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RADIOTELEPHONY DISCOURSE ANALYSIS: THE CASE OF AVIATION ENGLISH

This article deals with the issues of holistic study of syntactic units in radio exchange texts and the peculiarities of syntactic and structural-semantic organization of the English professional discourse of air traffic controllers. The features of dialogically structured English professional communication between a pilot and an air traffic controller were revealed by disclosing its structural and syntactic characteristics for the development of an effective system of professionally oriented communicative exercises and tasks. For the purpose of the data collection, we used on-line interviews and correspondence with the air traffic controllers of the Boryspil airport, representatives of the Training and Certification Centre of the Ukrainian State Air Traffic Service (NSS UkSATSE), observation, individual and group discussions, analysis of records of radio exchange texts carried out on board aircraft. The present study has a number of pedagogical implications for language training of air traffic controllers. The theoretical positions and results of scientific research provide a potential ground for a new concept, standards, ways and approaches to the development of educational programs for language training of future air traffic controllers. We have developed and tested a system of communicative tasks that maximally simulate the conditions of future air traffic controllers' operational activity and are aimed at the development of forecasting skills, speech-aural endurance, skills in grammatical, syntactic, lexical normativity, developed on the basis of a constructivist approach, the practical implementation of which is presented as an experiential learning. Experimental testing of the developed system of tasks in the process of students' language training made it possible to trace the positive dynamics of development of the future air traffic controllers' ability to successfully make foreign dialogue-structured professional communication which contributes to flight safety. The real texts of radio exchange have been analysed to determine the specifics of language and subject mistakes.

Key words: *dialogically structured English professional communication, aviation radiotelephony discourse, air traffic controller, language system, subject mistakes, language mistakes, verbal interaction.*

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АНАЛІЗ ДИСКУРСУ АВІАЦІЙНОЇ РАДІОТЕЛЕФОНІЇ: АВІАЦІЙНА АНГЛІЙСЬКА

У статті розглянуто питання цілісного вивчення синтаксичних одиниць у текстах радіообміну й особливості синтаксичної та структурно-семантичної організації англійського професійного дискурсу диспетчерів управління повітряним рухом. Особливості діалогічно структурованого англійського професійного спілкування між пілотом і диспетчером управління повітряним рухом розкрито шляхом визначення його структурних і синтаксичних характеристик з метою розроблення ефективної системи професійно орієнтованих комунікативних вправ і завдань. Для збирання даних використовувалися он-лайн інтерв'ю та листування з диспетчерами повітряного руху аеропорту «Бориспіль», представниками Центру навчання та сертифікації Державної служби повітряного руху України, методи спостереження, індивідуальної та групової дискусії, аналіз записів текстів радіообміну, здійснених на борту літальних апаратів. Це дослідження є значущим для мовної підготовки диспетчерів управління повітряним рухом. Теоретичні положення й результати наукових досліджень слугують потенційним підґрунтям для нової концепції, стандартів, способів і підходів до розроблення навчальних програм мовної підготовки майбутніх диспетчерів повітряного руху. Розроблено й експериментально перевірено систему комунікативних завдань, які максимально імітують умови оперативної діяльності майбутніх диспетчерів управління повітряним рухом і спрямовані на розвиток навичок прогнозування, мовленнєво-слухової витривалості, навичок граматичної, синтаксичної, лексичної нормативності. Система комунікативних завдань розроблена на основі конструктивістського підходу, практичним застосуванням якого є експеріенціальне навчання. Експериментальне тестування розробленої системи завдань у процесі мовної підготовки студентів дало змогу

простежити позитивну динаміку розвитку іншомовних професійно комунікативних умінь майбутніх диспетчерів управління повітряним рухом успішно здійснювати іншомовне діалогічно структуроване професійне спілкування, що забезпечує безпеку польоту. Здійснено аналіз реальних текстів радіообміну для визначення специфіки мовних і предметних помилок.

Ключові слова: *діалогічно структуроване професійне спілкування, англійський авіаційний радіотелефонний дискурс, диспетчер управління повітряним рухом, мовна система, предметні помилки, мовні помилки, словесна взаємодія.*

Introduction. In the context of the globalization of the global economy, civil aviation becomes an important element of Ukraine's integration into the modern system of international economic relations. Ukraine is a part of the international air transport community and a member of the International Civil Aviation Organization (ICAO), the European Civil Aviation Conference (ECAC), the European Organization for the Safety of Air Navigation (EUROCONTROL). One of the requirements of international aviation organizations (ICAO, EUROCONTROL) is the quality of the basic language training of aviation specialists, including air traffic controllers (ATCOs). The air traffic controllers' communication competence is of great importance because the proportion of aircraft incidents and accidents caused by radiotelephony communication errors is from 12% to 22% of total flight incidents and accidents (Huang, 2005). The method of solving this problem is in the plane of language education of aviation specialists, whose preparation is currently in the stage of modernization.

The problem of English-language communication of future air traffic controllers is represented by research of a number of scholars whose achievements can be considered as the starting point of our study. The scientists (Bogush, Kovtun, 2014: 74) considering the professional communication of future pilots and air traffic controllers as a component of their professional reliability, emphasize the significance of disciplines integration that provide Ukrainian and foreign language training of future aviators in the educational process of the universities. According to the authors, such integration should be based on the necessity of using interlingual comparison in the educational process for students to understand the essence of differences in multilingual linguistic material, facilitating the transposition of knowledge, skills and abilities and preventing interference. We agree that the integrative approach to language training of air traffic controllers in air traffic control simulator is a combination of two components of English communicative competency: oral speech skills (listening comprehension and speaking) and language of radiotelephony communication (radiotelephony phraseology and plain English in aviation context) (Petrashchuk, 2014; 84). L. Baranovska (2018) on the example of professional training of students of different specialties of higher aviation educational institution proves the importance of its linguistic component. T. Tarnavska (2008) developed a methodology for linguistic training of future ATC dispatchers in extreme situations on international air routes based on the method of analysis of materials from aviation accident research.

It is advisable to focus on the research which studies the communicative orientation of the aviation specialists' training. The author represents professionally-oriented listening as one of the main channels of getting information in the process of professional activity of aviation specialists whose communicative skills include auditory competence, that is, the ability and readiness to perceive and meaningfully rethink a foreign language audit message implemented by such mechanisms as perception of the speech stream, memory, imagination and logical thinking (Tsaryova, 2017: 222).

However, the scientific studies devoted to the problem of English-language aviation professional discourse do not represent a holistic concept that would ensure optimization of the process of foreign-language communicative orientation of the training of air traffic controllers. In particular, there were some important issues out of the attention of the scientists. They are: the problem of holistic study of syntactic units in radio exchange texts, the peculiarities of syntactic and structural-semantic organization of the English professional discourse of air traffic controllers, namely the development of a system of exercises and tasks that would consider all aspects of their foreign professional communication. This problem remains unresolved and requires a comprehensive comprehension, a thorough development of the methodology to ensure a high-quality foreign language training of specialists of the specified profile.

The aim of this article is to reveal the features of dialogically structured English professional communication between a pilot and an air traffic controller by disclosing its structural and syntactic characteristics for the development of an effective system of professionally oriented communicative exercises and tasks. The practical value of the expected scientific results is in the possibility of

applying the scientific provisions and conclusions of the study in the practical activity of formation the system of foreign language training of future air traffic controllers. The material of the research can be used to develop the content of curriculum of professionally oriented disciplines of the above-mentioned specialty, in preparation of practical classes, writing textbooks and methodical manuals on the problem of language training of future air traffic controllers, planning of students' independent work.

The theoretical positions and results of scientific research provide a potential ground for a new concept, standards, ways and approaches to the development of educational programs for language training of future air traffic controllers in the conditions of the educational environment of aviation higher educational establishment.

Methods. Methods of research: theoretical: theoretical and critical analysis of linguistic, pedagogical scientific literature, official documents on the subject of research, content analysis of the content of current curriculum, programs for preparation of future air traffic controllers; systematization, classification, comparison and generalization in order to identify the initial provisions and scientific approaches that make up the theoretical basis of the research; empirical: on-line interviews and correspondence with the air traffic controllers of the Boryspil airport, representatives of the Training and Certification Centre of the Ukrainian State Air Traffic Service (NSS UkSATSE), observation, surveys, individual and group discussions, analysis of records of radio exchange texts carried out on board aircraft to provide a comprehensive linguistic analysis of foreign language professional communication of air traffic controllers and find out its features.

Results and discussion. In our opinion, the English professional aviation radiotelephone discourse compiles English aviation texts, in particular radio texts. We find Malkovskaya's (2004) interpretation of the concept of the language of radio exchange crucial for our research. She explains it as a set of phonetic, grammatical and lexical units of speech, used in dialogues between the participants of the air traffic (air traffic controller and pilot) during the flight.

Based on this definition we believe that knowledge of the language system (lexical, grammatical, syntactic, morphological, orthoepic normativity) and ability to apply it in practice provide successful verbal speech interaction "pilot-air traffic controller". Therefore, the system of communicative tasks and exercises was developed on the basis of modelling of real situations of professional activity of the air traffic controller, aimed at formation of the above-mentioned types of normativities. Such learning environment encourages students to improve the fluency and accuracy of English air-ground communication which results in flight safety.

In the process of communicative language teaching the teacher's main task is to create a conversational environment and encourage students to interact with each other (Larsen-Freeman, Anderson, 2011).

The primary purpose is to enable future air traffic controllers and pilots to communicate in the target language (Celce-Murcia, Brinton, Snow, 2014). The principles of availability, which mean the use of real radio exchange texts determine the structure of each task. We check exercises in accordance with the international requirements for the language of the radio exchange (ICAO, 2010).

The process of formation and development of a communicatively competent personality of the future air traffic controller is subordinated to a constructivist approach, the value of which is to create conditions for speech activity, based on the knowledge of the language system and the ability to communicate by means of native and foreign languages. The practical implementation of the constructivist approach in the process of teaching English and English for professional purposes is represented by experiential learning. That is, the educational process of language learning is organized as a process of continuous simulation of the situations relevant to the future professional air traffic controller's activity by means of foreign language, aimed at forming their foreign-language professional and communicative competence. We assume that it is efficiently to use multilateral English communication, where the dialogue between the student and other subjects of the educational environment is the core unit. We consider dialogue-structured foreign communication in a professional context as a methodological principle, method and way of organizing educational activities and self-realization of future air traffic controller. We use learner-centered teaching as it involves a lot of teaching methods which make the teacher a learning facilitator but not an information provider (Blumberg, Weimer, 2012).

Developing a system of professionally oriented communicative exercises and tasks, we considered the characteristics of aviation radiotelephone communication and the linguistic characteristics of standard phraseology, since this group of factors may cause a non-standard situation in the process of foreign verbal interaction "pilot- air traffic controller". Therefore, the proposed system of exercises, aimed at the formation of psychophysiological and communicative readiness of future air traffic

controllers for the effective radio exchange process. Radiotelephone procedure is clearly regulated by legal and regulatory acts, in particular by the Order of the Ministry of Transport of Ukraine of 10.06.2004 No. 486 and the standard documents of ICAO (International Civil Aviation Organization

It's crucial to consider a number of characteristics of air radiotelephone communication, which must be considered to determine the content of language training of future air traffic controllers: the priority of speaking and listening skills, as well as the ability to perform all types of communication activity (perception, production, interaction, mediation) for air traffic controllers and pilots; the lack of visual contact, which makes it impossible to use nonverbal means of communication, giving the correct speech a decisive meaning for an adequate understanding of messages; the lack of opportunity to interpret the message for the effective control of the mutual understanding, since only one of the interlocutors can simultaneously transmit the message; exchanging a large amount of information between the air traffic controller and the pilot; loss of information caused by radio interference, background noise (operational noise in the cockpit, electrostatic obstruction), inadequate equipment.

In order to develop the system of English professionally oriented communication exercises aimed at formation of the ability to effectively carry out the radiotelephony communication, it is necessary to consider the specifics of the operational activity of the air traffic controller. 85% of the information is received by the air traffic controller visually. The task of the air traffic controller is to recognize on the radar screen the total number of aircraft in their sector, their position, coordinates, and speed.

Therefore, it is advisable to develop professionally-oriented communication situations as close as possible to the real conditions of their professional activity. We have considered that the memory and attention of the air traffic controller is reduced after 30 minutes of medium- medium-intensity activity. Therefore, the language training of future specialists should result in formation of high-level speech and auditory endurance. The air traffic controller's ability to predict the situation, to quickly make adequate decisions in the conditions of time shortage and high level of emotional and informational tension is significant, especially at big airports at rush hours, the loss of radar contact with the aircraft, the radar system failure. These factors were considered to plan and organize the language learning process of future air traffic controllers. Thus, we suggest developing listening exercises which include low-quality communications. The low quality of these messages can be caused by the radio interference, the individual features of the communicant (accent, rate of speech, peculiarities of diction, language errors in standard phraseology and spoken language, violation of radiotelephone procedure, simultaneous use of two languages, and the factor of unexpectedness). According to the requirements of ICAO, the oral, dialogical language of the radio exchange should be concise and unambiguous. It is full of numerals, terminology, abbreviations, rigidly structured, characterized by the use of a code method of information transmission, high recursion (ICAO, 2001; Werner, 1988: 684; CAP, 413).

Hierarchically organized speech acts "pilot – air traffic controller" are combined into dialogically structured statements. They are characterized by the absence of the verb "to be", articles, question sentences, modal verbs, limited use of pronouns, synonyms, and the avoidance of slang vocabulary, but this does not affect the effectiveness of communication. At the same time, in spite of the shortness tendency, the language of radiotelephone communication is oversaturated by duplicate elements, namely lexical, syntactic and lexico-syntactic repetitions, which are necessary for reaching mutual understanding between the participants of the verbal interaction, for example:

Controller: … **maintain** present level 200.

Pilot: … **maintaining** 200 (Live ATC.net, 2018).

As we can see from the above example, in the absence of a visual link the air traffic controller uses repetition of a grammatical form. He controls the pilot's actions listening to his confirmation of the performed action. However, the use of repetitions is necessary because they duplicate the information for the purpose of its proper transmission and decoding, establish and check the communication between the communicators during air negotiations.

Controller – ... **turn left on the outer** taxiway to holding point **27R**.

Pilot – Roger, **left on the outer** for **27R** (CAP 413, 2018).

Thus, having highlighted a number of factors that directly affects the quality of dialogically structured English communication between a pilot and an air traffic controller and systematized the necessary skills for the successful communication, we have proposed a system of communicative tasks that maximally simulate the conditions of their operational activity. It is advisable to carry out this training on the basis of the dispatcher training simulator, which enables the visualization of aircraft on the screen with the simultaneous development of skills of English professional dialogical communication in conditions

that are as close as possible to the real ones. It should be noted that the formation and development of the ability to efficiently conduct radio exchange is based on the integrative approach in the study of the course "English (Plain English proficiency)", "Professional (aviation) English (English for specific purposes)", "Radiotelephone" and practical training on dispatcher training simulators (Aiguo, 2008; Emery, 2000; Kukovec, 2008).

The selection and organization of educational lexical-grammatical material used by us in the development of the system of exercises and tasks were carried out on the basis of analysis of real texts of radio exchange and the specifics of language and subject errors that were made by students in the process of teaching foreign language professional communication.

There are language (mistakes in speaking and listening) and subject mistakes. Language mistakes: incorrect reading of numbers (heading one-eighty (correct: one-eight-zero): incorrect use of words with related meanings (holding point/holding pattern, course/heading); inappropriate use of spoken language instead of the language of the radio phraseology (Report in what weather conditions you are flying right now (correct: Report flight conditions); incorrect word order (Air France 1053, foreign object on the runway - stop immediately (correct: Stop immediately, Air France 1053, stop immediately, foreign object on the runway); use of pseudo-international words (pompage (correct: engine stall); incorrect use of prepositions (Expect departure in 55 (correct: at 55); use of the wrong parts of speech (What assistant do you need? (correct: help); use of wrong verb tense (Runway covered snow, I do not sure); incorrect use of the plural and singular noun (Confirm failure of both engine (correct: engines); listening errors, in particular in numbers, letters (Golf/Oskar, 650/6500); misunderstanding the message (Pilot: We do need a tug. The dispatcher heard: We do not need a tug). Subject mistakes are the result of getting the wrong knowledge: The inlet ducts have the same forms. Consequently, the listed mistakes can lead to a communicative misunderstanding that can be avoided by questioning or clarifying. However, in conditions of time shortage or in a non-standard situation, such a communicative failure can result in an emergency.

The suggested system of communicative tasks is oriented on the formation of auditory, terminological, communicative competence of the future air traffic controllers by updating the system of the acquired professional knowledge. Since, listening skills of air traffic controller are crucial, the first set of exercises is aimed at the formation and development of listening and speaking skills. The examples of tasks include various strategies of verbal interaction (information, inquiry, control) and speech acts, namely: quests (requests, refinements), constants (dispatcher's recommendations, confirmation of information received, unregulated forms), directives (commands, orders), performances (performance report), which are presented by question, narrative, and inductive sentences.

1. Listen to the fragment of the text of the radio exchange in a stressful situation and determine the ways of implementing the psychological component: interrogation, repeating, exclamations, the tone of communication.

A) Cleveland Centre Controller: **What's that**?

Cleveland Centre Controller 2: I just sayin' it looks like he descended there.

Cleveland Centre Controller: I don't think so. United 93, verify three five zero.

Cleveland Centre Controller 2: United 93,

Cleveland Cleveland Centre: Go ahead (indistinct).

Cleveland Centre Controller 2: **Do you have** United 93 south of Chardon?

Cleveland Centre: We hear some funny noises we're trying to get him. **Do you have him**? Cleveland Centre Controller 2: No.

Cleveland Centre: Thank You. United 93, Cleveland.

Cleveland Centre Controller: United 1523 **did you hear** your company, ah, **did you hear**, ah, some interference on the frequency, ah, couple a minutes ago, screaming?

United1523: Yes I did seven ninety seven and, ah, we couldn't tell what it was either. Cleveland Centre Controller: Ok. United 93, Cleveland, **if you hear** the centre, ident.

AA1060: American 1060. Ditto on the other transmissions.

Cleveland Centre Controller: American 1060, you heard that also?

AA1060: Yes sir, twice.

Cleveland Centre Controller: Roger, **we heard that also**, thanks, just wanted to confirm it wasn't some interference.

Ziad Jarrah: (Indistinct) please sit down and remain sitting. We have a bomb on board, so (indistinct).

Cleveland Centre: Ah, calling Cleveland Centre, you are unreadable, **say again slowly** (9/11 air traffic recordings-audio, 2011).

2. Watch the fragment of the video to recognize the structural components of the message, answer questions, fill in the gaps, and define the keywords.

3. Communication tasks aimed at development of forecasting skills. For example: 1) Complete the

conversation between the pilot and controller and act out the dialogue:

P.: Mayday, Mayday. London Control, Clipper 420, Boing 707, 200 passengers, severe cabin fire and smoke. Request emergency landing.

2) What would you do in the following situations?

– Controllers want to reroute planes around a thunderstorm, they have to contact each plane by radio to relay instructions individually (Lowy, 2016).

– You are an approach controller in a busy airport. An incoming English-speaking pilot has requested a priority landing for a heavy aircraft. He has repeated the request but you cannot understand the reason.

4. Communication tasks, oriented on the formation and development of skills of dialogically structured communication in a professional context. For example: 1) ATC-pilot communication is difficult. Try to establish the contact; 2) Warn the pilot about the presented snow on the runway and broaden the warning and caution.

5. Tasks focused on the formation and development of reading and speaking skills. For example: read the text and group the messages relating to (a) the problem of technical failure of the engine, and (b) the problems associated with the malfunction of the aircraft system. Collectively analyse and suggest ways to eliminate them.

– Hot air is getting inside the passenger compartment.

– Unable to extend flaps.

– Engine seizure and overheating.

6. The task aimed at formation of skills in lexical normativity. For example: 1) Give the definitions for the abbreviations: EMERG, UNL, DETRESFA, DEV, BKN, ALT. 2) Practice your spelling and pronunciation of the Phonetic Alphabet.

7. Tasks aimed at the formation and development skills in grammatical normativity. For example: Read the dialogues, explain the meaning of the underlined words. Fill in the correct verb forms. Act out the dialogues.

1**.** C. - The **receipt** (to acknowledge)?

P. – My reception of **frequency** 118.7 MHz (to brake) down.

We presented only a small number of examples of exercises and tasks that demonstrate the possible ways of forming and developing the foreign professional and communicative competence of the air traffic controller, which provides the basis for the further searching of the methods and ways of effective formation of skills for the successful dialogically-structured foreign interaction "pilot-dispatcher" in the professional field.

Conclusions. The peculiarities of the English professional-communicative interaction between the pilot and the air traffic controller have been defined by revealing its structural and syntactic characteristics. The features of the language of air radiotelephone communication, which must be considered to determine the content of language professional training of future dispatchers, have been observed. The specifics of the operational activity of the dispatcher have been revealed. The real texts of radio exchange have been analysed to determine the specifics of language and subject mistakes, which were considered in the selection and organization of educational lexical-grammar material for the development of a system of communicative tasks. The system of professionally oriented communicative exercises and tasks aimed at the development of forecasting skills, speech-aural endurance, skills in grammatical, syntactic, lexical normativity, developed on the basis of a constructivist approach, the practical implementation of which is represented by experiential learning, has been worked out.

Experimental testing of the developed system of tasks in the process of students' language training at the National Aviation University and at English language courses from 2018 to 2019 has shown that it enables the formation of persistent skills of future specialists to make foreign communication in a professional context. The effectiveness of this system of communicative tasks was tested by comparing academic success of the students of experimental and control groups before and after the experiment, which made it possible to trace the positive dynamics of development of the future dispatcher's ability to successfully make foreign dialogue-structured professional communication.

Based on the analysis of the data obtained, we can state that the number of students with a perfect and sufficient level of formation of foreign professionally communicative competence, especially in experimental groups, has increased significantly. Thus, in the experimental group, 15.22% of students reached the perfect level, sufficient – 54.35%, while in the control group this figure was 4.08% for the perfect and 28.57% for a sufficient level. The positive fact is that there are no students with an inadequate level of formation of foreign professionally communicative competence in the experimental group.

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