remarkable amount of air crashes due to miscommunication in the past, this study aims to investigate the breakdown points in the communication of US Bangla flight 211 crash. The researcher focuses on topic construction, sequence organization, use of aviation English, read-backs and Cockpit insider coordination.

To identify the potential gaps and glitches in the target transcript, the technique of conversation analysis was adopted. Besides, to testify the erroneous aspects regarding aviation English and ATC communication, the jargon, phraseologies, read-back errors and linguistic coordination inside the cockpit were taken into account. The results showed notable contributions of the misapprehensions in the areas mentioned above towards the air crash.

These results suggested that the confusing exchanges of information, muddled nature of communication among the interlocutors and the breakdown points in sequencing as well as topicality of the conversation played seminal roles in the accident. On this basis, the emphasis on the error-free maneuver of ATC communications would be increased to minimize the possibility of any future incident. Also, people in general would be made aware of the importance of the topic on a broader and more comprehensive level.

Keywords: ATC communication, Aviation English, Conversation analysis, flight crews, ATC.

Chapter One: Introduction

Aviation communication refers to the linguistic exchanges between two or more aircrafts and the air traffic controllers (ATC). Effective radio communication between ATC and pilots has long been recognized as an important element of aviation safety (Barshi & Farris, 2013). This is called ATC communication. The correct transmission of instructions between the air and the ground concerning the altitude, wind, another aircraft's position, air route, unoccupied runway, the takeoff and landing timing etc. is a major contributor in the overall safety of the flight. English is the main language in aviation which was determined by the International Civil Aviation Organization (ICAO) in 1951. The aviation English is unlike the regular English. Aviation English consists of many idiosyncratic structures, jargons, codes and standard phraseologies. All the aircrews and ATCs are instructed to use the scripted language during the communications but in times of turbulence, plain English is allowed to be used. Standard phraseology reduces the risk that a message will be misunderstood and aids the read-back/hear-back process so that any error is quickly detected (Skybrary).

Many researchers have executed studies on the consequences of miscommunication and accidents in aviation history. High profile accidents were instrumental in raising awareness to the importance of effective ATC-Pilot communications and were fundamental in the development of a standard phraseology for ATC-Pilot communications (Estival, et al., 2013). Some of the researchers, however, implemented conversation analysis to conduct their studies. Conversation Analysis (CA) provides a valuable qualitative methodology for informing many professional workplace operations by collecting, transcribing, and coding naturalistic audio and video recordings (Arminen, 2005). An interest in temporal order is fundamental for CA's focus on the sequential

organization of interaction, and the significance of this organization for revealing how participants create and interpret contributions to interaction, and so construct moment-to moment just what it is that they are doing and what is going on (Neville, 2007).

Communication was repeatedly proven as a vital factor throughout history. Communication failures have been blamed for more than a thousand deaths in plane crashes (Patty, 2016). Among the deadliest air accidents due to communicative errors, the Tenerife air disaster is the most devastating in aviation history. A Dutch pilot used Dutch syntax with English words and misinterpreted the order from the air traffic controller (ATC) which led to the face to face crash of two jumbo Boeing 747s costing the lives of 583 individuals including passengers and air crews. Besides, in 1981, 180 deaths were caused in Corsica due to ambiguous language use. In 1983, because of faulty communication procedures in a fight, 169 people died. In the case of a Colombian flight back in 1995, the ATC failed to converse in English resulting in 159 deaths. Another absolutely despairing incident took place in 1996, in the region of India where Hindi ATC could not communicate properly with the Arab and Kazakh pilots. The air crash led to 349 deaths.

Problem Statement

Cockpit communication is a rich area of study for language investigators, and it has been relatively under-researched given the critical role it plays in flight safety (Sexton & Helmreich, 2003). Especially, the South East Asian region has largely overlooked the importance of language in airline safety. This research, henceforth, investigates the cockpit voice recorder (CVR) transcript of US Bangla 211 flight conversation through studying the sequence organization and topic construction under the theoretical lens of conversation analysis and read-backs, cockpit coordination and the elements of aviation English. This research explains the inaccuracies and

confusions in the aforementioned sectors due to which the miscommunication emerged and led to the crash.

Objective of the Study

Through the methodologies of conversation analysis (CA), ATC communication and aviation English, this study inspects the gaps in US Bangla 211 CVR transcript that possibly contributed to the crash back in March 12, 2018.

Research Questions

1. How were topic constructions and sequence organizations in the ATC Communication of US Bangla flight 211?

2. What linguistic expressions were used by the captain and first officer of the flight in the communication that indexed their approaches in following the rules of ATC communication?

Significance of the Study

This research elucidates the importance of aviation communication and its impact on aviation safety. Especially in the Bangladeshi region, this study adds empirical knowledge to the literary body and it is also hoped to reduce the possibility of any future air disaster that could take place due to miscommunication.

Chapter two: Literature Review

This research aims at positing topic construction and sequence formation among the air-crews and also between the pilots and Air Traffic Controllers in the ATC communication of US Bangla flight 211. Therefore, the Cockpit Voice-Recorder transcript of the flight is analyzed under the lights of conversation analysis and Aviation English. The objectives here are to demonstrate the necessity of following the specific rules in carrying out ATC communications and to depict the gaps in topicality as well as sequence formation that can lead to possible air accidents and incidents. The overall study calls for the proper use of Aviation English on the communicators' ends, using Conversation Analysis as a means to scrutinize communication and behavioral patterns of the interlocutors, and the significance of Aviation communication, in this case ATC communication for the safety of the aviation world. This chapter, hence, discusses findings from previous studies conducted within these particular fields.

2.1 Conversation Analysis as the means of investigating verbal and behavioral factors of communications

Despite having started as a way of studying certain conversational exchanges in the field of sociology, the technique of conversation analysis now covers a wide array of fields and topics. In probing the glitches of ATC communications, this technique has been used by a number of researchers as it gives off almost entirely accurate sets of results.

Albert (2017) placed his focus on the methodological features of conversation analysis (CA). He called this technique an interdisciplinary as well as naturalistic approach to studying talk and interaction. He looked into CA aspects, backgrounds and structural organizations. How CA is used as the empirical study of human interaction was explained here. It is also said that CA has its own

standards of evidence, some unusual collaborative research practices, and a rich literature spanning sociology, linguistics, anthropology, psychology and communications. Current issues in CA regarding the related fields it is linked with for the sake of its development both as a methodology and a growing field of study were also analyzed. Through discussing sequential analysis, description of viable data, transcription, and cumulative observations, Albert called CA as a methodologically coherent field. Among the uses of CA, theory formation, experimental design, and evaluation processes were mentioned. The researcher also mentioned that CA incorporates pragmatics of talk and provides a cumulative basis for different forms of abstraction.

Tuccio Ph.D. and Neville Ph.D (2017) aimed at developing a training program for student pilots based on real incidents of ATC communications and to increase flight instructor effectiveness. The researchers worked with naturally occurring data which is the excerpts from ATC communications taken places in real life commercial flights. Under the lens of Conversation Analysis, they looked closely at the conversation structures. Transaction initiation, presenting information, sets of turns, accepting information by participants etc. were considered while experimenting. Hence, the readback errors, callsign clearances, repetition and repairs were observed carefully. Through this research, Tuccio and Neville developed videos, PPT slides and recorded conversation samples to incorporate them with the more practical training program for the student pilots.

Neville (2007) conducted the research on temporal organization for interaction in Cockpit. Here he focused on turn-takings, overlapping and scripted procedural wordings of the communication between pilots and controllers on the ground to identify their roles in temporal order of the ATC communication. Turn-takings and overlapping in the communications were looked at from the perspective of CA. He used this method to inspect the data that were collected

from eighteen different flights from the Australian region. In the result, he demonstrated the rarity of overlapping in the ATC communications that are generally carried out strictly following rules under careful scrutiny. As the exchanges of information during the ATC communications remain explicit, direct and most of the time, properly scripted, overlapping can occur on a very minimum basis. The final result also showed the rare cases that hold some overlaps. These cases were considered to have possibilities of ending up in dangerous consequences if not repaired quickly. Therefore, repair was also taken into account while inspecting the datasets using CA.

Arminen, Auvien and Palukka (2009) focused on repairs or corrections in interactions between pilots and ATC in case of preventing accidents. The data used for the research was collected from more than seventy hours of communication held in simulated Airbus flights. Through Conversation analysis, the sequence formation was closely scrutinized. Besides, the researchers extensively looked at the causes of misunderstandings among pilots inside the cockpit. Also, the miscommunications and gaps in the interactions with ATCs were also inspected. The result of the research supported the multimodality and ATC communication's being increasingly technically assisted. Hence, the repairs are necessary for correcting human errors in communication as well as reducing the technical issues.

2.2 Aviation English and the significance of linguistic rules

In the field of aviation, language plays an instrumental role as the precision and explicit deliverance of information is regarded as an absolutely important factor in the process of flying. Here, the Aviation English developed with certain linguistic rules and regulations by ICAO is supposed to be used instead of regular plain English. Aviation English has been, therefore, extensively studied

by several researchers in order to have a clear idea about the part that the language plays up in the air.

Breul (2013) aimed at locating the glitches in aviation communication using pragmatic inference. Here, the sets of data were collected from various airline accidents and incidents including Kuala Lumpur crash and Miami Everglades accident. The mistakes took place while inferring meanings in the phonological, lexical and syntactical levels were closely scrutinized through using the relevance theory. Also, the exceptional rules in Aviation English to deal with prepositions, numbers and homophony were also considered for the research. Moreover, excessive mitigation on first officers' ends was discussed. The concluding remarks of the research showed that Relevance theory being concerned with the human cognitive system worked correctly in the utterance interpretations of Aviation English.

Estival, Farris and Molesworth (2013) executed a research on Native speaking pilots and pilots who speak English as the second language (ESL) where they focused on four predetermined hypotheses in case of ATC communication. The hypotheses included more information, less efficiency, no pause in radio communication leading to mistakes, workload and radio frequency problematizing smooth transition. Through the research they worked on proving these hypotheses correct. As the data set, they collected communication transcripts of flights regulated under simulators. Four different scenarios were taken into consideration in terms of traffic and other turbulences. The concentrated areas regarding the breakdown points were context, airspace, ATC phraseology, sequence, noise and its impact on performance, attention, memory and perception. The phonetic, semantic, syntactic and pragmatic differences as well as the standardized phraseology of the Aviation English were meticulously explicated by the researchers. In the final result, all four of the hypotheses were proved right considering the external and internal factors.

Krasnicka (2016) looked at historical turning points of aviation and some specific linguistic features that contributed towards the development of Aviation English. She discussed the ICAO regulations, Language proficiency requirements, and linguistic evaluations in the aviation field. The Chicago Convention signed back in 1944 by the member nations of ICAO started the process to establish English as the lingua franca in the airspace. However, after the convention, ICAO faced a number of issues and had to take new initiatives to solve them. Certain air accidents including the 1977 Tenerife air disaster, the PSA flight 182 accident in 1978, Avianca air crash in 1990 and so on concerned and encouraged ICAO to come up with definite linguistic rules to be used up in the air. On the 1st January 2008, all the member nations were officially ordered to start implementing the Language proficiency requirements decided by ICAO.

2.3 The fatality of miscommunication and misunderstanding during the information exchange episodes of aviation field

As mentioned before, all the airline personnel are bound to complete the language proficiency test executed on the basis of aviation English with a minimum result of level 4 on the ICAO certification. The significance of strictly following this version of English is directly related to the communicative aspect of the aviation field. Through very minute gaps and glitches in communications, several air accidents and incidents had taken place in the past. In order to place more emphasis on this aspect and to assist in reducing future probabilities of air disasters due to miscommunication, diverse studies have been carried out inside and outside of the aviation industry.

Hamzah (2018) concentrated on pilots and controllers who speak English as their second language, in this case the Malaysian crews. This research examined the communicative turbulence

by pinpointing the breakdown points of ATC communications. As the data, 30 hours of actual pilot-controller audio communication from the Malaysian airspace was recorded. Flights from three different frequencies: Alpha, Bravo and Charlie were taken into consideration to inspect different traffic situations. Through Conversation Analysis, the breakdown points were assessed by looking at the use of phraseology, code switching, readback error, mishearing, incorrect responses and poor language skill. The result showed the importance of the pilots' adherence to phraseology and standardized forms of Aviation English to avoid communication turbulence.

McMillan (1998) carried out an entire experimentation from the point of view of an Air traffic controller. The objective of this research was to investigate miscommunications between ATCs and pilots through focusing on various communicative areas. He considered the case of the Tenerife airport disaster of September 1997 as the main data here. He inspected the pilot-controller relationship, nature of language, situational awareness, phonemes, noise, speech, memory, expectations and efficiency of communication under ambiguity, verbal blends and absent-mindedness in the interaction. Speech act theory was implemented to carry out the overall research. Callsign confusion and code switching turned out to be the main contributors in most cases of miscommunications.

Fischer, Orasanu and Davison (1996) considered the misunderstandings between pilots and ATCs from different cultural backgrounds as the focal point of the study. The inferential approach was used here. The Tenerife airport disaster was considered for analyzing the deviation of phraseology as well as the radio squeal in party-line understanding of messages. Here, party-line refers to the radio situation where crews from more than one flight are connected through one radio medium. The Kuala Lumpur accident, Everglades crash and de-iced Air Florida incident were also considered in the data set for the research. The ultimate outcome of this research demonstrated the

contributions of deviation of aviation phraseology, partial readbacks, unfamiliar terminology, speech act confusion, being hesitant or vague and convoluted messages to air accidents and incidents.

Therefore, extensive research in different areas such as repair, overlapping, noise, attention deficiency, aviation phraseology, linguistic rules etc. have been executed. However, studies concentrating on topic construction and sequence formation have not been exclusively done by the previous researchers. In the ATC communications of both routine flights and airline crashes, these two areas are significant in determining the flow of information. Any error regarding topicality and sequencing can break the error-free transmission of information resulting in miscommunication. Under the above-mentioned circumstances, in the following chapter, the methodologies and tools used for the study are elaborated.

Chapter Three: Methodology

Background to the dataset: This research aims at explaining the role of miscommunication in the US Bangla flight 211 crash that took place on 12th March, 2018. The investigation focuses on the structures of sequence organization and topic construction in the conversation of the flight. It also focuses on the significance of the guidelines provided by the International Civil Aviation Organization for Aviation communication by elucidating the distinct linguistic items of ATC English. The researcher selected a qualitative method for completing the research. Here, the non-numerical data is analyzed to gather thorough understanding into the problem. The transcribed version of the particular flight's Cockpit Voice Recorder (CVR) is used as the main dataset for the study.

Figure.1: Cockpit Voice Recorder (CVR)

The Federal Aviation Administration (FAA) has strictly imposed the law for large commercial aircrafts, some smaller ones, corporate, and private aircrafts to be equipped with two black boxes or recorders. Both these recorders are installed to help in reconstructing the events that lead to aircraft accidents. Radio transmissions and pilot's voices as well as engine noises inside the cockpit are recorded by one of these named, Cockpit Voice Recorder (CVR). Following an

accident, both recorders are immediately removed from the accident site and transferred to The National Transportation Safety Board (NTSB) headquarters in Washington D.C. for processing. Using sophisticated computer and audio equipment, the information stored on the recorders is drawn out and translated into an intelligible format.

Data Collection: As a passive participant, the researcher collected the transcript form the Cockpit Voice Recorder Database. This database provides CVR transcripts of most of the aviation accidents and incidents that took place throughout history. The website, http://www.tailstrike.com houses the database which currently possesses 182 CVR transcripts from across the globe. As the researcher is not an airline personnel, it is not possible to work as an active participant in gathering the dataset. Generally in conventional cases of conversation analysis, tape-recorded or video-recorded data is supposed to be used. However, here for this study, the tape recorded data was not possible to accumulate. In the field of aviation, the CVR recordings are treated differently and more cautiously than the other factual information received in an accident investigation. Congress has required the Safety Board not to allow any part of a CVR tape recording to be accessed by the public or outside the field of aviation. The highly sensitive nature of the verbal communications inside the cockpit is the central reason behind it. Hence, the transcribed dataset which is available in the aforementioned website was considered to inspect for this study.

Methodology and tools used for data analysis: After collecting the set of data, the researcher first focused on the sequence organization and topic construction of the conversation using the methods of Conversation Analysis (CA). After that, the conversation was evaluated through applying the linguistic elements of Aviation English and considering read backs and cockpit insider coordination involved in the ATC communication. The distinct nature of Aviation English falls into the category of English for specific purposes (ESP). However, this research will

not consider ESP as the main focus is on the communication errors. The conversation has three parts including the initial part associating the take-off phase held among the captain, the first officer, US Bangla Operations and Dhaka tower, the second part held between the captain and the first officer inside the cockpit and the third part associating the captain, the first officer and the Kathmandu tower concerning the landing of the aircraft. These three phases, henceforth, were scrutinized under two different theoretical lenses, the first one being CA and the second one is Aviation English and ATC communication.

Sequence Organization: In social interactions, interlocutors convey their messages to each other following a certain sequential order. Sequence organization includes the ways in which turns-at-talk are ordered and combined to make actions take place in conversation, such as requests, offers, complaints, and announcements (Schegloff, 2007). It helps participants to accomplish and coordinate in any interactional activity. Adjacency pairs work as the primary units of conversational organizations. These pairs assist shaping the sequential formation of any interaction that contains an exchange of one turn each by two participants. The two different utterances are deemed as first pair part (FPP) and second pair part (SPP). The organization of adjacency pairs can facilitate creation of sequences of various sizes (Schegloff, 2007). It works as a center of relevance rules. It is considered as a conditional relevance rule that relates the first pair part and second pair part (Schegloff, 2007). These are interrelated and an FPP always requires an SPP. Another important element in sequence organization is sequence expansion. Three types of expansions can take place based on their position in the adjacency pairs: pre-expansion, insert expansion and post expansion. These expansion sequences are found to be in the service of the base sequence in some crucial ways. A pre-sequence comes along with any preliminary action that is necessary before starting an FPP. This preliminary action generally involves an adjacency pair.

Insert sequences are typically concerned with repairing some aspect of an FPP or can be concerned with eventualities on which an SPP might depend. Post sequences are concerned with repairing some aspect of an SPP, following additional information or proposing sequence closure.

Topic Construction: A conversation moves forward with the interlocutors' introducing diverse topics within their talk. Sometimes, some conversations can only hold one particular topic but often, in bigger linguistic interactions, topics are found to be altered and new topics are introduced. One common sense notion, shared by professionals, is that the "topic" in a conversation is what the conversation is "about" (Maynard, 1980). According to Schegloff and Sacks, "Conversationalists 'fit' their current utterance to the utterance of the prior speaker. Through looking at the topic constructions, the coordination and comprehensibility among the participants can be spotted." At times, new topics can be inserted by one participant while the other participant is in need of a response regarding the previous topic. This can lead to a haphazard flow of information and in fact, in the field of aviation, this can lead to a grand scale of misunderstandings among the interlocutors resulting in mishaps.

***ATC communication and aviation English*:** In the field of aviation, communication plays a seminal role to ensure the safety of the passengers boarded on the aircrafts. Among different kinds of communicative exchanges, the conversations held inside the cockpit are very crucial. Communications between the pilot and co-pilot as well as among the pilots and Air Traffic Controllers (ATC) are included in ATC communication. According to Aviation Safety Reporting System, "Incorrect or incomplete pilot-controller communication is a causal or circumstantial factor in 80 percent of incidents or accidents." Here, the basic structure is composed of request, instruction and confirmation when it comes to conversing with the ATCs. Sometimes, the instructions can be followed by further requests or additional instructions not necessarily following

the rigid arrangement. However, the confirmation plays an important role by generating correct read backs. Read-back is defined as a procedure whereby the receiving station repeats a received message or an appropriate part thereof back to the transmitting station so as to obtain confirmation of correct reception (ICAO Annex 10 Vol. II).

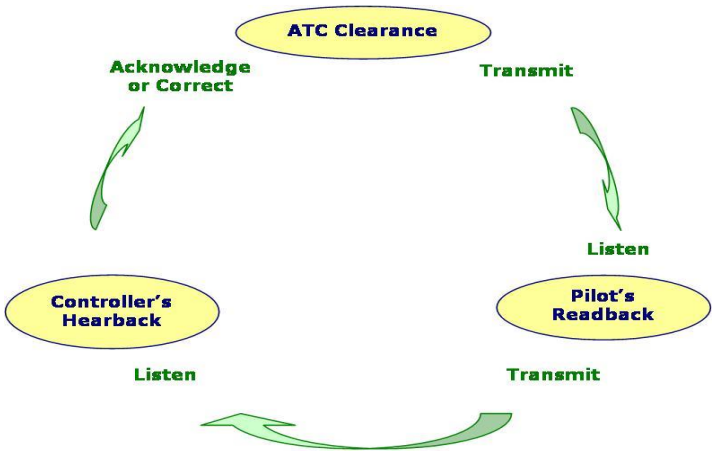

Figure.2: Role of Read-backs/Hear-backs in Pilot-ATC Communication Loop

For example, "Dhaka Tower: 0650:25.7 BS211 clear line up runway 14.

FO: 0650:30.4 Clear line up, clear line up runway 14, BS211."

In this instance, the First Officer (FO) repeats the information after the ATC to confirm the correct read-back. In terms of cockpit coordination, the captain and first officer should be clear and concise in communicating with each other. All the way, the use of standard phraseologies and jargons from Aviation English is required. In accordance with Skybrary, “Standard phraseology reduces the risk that a message will be misunderstood and aids the read-back/hear-back process so that any error is quickly detected.” One of the frequent and causal contributors to aircraft accidents and incidents is the use of ambiguous or non-standard phraseology. Phraseologies are formed by different words

and lexical items that collectively convey a meaning different from the regular uses of those items combined. Standard phraseologies can be altered with plain English in the times of turbulence but the foremost requirement is to follow the scripted way of information exchange. However, like so many other industries, aviation has its own use of jargon. These are words that are designed to be specific to people within the chosen industry or field they operate within (O'Loughlin, 2017). The aviation codes, jargons and phraseologies that were used in the flight conversation are added in the appendix section.

Implementing the aforementioned theoretical tools, the dataset was studied in fragments. The researcher assessed the possible mismanagements in the transcript in terms of sequence organization, topic construction, read-backs, cockpit coordination and use of aviation English. The errors in each fragment were separately scrutinized before accumulating them together. The detailed procedure of data analysis and findings are described in the next chapter.

Chapter Four: Data Analysis

The CVR transcript of US Bangla 211 was analyzed using the methods of Conversation analysis, aviation English and ATC communication. This chapter presents the analysis of the data by providing the excerpts and base sequences from the transcript that possess possible inaccuracies. These extracts were separately assessed using the methodologies mentioned. The fragments of data are directly copied from the main transcript, omitting the parts that are free of any apparent error. Here, the descriptions in capital letters within square brackets indicate the audio cockpit warnings and the times are in Coordinated Universal Time (UTC) format. The aviation codes and phraseologies are marked by the (*) symbol.

Sequence organization: The opening of the CVR transcript shows the initial part of the conversation that takes place between the first officer and the ATC of Dhaka tower. The pilot in command (PIC) interrupts the first officer after she (FO) informs the ATC of the aircraft's position and opens the ground for receiving instruction. With the interruption, a new adjacency pair starts without finishing the former. Besides, the captain inserts non-relevant utterances in the middle of the consecutive pairs. Whereas linguistics and psychology have largely maintained an exclusive focus on the composition or design of the singular utterance conceptualized as a phrase or sentence, CA views the positioning of an utterance in the ongoing conversation as fundamental to the understanding of its meaning and to the analysis of its significance as an action (Schegloff, 1984). The concept of the adjacency pair begins with the observation of 'nextness ' and its corollary that each utterance has a reflexive relationship with what comes prior, and with what comes next (Sacks, 1992, pp: 32 – 43; Schegloff, 1968, 2007). Therefore, the gaps in terms of adjacency pairs promote the misinterpretations of instructions inside the cockpit.

Extract from the conversation during the take-off

1. FO*: 0636:20.2 Dhaka Ground BS211 good afternoon

2. Dhaka Ground: 0636:20.2 BS211 good afternoon, go head ma'm

3. FO: 0636:34.8 BS211 standing at 28 South flight for KTM* FL 240*

4. PIC*: 0642:24.0 do you have the ADC* number? (Bangla)

5. FO: 0642:25.9 No Sir, I have one number 2177

6. PIC: 0642:25.9 Operations, BS211, how long will you take to respond, I want the

7. ADC and FIC*. (Angry tone)

8. OPS: 0643:31.5 KTM FIC for 211 is 1171 ADC KX 848 and for 212 FIC

9. PIC: 0643:39.7 I don't want f–k 212, I want 211 (Very angry) … I don't want to f–k you,

10. read you, again? Keep your f—ing mouth shut.

……..

13. PIC: 0650:16.0 Don't be scared, I am going to stay for another 3 months, I am

14.going to f–k these people right and left.

15. Dhaka Tower: 0650:25.7 BS211 clear line up* runway14

16. FO: 0650:30.4 Clear line up, clear line up runway 14, BS211

……

24. FO: 0652:57.5 Recleared to 240, we'll call out of 4,000

25. PIC: 0653:31.5 Even I am abusing others, you don't be afraid, Buri, I am addressing you

26. as Buri to show my affection for you. (Bangla)

27. PIC: 0656:14.5 Operations BS 211?

28. OPS: 0656:17.5 BS 211 Operations, go ahead Sir —

29. PIC: 0656:32.5 Why the hell you need the onboard fuel? Why do you ask me the onboard 30.fuel? Tell me the reason you want to do with onboard fuel, let me know now … I want 31.written f—ing explanation before I come back to Dhaka

32. OPS: 0659:27.5 Copied Sir, Wilco*, Safe flight Sir

33. PIC: 0659:34.5 I don't f–k care about the safe flight, you f–k your duty … Don't talk to 34.me unless I call you.

35. PIC: 0700:04.5 Okay, after takeoff checklist done? (Normal tone)

36. FO: 0700:07.5 Sir, yes, Sir done.

The opening adjacency pair is interposed by the pilot in command in line 4. As a result, the pair is left unfinished while another new pair is initiated in the same line. After that, the first pair parts and second pair parts of the following adjacency pairs co-exist in correct form until line 13. In line 8, the operations provide more than necessary information which invites a post expansion from the PIC in the following line that brings a closure to the pair. In lines 13 and 14, the PIC's comment does not welcome any second pair part from the FO. However, it can imply that the FO must have been scared at the PIC's abusive words which is later minimized by the PIC's remark, "Don't be scared, I am going to stay for another 3 months, I am going to f–k these people right and left". In line 25, the PIC inserts a fairly unrelated statement which does not have any connection with the first officer's (FO) previous utterance. Although in line 32, the US Bangla operations apparently closes the adjacency pair, the following line shows another unnecessary post expansion from the PIC.

The initial extract from the cockpit insider conversation

37. PIC: 0700:09.5 Mother f—er, piglets, son of bitch (Bangla, low voice)

38. PIC: 0715:33.5 (Paraphrased and shortened from transcript) Lamia was the worst trained in
39. US-Bangla, now in Biman Bangladesh talks ill of US- Bangla instructors including me. They
40. said we f—ed in the cockpit. Lamia is not even worth approaching, she is ugly, fat with
41.obnoxious appearance…what the f–k is she, the beauty queen of the world? My wife is far
42.more beautiful, I don't need Lamia. If I intend to buy sex, I can do that with 100 dollars.

……

46.FO: 0715:33.5 Oh no, oh my God.

47. PIC: 0717:40.5 That f—er, that son of a gun, bitch, she asked to fly 100 hours with me. With
48. no intention that she has big boobs nor she would do sex with me. If I want to f–k her, I can
49. f–k her in the hotel.

…….

52. FO: 0720:46.5 Sir, shouldn't I switch on the radar*?

53. PIC: 0804:52.5 That f—er Lamia, she made me… look at my f—ing eyes… weeping …
54. crying… where did I do mistake (crying)? I take the blame and resigned. What is my next
55. source of income? At least look at me f—er (crying and blowing nose) Do I need to cry
56. like this?

57. FO: No, no Sir.

58. PIC: Look at me now (crying, choking and blowing nose). So, it is my problem that I have
59. not been able to teach you.

60. PIC: 0806:08.5 Okay, let us do the descent checklist* (Bangla).

61. FO: Yes Sir, it is time (Bangla)

62. PIC: 0806:55.5 I have suffered a lot, my child (bursts out crying, blowing nose)

63. FO: Sir, please forget. The God is above us. Even if you find it hard to forgive her, please

64. forgive her.

65. PIC: How can I forgive her. The girl for whom I have taken so much pain. We don't know

66. f–k how do I accept that, tell me (crying and blowing nose)

In line 37, the PIC starts complaining about his resignation and how unjustly he has been blamed. After a long ranting, (which, according to the official order of information exchange, should not occur here) in line 46, the FO expresses her concern by stating, "Oh no, oh my God". The PIC does not seem to follow along and continues to complain. This hampers the continuity of the sequence. In line 52, the FO brings the topic of her concern, "Sir, shouldn't I switch on the radar?" In reply the PIC must have acted accordingly as the base pair is closed here. However, in line 53, the PIC resumes the ranting and the FO complies with him so that he can let go of the topic. In line 62, the complaining returns with a new pair. As an SPP, the FO consoles the captain but he goes on complaining as the post expansion sequence.

The conversation during the descent involving the Kathmandu ATC

69. PIC: Ask, request for descent*

70. FO: 0807:49.5 Kathmandu, BS211 ready for descent

71. KTM Control: 0807:49.5 BS211, descend to FL 160

72. PIC: 0810:17.5 Do you know that I have not slept during the whole night and I cried a lot

73. (Bangla). I have received so much pain … you have seen me now. I have cried enough my

74. daughter, cried a lot.

75. KTM Approach: 0813:41.5 BS211, Reduce to minimum speed* and descend to 12,500 ft

76. FO: 0813:45.5 Descend to 12,500 and reduce speed to minimum BS211

……

79. PIC: 0819:03.5 I have dropped my cigarette, let me find the thing, do you know where I
80. have dropped it … it is on the left. There is possibility of catching fire.
81. FO: 0819:22.5 Sir, we are getting into cloud.
82. PIC: Forget it. Okay adjust the pitch control of Weather Radar … Okay we don't need this
83.now out of cloud (Bangla) … Why are you holding the power levers*? I am the pilot
84.flying, idiot, I should be holding. What is our QNH*1015 okay? Okay put your HDG bug* on top.

In this extract, from line 69 to 71, the conversation flows smoothly in a primary base sequence. In line 72, the PIC brings back the topic of his resignation starting another pair but before the FO can retaliate, KTM tower provides instruction which begins a new base sequence. In line 79, the PIC talks about a different matter (his cigarette) which is apparently not complied by the FO. In line 81, the FO presents her query at which the PIC responses in the line that follows.

Extract from the conversation held during the landing at Kathmandu

109. KTM Tower: 0826:33.5 BS211, wind 220 degrees 7 knots, tail wind component* 6
110.knots, runway 02, clear to land. [EGPWS* SOUND] ["TOO LOW-GEARS"] [GEAR UNSAFE WARNING CONTINUES]
111. FO: 0826:37.5 Clear to land, BS211.
[GEAR UNSAFE WARNING] ["TOO LOW – GEAR"] ["TERRAIN"*]
……..
119.KTM Tower: 0827:43.5 BS211, Tower…. you were given landing clearance to runway 02
120.PIC: 0827:45.5 Affirmative* Ma'am
121.KTM Tower: 0827:48.5 You are going towards Runway 20

122.PIC: 0827:53.5 I think we are going to Runway 02

123.KTM Tower: 0828:01.5 Ok, BS211, runway 20 clear to land

124.PIC: 0828:03.5 Clear to land

125.PIC: 0828:08.5 Can we see the Runway? We have set up everything, all done but we are'nt

126. seeing the Runway

127. FO: No.

With the instruction from KTM Tower in line 109, primarily the information sequence creates a regular adjacency pair up to line 111. In line 119, the KTM tower initiates another base sequence to which the PIC responds in the next line. In line 121, the KTM tower inserts a post expansion concerning the misinterpretation of runway number on the flight crews' end. Line 123 shows the lack of comprehensibility of the KTM tower about the PIC's response and decides to introduce a new instruction. In the next line, the PIC closes the post expansion sequence. Another base sequence gets initiated and closed in the following line between the PIC and the FO.

Extract from the information exchange before landing

157.KTM Tower: BS211 runway ah..clear to land…runway is vacated. Either runway 02 or 20.

158. Confirm you need vector*? ["BANK ANGLE, BANK ANGLE"]

159.PIC: 0832:07.5 Sir, we would like to land RW 20 ["BANK ANGLE, BANK ANGLE"]

160.KTM Tower: 0832:09.5 Ok, runway 20 clear to land. Wind 270 degrees 6 knots

161.PIC: 0832:10.5 260 copied clear to land.

…….

166. (Unidentified voice in Nepali:) 0832:31.5 *gayo jasto cha khoi?*

167. (where is it?)

168. KTM Tower: 0832:38.5 BS211, confirm you have air… runway in sight?

169. PIC: 0832:40.5 Negative* Sir.

The pre-expansion sequence in lines 157, 158 and 159 leads to the base sequence. The instruction in 160 given by the KTM tower is totally misunderstood by the PIC as in line 161, an unidentified voice in Nepali expresses doubt and confusion regarding the aircraft's position. In line 169, the PIC confirms the misinterpretation by stating that he does not have any runway in sight.

Extract from conversation before the crash

178. (Unidentified voice in Nepali): 0833:11.5 *Jahaj dekhira Chaina? Dekhira chha Sir.*

179.*Downwind ma chha. Tei ta, yo ta purai almaliyo. Pheri orbit garyo Sir.* (Can you see the

180. plane? Yes, he is downwind, it is completely confused. He is making another orbit*, Sir.)

181. PIC: 0833:23.5 Have you given 022 [RADIO ALTIMETER CALL* "100,

[MINIMUMS*]

182. KTM Tower: 0833:26.5 BS211, that is not the runway… over…that's not the runway.

183.BS211, that is not the runway I say again. Take off clearance cancelled. [EGPWS "SINK RATE, PULL UP]

184. PIC: 0833:35.5 We have the runway in sight Sir. Are we cleared to land?

185. FO: 20 … Oh my God, Sir ["BANK ANGLE"]

186. KTM Tower: BS 211, I say again turn … ["BANK ANGLE*, BANK ANGLE,

BANK ANGLE, SINK RATE, SINK RATE"] ["50"] ["BANK ANGLE, BANK ANGLE"]

187. FO: 0834:04.5 Sir! Sir! (Very alarmed)

Closing: Miscommunication through the inaccuracies in sequence organization keep continuing with the lack of cohesion. In line 181, the PIC asks the ATC if the instructed runway number is

022, whereas they were given clearance to land on runway 20 in line 160. In the following two lines the ATC repeatedly warns the aircraft not to land on the runway in sight but in line 184, the PIC asks the permission to land as the SPP. In the closing line, the FO's alarmed call "Sir! Sir!" ends the conversation thus, leaving it interrupted and unfinished.

Topic Construction: Topical talk often proceeds by one person being the speaker of the topic and the other being the recipient. Topic changes take place when the recipient decides to shift to another matter or sometimes, the speaker's utterance brings a closure to the current topic. In certain portions of the target transcript, the topic transactions do not occur smoothly and naturally. It results in haphazard communication among the interlocutors. At times, the PIC happens to insert irrelevant topics or continue the previous topics although new topics are introduced by the FO or the ATC. The sudden and non-cooperative shifts in topic construction make the sequence organization quite disorderly as well.

From the beginning of the recording, the topics smoothly evolve with proper coordination among the interlocutors. In line 37, the PIC introduces the topic that is totally outside the realm of the cockpit information exchange. This topic change hampers the communicative aspect as the FO does not comply with the PIC. In lines 46 and 52, the FO introduces new topics to which the PIC does not reply in words but in possible actions aligned with the queries. In line 53, the PIC reintroduces the similar topic complaining about his resignation. It continues until line 59 with the brief response from the FO along the way. Although the topic of descent checklist is initiated at 0806:08.5, the captain once again goes back to his previous topic in the very next instant. This goes on for another 4 lines. In line 67, the PIC initiates a new topic related to the landing procedure. However, in line 72, he again goes back to the previous topic which does not continue for long as the Kathmandu ATC provides a new instruction. In line 79, another irrelevant topic regarding the

captain's cigarette is inserted but is interrupted by another topic in the following line. After that, any arbitrary topic construction cannot be spotted as the topic transitions that follow proceed according to the necessities regarding the landing procedure.

Aviation English and ATC communication: According to the aviation linguistic rules, certain phraseologies and codes or jargon are supposed to be used by the flight crews and ATCs during the communication. In the conversation of US Bangla 211, the use of phraseologies and jargons are quite correctly and systematically implemented. The explanations of the jargon and scripted phrases used in this flight conversation are added in the appendix section. However, the code switching portions of the communication between the PIC and the FO inside the cockpit and during the landing can be considered to be problematic as through the party-line communication other pilots could not grasp the meaning of their confusions. The party line refers to the open radio channel through which all aircraft in a given airspace communicate with air traffic control, a system that allows pilots to hear both their own clearances as well as those of the other aircraft (Hodgetts et al., 2006). If the flight crews from US Bangla 211 did not switch codes more often, the gaps and confusions emerging in the cockpit insider conversation could have been corrected or at least acknowledged by the other flight crews. Under the light of ATC communication, the researcher scrutinized the basic structures of the instruction transmission to evaluate the read-backs and cockpit insider coordination. Certain errors were spotted in both the sectors.

Read-back: Read-back is an information confirmation procedure where the receiver must repeat the instructions or information given by the speaker to make sure the comprehension is correct. It happens on the syntactic level where the receiver has to repeat the whole sentence or phrase that is said. In the transcript, initially the read-backs are performed neatly by the air crews as well as

the ATCs. Yet, when the confusion during the transmission of landing instructions emerged, the erroneous read-backs in certain crucial situations were detected.

109. KTM Tower: 0826:33.5 BS211, wind 220 degrees 7 knots, tail wind component* 6

110. knots, runway 02, clear to land. [EGPWS SOUND] [“TOO LOW-GEARS”] [GEAR UNSAFE WARNING CONTINUES]

111. FO: 0826:37.5 Clear to land, BS211

Here, the read-back from the FO in line 111 should have included the runway number instructed by the KTM tower but she only goes with “clear to land”. This tiny mistake leads to more confusion between runway 02 and 20.

119. KTM Tower: 0827:43.5 BS211, Tower…. you were given landing clearance to runway 02

120. PIC: 0827:45.5 Affirmative Ma’am

121. KTM Tower: 0827:48.5 You are going towards Runway 20

122. PIC: 0827:53.5 I think we are going to Runway 02

123. KTM Tower: 0828:01.5 Ok, BS211, runway 20 clear to land

124. PIC: 0828:03.5 Clear to land.

The KTM tower begins with the clearance to land on runway 02 but the PIC provides a vague read-back in line 122. In the following line, the KTM tower misinterprets the read-back and provides another confusing instruction. In line 124, the PIC makes the same mistake as the FO in line 111 by excluding the runway number in the read-back.

134. PIC: 0829:09.5 I would like to land on 02.

…….

137. KTM Tower: 0829:20.5 BS211, join the… (Garbled) … right downwind* runway 20.

138. PIC: 0829:21.5 Copied.

This entire extract is permeated with muddled read-backs. First the PIC states that he would like to land on runway 02 to which the ATC introduces a command quite opposite of that implying a wrong hear-back. In reply, the PIC simply states, “copied” again, without mentioning the runway number. After a few moments, the ATC once again changes the instruction by shifting the runway number from 20 to 02. The PIC in the similar tone, provides an inadequate read-back, “copied” in the ensuing excerpt.

142. KTM Tower: 0830:12.5 Join left … right downwind, runway 02 … BS211, I say again, do

143. not proceed towards runway 20. Clear to hold your present position.

144. PIC: Copied Sir.

Similar mistake of not repeating the runway number as instructed was located once again in the following transmission. The PIC also misinterprets the wind degrees to be 260 whereas it is instructed 270 by the ATC.

160. KTM Tower: 0832:09.5 Ok, runway 20 clear to land. Wind 270 degrees 6 knots

161. PIC: 0832:10.5 260 copied clear to land.

When the confusion regarding the correct number of the runway reaches its peak, the ATC omits the number in providing read-back and clearance.

174. PIC: 0832:47.5 Affirmative, we have runway in sight, request clear to land Sir

175. KTM Tower: 0832:52.5 BS211 Cleared to land.

Finally, the KTM tower changes the instruction at the last minute when the PIC cannot comply with it anymore. Instead of providing a read-back, he pursues asking for the permission to land.

183. KTM Tower: BS211, that is not the runway I say again. Take off clearance cancelled. [EGPWS "SINK RATE" PULL UP. PULL UP]

184. PIC: 0833:35.5 We have the runway in sight Sir. Are we cleared to land?

185. FO: 20 … Oh my God, Sir ["BANK ANGLE*"]

Cockpit Insider Coordination: Problems of team interaction often result from unclear distribution of duties, ambiguous human behavior, too much respect for the superior or elder colleague and an underdeveloped ability to deal with criticism (Dehning, 2001). The cockpit coordination thus, works as a very crucial factor in the smooth transition of communications in aviation. In the dataset, the lexical and semantic coordination between the PIC and the FO is extremely garbled during the cockpit insider talks. From line 37 up to line 79 of the transcript, the PIC constantly expresses irrelevant issues of his resignation, of the girl who was responsible for his downfall and even at one point he talks about dropping his cigarette. No response or understanding is seen on the FO's end. Even after the ranting session, the lexical coordination between the crews is obscured which is clearly apparent in the following fragment showing the absence of the harmony between words and actions.

90. PIC: 0823:00.5 Flaps 15 … Do the Before Landing Checklist … Do it

……

94. PIC: 15 set

95. FO: Sir, not yet set [LANDING GEAR* UNSAFE WARNING] …Sir, Speed, Speed, Speed

96. PIC: No worry, no worry.

Similar to the former occurrence, the comprehension among the lexical items uttered by the interlocutors is muddled in the brief transmission below.

105. PIC: 6,640 So let me increase the ROD

106. FO: Yes Sir, the ROD needs to be increased … 4 DME, Sir we are 600 ft high

107. PIC: I do not understand what you are saying, say slowly. (Bangla)

Findings

The analysis shows that the opening of the conversation between Dhaka tower and the first officer starts on a correct note. After the first pair part, the adjacency pair gets interrupted by the Pilot in command. The pilot in command, aka the captain, faces several verbal clashes with US Bangla operations and also the Dhaka ATCs in the instances that follow. Besides, inside the cockpit, he struggles to sustain the cohesion among the sequences of the conversation between him and the first officer. The topic construction gets equally hampered along the way. Due to the lack of understanding and interrelatedness in the communication, the overall coordination gets impeded. This leads to the haphazard comprehension of the numerical data regarding the runway number when the Kathmandu ATC instructs it. Consequently, the whole set of instructions and information during the landing end up being utterly confusing. However, in terms of codes and phraseologies of aviation English, no particular gap can be spotted as both the air crews and ATCs maintain the linguistic rules as well as the scripted use of aviation English. Still, in case of party-line communication, the frequent code switching between the PIC and FO poses a hurdle as pilots from other aircrafts could not come to any assistance because of it. However, due to certain incorrect and vague read-backs and the muddled nature of cockpit insider coordination, the overall communication gets thwarted and leads to the crash.

Chapter Five: Conclusion

This research projected the vital impact of communication in aviation and its role in the ultimate safety of this field. The sequence organization, topic construction, aviation phraseologies, jargons, read-backs and cockpit insider coordination reveal the glitches in the target flight conversation disclosing their possible contribution towards the air crash. The adjacency pairs show the absence of cohesion along with the instances of verbal clashes among the interlocutors. The topic construction process faces many hurdles including the arbitrary shift of topics and lack of comprehension. The read-backs possess inadequacy and erroneous utterances on both ATC and pilot's ends. Moreover, the Lack of attention, misinterpretation and the additional deficiencies in information exchange inside the cockpit result in the subsequent accident.

Limitations of the Study

This research has two notable limitations. In case of the studies concerning conversation analysis, the dataset is supposed to be audio or video recorded and later transcribed through following the Jeffersonian method. However, because of the strict law imposed by Congress regarding the disclosure of the verbal communications inside the cockpit, the researcher, not being an aviation personnel, had to work with the transcribed version instead of the audio or video recorded dataset. Besides, in Bangladesh, very little to no study has been conducted in aviation linguistics and ATC communication. Hence, any locally sourced information or related details could not be accumulated for this research.

Recommendations for Future Works

The research findings expand the literature body in this area introducing the problem in the Bangladeshi region; the results will guide future research of the same interest. Moreover, the findings will emphasize deeper understandings and further studies in the realm of aviation linguistics as well as communication. As this research has focused on the conversation of an air disaster, future studies can be conducted on the communication aspects of routine flights with apparently no fatal consequences to develop a broader perspective in this field. Moreover, the future researchers can study in what ways CA tools can be used to comprehend the ATC communication. They might test the accuracy of identifying the possible glitches of the aviation conversations through analyzing topic construction and sequence organization.

References

Albert, S. (2017). Research Methods: Conversation Analysis. Research Gate publication.

Alderson, J. C. (2009). *Air safety, language assessment policy and policy implementation: the case of aviation English*, 168–187.

Arminen, I., Auvien. P., & Palukka, H. (2009). *Repairs as the Last Orderly Provided defense of Safety in Aviation.* Research Gate publication.

Barshi, I. & Farris, Candace. (2013). Misunderstandings in ATC communication: Language, cognition, and experimental methodology. 1-252.

Breul, C. (2013). Language in Aviation: The Relevance of Linguistics and Relevance theory. *LSP Journal, 4:* 1-16.

Byron, B. (1997) Air traffic clearances: what you heard may not be correct. Asia-Pacific Air Safety, July, Issue 15, pp 14-16. BASI, Canberra.

Cookson, S. (2009). Zagreb and Tenerife: Airline accidents involving linguistic factors. *Australian Review of Applied Linguistics.* 32(3), 22.1-22.14.

Cushing, S.(1994). *Fatal words: communication clashes and aircraft crashes.* Chicago: University of Chicago Press.

Dehning P. (2001) Crew Coordination in Aviation. In: *Steiger HJ. Uhl E. (eds) Risk Control and Quality Management in Neurosurgery*. Acta Neurochirurgica Supplements, vol 78. Springer, Vienna. https://doi.org/10.1007/978-3-7091-6237-8_6

Estival, D., Farris, C., & Molesworth, B. (2013). In *Aviation English: A Lingua franca for Pilots and Air Traffic Controllers.* Chapter: 7: 140-183.

Fischer, U., Orasanu, J., & Davison, J. (1996). *Cross-cultural Barriers to Effective Communication in Aviation.* Research Gate publication.

Hamzah, H. (2018). Miscommunication in Pilot-controller Interaction. *3L: The Southeast Asian Journal of English Language Studies. 24(4):* 199 – 213.

Hodgetts, H. et al. (2006). *The effects of party line communication on flight task performance.*

Howard, J. W. (2008). Tower, am I cleared to land? : Problematic communication in aviation discourse. *Human Communication Research.* 34(1991), 370-391.

International Civil Aviation Organization (2009) Safety Management Manual (SMM). *Montréal: International Civil Aviation Organization.*

Linde, C., & Goguen J.A. (1984). *Linguistic Methodology for the analysis of Aviation Accidents.* Research Gate publication.

Jones, R.K. (2003). Miscommunication between pilots and air traffic control. Language Problems & Language Planning. 27(3), 233-248.

Kraśnicka, I. (2016). English with Flying Colors: The Aviation English and the International Civil Aviation Organization. *Studies in Logic, Grammar and Rhetoric* 45 (1):111-124. DOI 10.1515/slgr-2016-0019

Krifka, M., Martens, S. & Schwarz, F. (2003): Group interaction in the cockpit: some linguistic factors. In Dietrich (ed.) 2003: 75-101.

Mauranen, A. (2006). Signaling and preventing misunderstanding in English as lingua franca communication. *International Journal of the Sociology of Language.* 123-150.

McMillan, D. (1998). *Say Again? Miscommunications in Air Traffic control.* Queensland University of Technology.

Nevile, M. (2013). Conversation analysis and cockpit communication. In C. A. Chapelle (Ed.), *The encyclopedia of applied linguistics*. Hoboken, NJ: Blackwell Publishing Ltd.

Neville, M. (2007). Talking without Overlap in the Airline Cockpit: Precision timing at work. Research Gate publication.

Sacks, H., Schegloff, E., & Jefferson, G. (1974). A Simplest Systematics for the Organization of Turn-Taking for Conversation. *Language,* 50(4), 696-735. doi:10.2307/412243

Schegloff, E. (2007). Sequence Organization in Interaction: A Primer in Conversation Analysis. Cambridge: Cambridge University Press. doi:10.1017/CBO9780511791208

Sexton, J. B., & Helmreich, R. L. (2003) Using language in the cockpit: Relationships with workload and performance. *Communication in high risk environments,* 12, 57-74.

Sidnell, J., & Stivers, T. (Eds.). (2013) The Handbook of Conversation Analysis. *Wiley-Blackwell.* DOI:10.1002/9781118325001

Sprogis, H. (1997) Deadly misunderstandings of English in aviation. Proceedings of the Twenty-eighth International Seminar of the International Society of Air Safety Investigators, Anchorage, Alaska, September 28 - October 3.

Tajima, A. (2004): Fatal miscommunication: English in aviation safety. World Englishes, 23(3): 451-470.

Tattersall, A. (1998) Individual differences in performance. In *Smolensky, M. and Stein, E. (eds.) Human Factors in Air Traffic Control*, pp. 185-213. Academic Press, San Diego.

Tuccio, W. A. Ph.D., Neville, M. Ph.D. (2017). Using Conversation Analysis in Data driven Aviation Training with Large-scale Qualitative datasets. *Journal of Aviation/Aerospace Education & Research. 26:* 1-48.

Weick, K. (1990) The vulnerable system: an analysis of the Tenerife air disaster. *Journal of Management*, Vol.16, No.3, pp. 571-593.

Appendices

CVR Transcript of US Bangla Flight 211

1. FO: 0636:20.2 Dhaka Ground BS211 good afternoon

2. Dhaka Ground: 0636:20.2 BS211 good afternoon, go head ma'm

3. FO: 0636:34.8 BS211 standing at 28 South flight for KTM FL 240

4. PIC: 0642:24.0 Do you have the ADC number? (Bangla)

5. FO: 0642:25.9 No Sir, I have one number 2177

6. PIC: 0642:25.9 Operations, BS211, how long will you take to respond, I want the

7. ADC and FIC. (Angry

tone)

8. OPS: 0643:31.5 KTM FIC for 211 is 1171 ADC KX 848 and for 212 FIC

9. PIC: 0643:39.7 I don't want f–k 212, I want 211 (Very angry) … I don't want to f–k you,

10. read you, again? Keep your f—ing mouth shut.

11. PIC: 0650:10.5 Got the clearance?

12. FO: 0650:09.1 Yes sir, line up is due.

13. PIC: 0650:16.0 Don't be scared, I am going to stay for another 3 months, I am

14. going to f–k these people right and left.

15. Dhaka Tower: 0650:25.7 BS211 clear line up runway14

16. FO: 0650:30.4 Clear line up, clear line up runway 14, BS211

17. PIC: 0651:03.5 Bismillah, have we done the takeoff checklist? (Bangla)

18. FO: 0651:40.5 80 kts, power set, V1 rotate, positive rate

19. PIC: 0652:32.5 Look out for 23.birds

20. PIC: 0652:44.9 Autopilot engaged, 1,000, turning right. Perform the flow check (Bangla)

21. Dhaka Tower: 0652:49.9 BS211 airborne 52, call turning right

22. FO: 0652:46.4 We are turning right 28.BS211

23. Dhaka Tower: 0652:57.5 Roger re-cleared to 240, call passing

30.4,000

24. FO: 0652:57.5 Recleared to 240, we'll call out of 4,000

25. PIC: 0653:31.5 Even I am abusing others, you don't be afraid, Buri, I am addressing you

26. as Buri to show my affection for you. (Bangla)

27. PIC: 0656:14.5 Operations BS 35.211?

28. OPS: 0656:17.5 BS 211 Operations, go ahead Sir —

29. PIC: 0656:32.5 Why the hell you need the onboard fuel? Why do you ask me the onboard

30. fuel? Tell me the reason you want to do with onboard fuel, let me know now … I want

31. written f—ing explanation before I come back to Dhaka

32. OPS: 0659:27.5 Copied Sir, Wilco, Safe flight Sir

33. PIC: 0659:34.5 I don't f–k care about the safe flight, you f–k your duty … Don't talk to

34. me unless I call you

35. PIC: 0700:04.5 Okay, after takeoff checklist done? (Normal tone)

36. FO: 0700:07.5 Sir, yes, Sir done

37. PIC: 0700:09.5 Mother f—er, piglets, son of bitch (Bangla, low voice)

38. PIC: 0715:33.5 (Paraphrased and shortened from transcript) Lamia was the worst trained in

39. US-Bangla, now in Biman Bangladesh talks ill of US- Bangla instructors including me. They

40. said we f—ed in the cockpit. Lamia is not even worth approaching, she is ugly, fat with

41. obnoxious appearance…what the f–k is she, the beauty queen of the world? My wife is far

42. more beautiful, I don't need Lamia. If I 53.intend to buy sex, I can do that with 100 dollars.

43. Because of the mother f—er Lamia, only Lamia, I decided to resign. She talks big, what she

44. knows about flying.… if this impression goes to my wife and imagine if you were my wife, if

45. you learn that your husband is fooling with another girl, how would you feel?

46. FO: 0715:33.5 Oh no, oh my God.

47. PIC: 0717:40.5 That f—er, that son of a gun, bitch, she asked to fly 100 hours with me. With

48. no intention that she has big boobs nor she would do sex with me. If I want to f–k her, I can

49. f–k her in the hotel. And you know that your friend is f—ing too horny. She has a… she does

50. sex with 6-7 guys I know. You note it, she is not a virgin … So, your friend Lamia is a

51.prostitute. (Bangla)

52. FO: 0720:46.5 Sir, shouldn't I switch on the radar?

53. PIC: 0804:52.5 That f—er Lamia, she made me… look at my f—ing eyes… 65.weeping …

54. crying… where did I do mistake (crying)? I take the blame and 66.resigned. What is my next

55. source of income? At least look at me f—er (crying and blowing nose) Do I need to cry

56. like this?

57.FO: No, no Sir.

58.PIC: Look at me now (crying, choking and blowing nose). So, it is my problem that I have

59. not been able to teach you.

60. PIC: 0806:08.5 Okay, let us do the descent checklist (Bangla).

61. FO: Yes Sir, it is time (Bangla)

62. PIC: 0806:55.5 I have suffered a lot, my child (bursts out crying, blowing nose)

63. FO: Sir, please forget. The God is above us. Even if you find it hard to forgive her, please

64.forgive her.

65. PIC: How can I forgive her. The girl for whom I have taken so much pain. We don't know

66. f–k how do I accept that, tell me (crying and blowing nose)

67. PIC: 0807:42.5 We will do approach checklist at Romeo, okay (Bangla)?

68. FO: Yes Sir

69. PIC: Ask, request for descent

70. FO: 0807:49.5 Kathmandu, BS211 ready for descent

71. KTM Control: 0807:49.5 BS211, descend to FL 160

72. PIC: 0810:17.5 Do you know that I have not slept during the whole night and I cried a lot

73. (Bangla). I have received so much pain … you have seen me now. I have cried enough my

74. daughter, cried a lot.

75. KTM Approach: 0813:41.5 BS211, Reduce to minimum speed and descend to 12,500 ft

76. FO: 0813:45.5 Descend to 12,500 and reduce speed to minimum BS211

77. PIC: Good job my daughter.

78. FO: Sir

79. PIC: 0819:03.5 I have dropped my cigarette, let me find the thing, do you know where I

80. have dropped it … it is on the left. There is possibility of catching fire.

81. FO: 0819:22.5 Sir, we are getting into cloud

82. PIC: Forget it. Okay adjust the pitch control of Weather Radar … Okay we don't need this

83. now out of cloud (Bangla) … Why are you holding the power levers? I am the pilot

84.flying, idiot, I should be holding. What is our QNH 1015 okay? Okay put your HDG bug on

85. top.

86. KTM Approach: 0822:15.5 BS211, confirm holding over Guras?

87. FO: 0822:15.5 We are continuing approach

88. PIC: 0822:57.5 How much will it be at 13 DME? 9,800. Is it okay? Pumps on, Flaps 5

89. FO: Okay. Speed good for flaps… Flaps 5

90. PIC: 0823:00.5 Flaps 15 … Do the Before Landing Checklist … Do it

91. FO: 0823:17.5 Landing Gear

92. PIC: Down Three Green

93. FO: Flaps

94. PIC: 15 set

95. FO: Sir, not yet set [LANDING GEAR UNSAFE WARNING] … Sir, Speed Speed Speed

96. PIC: No worry, no worry [GEAR UNSAFE WARNING]

97. KTM Approach: 0823:46.5 BS211, Position 10 Miles, contact Tower 118.[GEAR UNSAFE WARNING CONTINUES]

98. FO: 0824:37.5 Kathmandu Tower, BS211, Finals RW 02 [GEAR UNSAFE WARNING]

100. KTM Tower: 0824:45.5 BS211, Kathmandu Tower, wind 230 degrees 8 knots, tail wind component 7 knots, runway 02, continue approach

101. PIC: Okay do Before Landing Checklist now (Bangla)

102. FO: Sir, have done Before Landing Checklist

103. PIC: What altitude at 5 DME

104. FO: At 5 DME 6,640

105. PIC: 6,640 So let me increase the ROD

106. FO: Yes Sir, the ROD needs to be increased … 4 DME, Sir we are 600 ft high

107. PIC: I do not understand what you are saying, say slowly. (Bangla) ["MIMINUMS, MIMINUMS] [GEAR UNSAFE WARNING]

108. PIC: 0825:46.5 Have we seen the runway? (Bangla)

[EGPWS "MINIMUM" "SINK RATE"] ["TOO LOW-GEARS"] [GEAR 127.UNSAFE WARNING CONTINUES].

109. KTM Tower: 0826:33.5 BS211, wind 220 degrees 7 knots, tail wind component 6

110. knots, runway 02, clear to land. [EGPWS 129.SOUND] ["TOO LOW-GEARS"] [GEAR UNSAFE WARNING CONTINUES]

111. FO: 0826:37.5 Clear to land, BS211

112. FO: 0826:46.5 Sir, Gear not yet down! (Bangla)

[GEAR UNSAFE WARNING] ["TOO LOW – GEAR"] ["TERRAIN"]

113. PIC: Okay put the gear down. Flaps 15, and Before Landing Checklist

114. FO: Landing Checklist done Sir

115. PIC: Done? Okay set the Go around Altitude 10,500

116. PIC: 0827:17.5 Have we seen the runway (Bangla)?

117. FO: No not yet (Bangla)

118. PIC: Not seen yet? (Bangla) No problem, it will be in front.

119. KTM Tower: 0827:43.5 BS211, Tower…. you were given landing clearance to runway 02

120. PIC: 0827:45.5 Affirmative Ma'am

121. KTM Tower: 0827:48.5 You are going towards Runway 20

122. PIC: 0827:53.5 I think we are going to Runway 02

123. KTM Tower: 0828:01.5 Ok, BS211, runway 20 clear to land

124. PIC: 0828:03.5 Clear to land

125. PIC: 0828:08.5 Can we see the Runway? We have set up everything, all done but we are not

126. seeing the Runway

127. FO: No

128. PIC: That means the runway is to our right ["TERRAIN"] So, we have crossed the VOR, is

129. not it, okay? (Bangla) [EGPWS "TERRAIN, TERRAIN, PULL UP, 153.PULL UP"].

130. Let us turn right then, okay (Bangla)? [EGPWS "PULL UP, PULL 154.UP, PULL UP].

131. So, we have gone past (Bangla) we will approach runway 02, 155.002 [EGPWS "TERRAIN, TERRAIN, TERRAIN, PULL UP, PULL UP, PULL 156.UP"]

132. FO: Okay (Scared voice) [EGPWS "PULL UP, PULL UP, PULL UP"]

133. KTM Tower: 0829:07.5 BS211, Kathmandu Tower, request your intention [EGPWS CONTINUOUS "PULL UP"]

134. PIC: 0829:09.5 I would like to land on 02.

135. KTM Tower: 0829:14.5 BS211, and confirm you're VFR.

136. PIC:0829:14.5 Affirmative.

137. KTM Tower: 0829:20.5 BS211, join the… (Garbled) … right downwind runway 20.

138. PIC: 0829:21.5 Copied.

139. PIC: 0829:33.5 We have crossed and that's why we have not being able to make it (Bangla)

140. FO: Sir, how have we missed the runway?

141. PIC: No worry, no worry. We are going to VOR. [CONTINUOUS EGPWS WARNING]

142. KTM Tower: 0830:12.5 Join left … right downwind, runway 02 … BS211, I say again, do

143. not proceed towards runway 20. Clear to hold your present position.

144. PIC: Copied Sir

145. PIC: So, our VOR is on to the left, is it not? Okay, Before Landing Checklist is done?

146. FO: Yes everything done

147. PIC: 0830:37.5 Tower, Ok we are making an orbit to the right

148. FO: Sir, this is runway

149. PIC: Have you seen the runway, where is it?

150. KTM Tower: 0831:00.5 Ok that's good, but do not land. Traffic is on short final

151.runway 02

152. PIC: 0831:12.5 We know that sir. Copied, let us know Sir once the aircraft lands

153. PIC: So I have done mistake, it happens isn't it? It can happen since I was talking to you!

154. Where is our VOR, gone left isn't it, so let me make a turn 15 degrees to come back to the

155. final.

156. FO: Okay (More confident voice)

157. KTM Tower: BS211 runway ah…clear to land…runway is vacated. Either runway 02 or 20.

158. Confirm you need vector? ["BANK ANGLE, BANK ANGLE"]

159. PIC: 0832:07.5 Sir, we would like to land RW 20 ["BANK ANGLE, BANK ANGLE"]

160. KTM Tower: 0832:09.5 Ok, runway 20 clear to land. Wind 270 degrees 6 knots

161. PIC: 0832:10.5 260 copied clear to land

162. PIC: 0832:16.5 We have to now find the runway isn't it? We are 4 miles now. Which side

163. should the runway be? (Bangla)

164. FO: 12 O'clock

165. PIC: Where is the runway? [EGPWS "TERRAIN, TERRAIN PULL UP, PULL UP, PULL UP"]

166. Unidentified voice in Nepali: 0832:31.5 *gayo jasto cha khoi?* (May have gone 203.to 02,

167. where is it?)

168. KTM Tower: 0832:38.5 BS211, confirm you have air… runway in sight?

169. PIC: 0832:40.5 Negative Sir

170. PIC: Where is the runway? (Bangla)

171. KTM Tower: 0832:44.5 BS211, turn right and uh… you have runway… confirm you have a

172. runway not in sight yet?

173. FO: 0832:44.5 Sir runway, runway. Sir 3 O'clock. ["BANK ANGLE, BANK ANGLE"]

174. PIC: 0832:47.5 Affirmative, we have runway in sight, request clear to land Sir

175. KTM Tower: 0832:52.5 BS211 Cleared to land

176. PIC: 0832:55.5 Okay put the Flight Director Standby … keep the Heading Bug Zero …

177. Okay, Landing Checklist Done?

178. Unidentified voice in Nepali: 0833:11.5 *Jahaj dekhira Chaina? Dekhira chha Sir.*

179.*Downwind ma chha. Tei ta, yo ta purai almaliyo. Pheri orbit garyo Sir.* (Can you see the

180. plane? Yes, he is downwind, it is completely confused. He is making another orbit, Sir.)

181. PIC: 0833:23.5 Have you given 022 [RADIO ALTIMETER CALL "100, MINIMUMS"]

182. KTM Tower: 0833:26.5 BS211, that is not the runway… over… that's not the runway.

183. BS211, that is not the runway I say again. Take off clearance cancelled. [EGPWS "SINK RATE" PULL UP. PULL UP]

184. PIC: 0833:35.5 We have the runway in sight Sir. Are we cleared to land?

185. FO: 20 … Oh my God, Sir [“BANK ANGLE”]

186. KTM Tower: BS 211, I say again turn … [“BANK ANGLE, BANK ANGLE, 228.BANK ANGLE, SINK RATE, SINK RATE”] [“50”] [“BANK ANGLE, BANK 229.ANGLE”]

187. FO: 0834:04.5 Sir! Sir! (Very alarmed)

---End of Recording---

The Glossary of Aviation Codes and Phraseologies used in the CVR Transcript of US Bangla flight 211.

1. FO: First Officer (Co-pilot)
2. OPS: US Bangla Operations
3. PIC: Pilot in command
4. KTM: Kathmandu
5. ADC: Air Defense Clearance (Provided by ATC)
6. FIC: Flight Information Center
7. Romeo: Waypoint Southeast of Kathmandu (the alphabet “R” is pronounced as ROMEO in aviation English)
8. Guras: Waypoint 12 miles south of Kathmandu
9. VFR: Visual Flight Rules
10. EGPWS: Enhanced Ground Proximity Warning System
11. DME: Distance Measuring Equipment (Miles from beacon)
12. VOR: Visual Omnidirectional Range beacon
13. ROD: Rate of Descent
14. Takeoff Checklist: Checklist prior to takeoff by pilots and aircrew to improve flight safety by ensuring that no important tasks are forgotten
15. Line up: A part of the ground movement of an aircraft that normally connects the taxiing phase and takeoff roll
16. Clearance: Authorization by ATC
17. V1 rotate: Decision speed at which stopping is no longer possible and the airplane is committed to fly

18. Positive rate: Far enough off the ground that you really don't need to worry about touching again
19. Look out for birds: Phraseology used to make sure no collision involving an aircraft with one or more birds take place
20. Autopilot engaged: Activating the device used to guide an aircraft without direct assistance from the pilot
21. Airborne: Being in the air
22. Wilco: Will comply
23. Switch on the radar: Procedure to be visible on the ATC screen
24. Descent: Aircraft decreases altitude
25. Minimum speed: Minimum control speed air that the aircraft is still controllable with the critical engine inoperative while the aircraft is airborne
26. Power levers: Throttle or thrust lever by which the pilot controls the amount of fuel provided to the engine with which it is associated
27. QNH: Airfield pressure setting
28. HDG bug: Magnetic heading bug
29. Pumps: In which an accelerating jet entrains a second fluid to deliver it at elevated pressure
30. Flaps: High lift devices used to reduce the stalling speed of an aircraft wing at a given weight
31. Landing gear: Undercarriage of an aircraft used for either takeoff or landing
32. RW: Runway
33. Tail wind component: Performance diminishing wind component

34. MINIMUMS: You've arrived at that altitude
35. SINK RATE: The callout that emerges when GPWS detects excessive descent rate for the altitude above ground
36. Go Around Altitude: Gaining altitude, circling the airport and lining up for another approach to landing
37. Affirmative: YES
38. Negative: NO
39. TERRAIN PULL UP: If you are at flying level and there is rising ground ahead, the callout is TERRAIN and shortly, TERRAIN PULL UP
40. Downwind: Wind direction towards the southeast
41. Orbit: Procedure where an aircraft flies a 360 degree loop either clockwise or anti-clockwise
42. Vector: Magnetic heading given to an aircraft from ATC to be flown for a period of time or distance
43. 10 o'clock or, 3 o'clock: Clock positions from a vehicle
44. Flight Director: A flight instrument that is overlaid on the attitude indicator that shows the pilot of an aircraft the attitude required to follow a certain trajectory to which the flight is to be conducted.
45. Heading Bug: A marker on the heading indicator that can be rotated to a specific heading for reference purposes, or to command an autopilot to fly that heading.
46. RADIO ALTIMETER: An airborne electronic device capable of measuring the height of the aircraft above terrain immediately below the aircraft.

47. BANK ANGLE: The angle between the wings and the horizon, as viewed from the rear of the airplane. An airplane with its wings level has zero degrees of bank.