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Faculty of Social Sciences, Humanities and Education

Ph.D. Program in Education Sciences

Analysis of the Factors Affecting Validity in Aviation English Assessment through Evaluating
Errors of Radiotelephony Communication against Language Proficiency Requirements
(A Case of Georgia)

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Extended Abstract of Doctoral Dissertation in Education Sciences

Tbilisi, 2020

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I confirm that the work corresponds to the field, is characterized by novelty, scientific and practical value and is presented in the format defined by International Black Sea University.

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Introduction

Background information*.*The International Civil Aviation Organization (ICAO) represents the Agency of the United Nation, which was established in 1946 for ensuring and setting "standards and regulations necessary for aviation safety, security, efficiency and regularity…" (Alderson, 2011, p. 386). ICAO is an organization, which is in charge of "establishment of Standards and Recommended Practices" (Mathews, 2016, p. 3) (SARPs) for enhancing the issues related to international aviation. Those SARPs are published through "eighteen Annexes to the ICAO Convention" (Mathews, 2016, p. 3).

Amongst various issues, the concern of ICAO is to consider English language proficiency due to the number of incidents and accidents that sacrificed the lives of many passengers and crew members. The chain of events led the investigation authority to the language as a contributory factor of those incidents and accidents. As a resolution, ICAO set up the "Proficiency Requirements in Common English Study Group" (PRICESG) (ICAO, 2010a, pp. 1-3). The group has designed language proficiency requirements (LPRs) and proficiency rating scale. ICAO assembly Resolution A32-16 urged the ICAO Council "to direct the Air Navigation Commission to consider this matter with a high degree of priority and complete the task of strengthening relevant ICAO provisions concerning language requirements, with a view to obligating Contracting States to take steps to ensure that air traffic control personnel and flight crews involved in flight operations in airspace where the use of the English language is required are proficient in conducting and comprehending radiotelephony communications in the English language" (ICAO, 2010a, pp. 1-3). Language proficiency requirements were published in 2003 and the "aviation industry was given 5 years to implement these standards" (Alderson, 2011, p. 387). What is more, this was the first time in the history of aviation industry when active controllers and pilots had to take the English language exams. Nevertheless, ICAO "addresses only spoken language (speaking and listening)" (ICAO, 2010a, pp. 4-7) test format, thus does not control the testing system. Each country conducting an assessment in the field is able to design a speaking and listening testing tool or adopt a license from another country to use the format developed by this particular country (ICAO, 2010a).

The fact that ICAO presented LPRs has not resolved the issue completely, though several countries designed their own assessment style and tools the users, air traffic controllers and pilots underlined their concerns. For instance, South Korea was the "one of the first member countries" (Kim, 2013,

p. 103), which designed its local measurement tool, moreover, the sample of the evaluation was opened up on the website. Nevertheless, after the research has been done by Kim (2013), vast majority of participants stated that "the test content was inappropriate and irrelevant to the demands of the job; test development procedures were unclear" (Kim, 2013, p. 105). Similarly, other countries also depicted different issues related to Aviation English (AE) assessment instrument. As a result, juxtaposed concerns revealed firstly, whether the various testing style instruments and approaches developed around the world measures listening and speaking skills of controllers and pilots. Secondly, do the assessment tools meet the needs of the requirements? Thirdly, are there factors that might affect testing system and assessment, if any, and what test developers have to take into consideration with this respect.

Though the number of researches had already been conducted regarding aviation English testing system for instance by Garcia (2015), Monteiro (2019), the context still needs to be explored more in details. Obtained findings should be shared with aviation community to develop expertise not only in one particular country but globally. From that perspective, researches and activities within aviation English field will disclose the number of challenges in the industry from different sides and contexts. This will provide possible scenarios to enhance and ensure safe usage of English as a Lingua franca (ELF) in the air-ground communication and adequate language knowledge provision while assessing language proficiency requirements. Evaluation, synthesis and sharpening of the issues mentioned above represent the main objective of all international organizations and stakeholders to meet and comply with the specific requirements of the field of aviation.

The research problem. In spite of the fact that different countries speak their own languages, all of them use the English language for safe flight operations. "The language of a situation, such as medical English, or legal English as a sort of special language like a dialect, in the sense of a special code having its own syntactical peculiarities and its own vocabulary is, at best, only a partial explanation, and that the ability to communicate adequately in any situation involves more than the possession of a code" (Corder, 1981, p. 48). The issues rise with this respect when it comes to using the code and making adequate interpretation. In this case, it is not enough to know just the language, but to have communicative competence and usage of the specific language code is important. Another view worth to be noting one may know the language and have the skills to use the code as well, within the specific environment, but s/he might not be able to communicate outside of this particular environment where s/he uses the language and the code. This is the case of aviation English. Controllers with minimum language proficiency set by ICAO (2010a) (see

chapter 3 for further discussion of language proficiency requirements) are able to communicate successfully on frequency by their experience, however, while retaking the language proficiency requirements (LPRs) test they face problems, they may fail the exam and have to take it again, sometimes even more than two times. In this case, as Corder argues a learner's knowledge should be brought to the required standard or "bring the demands of this situation into accord with the learner's abilities in the language" (Corder, 1981, p. 49).

Air traffic controllers during communication with pilots make zealous efforts to produce either standard phraseology, which is considered by them to be routine, or they have to produce spontaneous language under non-standard situation. Hence, if they somehow decide to use plain English during standard procedures and unexpectedly they face a case investigation later, all experts would ask why the controller had not used standard phraseology instead. From that point of view, the problems that controllers face are that the environment they are working in requires strict usage of standards, therefore, the assessment of LPRs requires the usage of plain English more than the usage of standards. Another huge problem in this field unifies the number of factors including evaluation tool, speech rate, accent, type of errors/ mistakes, the variate of usage of ELF by Non-Native Speakers (NNES) and the English language usage by Native Speakers (NES) that might influence both radiotelephony (RT) communication and the assessment of LPRs as well. From those perspectives, the goal of this particular research is related to tackling and analyzing errors of radiotelephony communication against assessing language proficiency requirements, as well as factors affecting validity in aviation English assessment. Moreover, the discourse of error analysis will aimed to verify whether the rating scale in use for controllers' language proficiency requirements assessment is capable of capturing the types of linguistic challenges mentioned above and if so, if this is reflected in the testing instrument in use in Georgia and if not, how to change the instrument to obtain a match.

The data is elicited from three phases of an experiment including error elicitation from radiotelephony communication in Georgian airspace conducted by Georgian air traffic controllers and from errors elicited from LPRs assessment committed by Georgian controllers. As for the last phase, online questionnaire fulfilled through SurveyMonkey will ferret out active controllers' views towards the errors derived from RT and they will assess error samples whether the linguistic challenges represent threat to communication or not, should they be considered as errors at all or not. The chart below provides the three phases of the experiment.

Figure 1: Experiment of the Research

Experiment	
Phase One	Error Analysis: Analysis of errors committed by Georgian controllers in Georgian airspace on frequency during radiotelephony communication
Phase Two	Error Analysis: Analysis of errors made by Georgian controllers found in LPR assessments conducted in Georgia
Phase Three	Analysis of error samples through online survey to ferret out whether errors create real threats to radiotelephony communication or not.

Actuality of the research. Nowadays, the field of assessing English for specific purposes, including various branches like English for aviation, is widely spread all over the world. Aviation as an industry is increasing consistently; this contributes and enlarges the usage of the English for safe flight operations in the air and on the ground as well. Thus, aviation English is not explored as much as it used to within its different contexts around the world. Each research done regarding aviation English increases an awareness amongst specialists and enhances methodology, preparation programs for specific population and materials for the testing, teaching and possible ways of solutions of risen issues. This research focusses on investigation of human factors within the frame of error analysis and its' impact on validity in aviation English assessment of language proficiency requirements (LPRs) in the case of Georgia.

Novelty of the research. Types of testing language proficiency requirements vary around the world, thus test providers have to comply with International Civil Aviation Organization (ICAO) requirements and ICAO rating scale to design and develop the test for controllers and pilots. Analysis of errors committed by Georgian controllers on frequency during radiotelephony communication and during their language proficiency requirements (LPRs) assessment, evaluation of LPR assessment tool in use in Georgian will disclose the compliance of Georgian LPR test with ICAO rating scale and requirements. If the examination of variables determines that assessment instrument is not valid, the research will investigate and refer how to change the assessment instrument to meet ICAO requirements and obtain a match with ICAO rating scale. This research is the first one conducted in Georgia within the context of investigating types of errors made by Georgian controllers on frequency during radiotelephony communication and during language

proficiency requirements (LPRs) assessment. In addition, from that perspective the study would be the first that will rout out the validity of language proficiency requirements (LPRs) assessment of high stakes in the country as well.

Practical and Theoretical Value of the Research. Testing instrument in use in Georgian Aviation University International Aviation Training Center was also designed according to ICAO requirements, nevertheless there is no evidence whether the test is valid and complies with ICAO requirements. The outcomes of the research, on the one hand, will identify language challenges of controllers on the frequency and challenges of language proficiency requirements (LPR) testing in Georgia. On the other hand, the research results will disclose similarities and discrepancies between the provision of the English language of Georgian controllers according to the two data set. What is more, the research will develop error typology for Georgian learners. The results can be shared and used by the proficiency test developers and researchers in the field, aviation English raters, operational experts (OPEs) and English language experts (ELEs), and aviation English instructors/lecturers. This dissertation will provide recommendations with regard to aviation English use, language knowledge improvement and enhancement and refinement of testing instrument. The results will also increase awareness of instructors/lecturers with respect of language challenges of the specific population within the frame of assessment, and authentic situations and will enable them to apply theoretical knowledge in practice for valid, adequate, appropriate teaching criteria and assessment of high stakes as well.

The study will juxtapose analysis of the theories of educators and tackle key factors affecting the validity of assessment and the ways how to improve and refine LPRs assessment instrument in use in Georgia to meet the requirements of ICAO. Theoretical bases of the research are as follows:

- Fundamental Considerations in Language Testing (Bachman, 1990)
- Language Testing in Practice: Designing and Developing Useful Language Tests (Bachman & Palmer, 1996)
- Assessing Language for Specific Purposes (Douglas, 2000)
- Measurement and Assessment in Education (Reynolds, Livingston, & Willson, 2009)
- Generalizability Theory and Classical Test Theory (Brennan, 2011)
- Current Concerns in Validity Theory (Kane, 2000)
- Errors in Language Learning and Use; Exploring Errors Analysis (James, 1998)
- Error Analysis and Interlanguage (Corder, 1981)

- You Can't Learn Without Goofing An Analysis of Children's Second Language 'Errors' (Dulay & Burt, 1980)
- Analyzing Oral Proficiency Test Performance in General and Specific Purpose Context (Douglas & Selinker, 1992)
- Assessing Speaking (Luoma, 2004)
- Assessing Listening (Buck, 2001)
- Manual on the Implementation of ICAO Language Proficiency Requirements; DOC 9835 (ICAO, 2010a)
- Language Testing Criteria for Global Harmonization; Cir 318 (ICAO, 2009b)
- Manual of Radiotelephony; DOC 9432 (ICAO, 2007)
- Aeronautical Telecommunications (ICAO, 2001a)
- Personnel Licensing (ICAO, 2011)
- ICAO LPR Test Design Guidelines (ICAEA, 2019)
- Guidelines for Aviation English Training Programmes; Cir 323 (ICAO, 2009a)

Research questions

1. What kind of errors are made by Georgian controllers on frequency during radiotelephony communication?
2. What kind of errors are made by Georgian controllers during language proficiency requirements (LPRs) assessment?
3. What kind of similarities and discrepancies are there between the types of errors elicited from Georgian controllers' radiotelephony communication and language proficiency requirements (LPRs) assessment?
4. To what degree does the testing instrument in use in Georgia reflect all these types of linguistic challenges?

Research hypotheses

1. Errors made on frequency and during aviation English assessment of language proficiency requirements (LPRs) of Georgian controllers have an interactive effect on each other.
2. International Civil Aviation Organization (ICAO) Rating Scale captures types of linguistic challenges elicited from Georgian controllers' radiotelephony communication and language proficiency requirements' (LPRs) assessment.
3. The testing instrument of language proficiency requirements (LPRs) in use in Georgia is sufficiently valid and complies with International Civil Aviation Organization ICAO language

proficiency requirements (LPRs) and International Civil Aviation Organization (ICAO) rating scale.

Structure of the Dissertation. The dissertation includes introduction, 5 Chapters and conclusion and recommendations.

Chapter 1: Literature Review: English for Specific Purposes Concerning Assessment; Essential Measurement Qualities within Reliability and Validity Context

The aim of the first chapter was to identify peculiarities of ESP combining disciplines like English for science, engineering, aviation, etc. the notion of ESP assessment, authenticity of the tasks, interaction of the language and content knowledge in ESP and two major criteria of the assessment reliability and validity. The searched data routed out that the main characteristic of ESP is learners need to use ESP in the work related environment. The data also revealed that aviation English, used by controllers and pilots working in the international airspace, represents specific branch of ESP. As it was already mentioned the number of catastrophes caused by lack of English language knowledge contributed creation of language proficiency requirements (LPRs) for controllers and pilots in the ESP context. However, before identifying, what LPRs exactly are aviation English and its characteristics should be discussed.

Chapter 2: Background of Teaching Aviation English and Role of Georgian and International Civil Aviation Authorities

Aviation English (AE) used by controllers and pilots is complex. Complex nature of AE evoked the number of requirements to ensure clear and unambiguous air-ground communication in the international environment. Requirements set by ICAO for safe air-ground communication merges adequate knowledge of AE and use of standard phraseology during RT communication. Moreover, ATCOs and pilots have to master language skills in AE context and those skills should be assessed. Only after assessment controllers and pilots are granted with language proficiency that is necessary for radiotelepnoy communication. Georgian Aviation University and LTD SAKAERONAVIGATSIA are in charge of preparation of pilots and controllers respectively. Nevertheless, the faculty of Air Transport Flight Exploitation at Georgian Aviation University prepares bachelor specialists who major in flight exploitation of aircraft (commercial pilot). As for the LTD SAKAERONAVIGATSIA, Georgian Navigation Service Provider (GNSP), after the selection of appropriate number of candidates, the organization sends the candidates abroad to get the adequate knowledge and license for controllers. GNSP, Georgian Civil Aviation Agency (GCAA), EUROCONTROL and of International Civil Aviation English Association (ICAEA) are

local and international organizations. They are focused on the safe/secure operations in the air and on the ground combining air traffic flow and capacity management; collection of air navigation charges; regional control of airspace; development of new ATM technologies and procedures, and ATM training and language proficiency requirements (LPRs) assessment. However, Skills to be assessed and assessment criteria set for language proficiency requirements for controllers and pilots (ICAO, 2010a) need to be discussed to get a deep concept of the research.

Chapter 3: Language Proficiency Requirements (LPRs) and ICAO Language Proficiency Rating Scale for Aviation Personnel; ICAO LPRs Test Design Criteria; Language Proficiency Assessment Test in use at Georgian Aviation University's International Aviation Training Center

Discussion of chapter 3 underlined ICAO LPRs, ICAO rating scale, ICAO TDGs and LPR assessment instrument in use in Georgia. Overall revision of requirements, recommendations, and criteria, tight link amongst chapter 1, chapter 2 and chapter 3, pointed out that for controllers and pilots LPR assessment, precise, separate and equivalent versions of the test format should be developed. Moreover, testing instrument needs to engage test takers in job-related communication context within its various aspects to ensure safe flight air-ground communication. Issues discussed in the three chapters in details have made arguable Georgian Aviation University International Aviation Training Center LPR assessment instrument's validity and tailored the main objective of this particular research to analyze factors affecting validity in aviation English assessment through evaluation errors of radiotelephony communication against language proficiency requirements in the case of Georgia. Before conducting the study and analyze errors of RT and LPR assessment of Georgian controllers, the concept of error analysis needs to be explored.

Chapter 4: General Concepts of Error Analysis, Sources of Errors, Types and Levels of Errors

The key point of chapter 4 was to identify types of errors from the linguistic point of view. The study underlined that not all types of faults can be concluded as errors, they might be categorized as mistakes. Nevertheless, to widen the horizon of the study details were searched from various literature sources and identified the major typologies of errors, namely: grammaticality, acceptability, correctness, and strangeness and infelicity. As for the sources, they are as follow: local and global errors combining overgeneralization, ignorance of rule restriction, incomplete application of rules; false concept hypothesized; fossilization, hypercorrection**,** and avoidance (Heydari & Bagheri, 2012; Khansir, 2012; Long & Hatcho, 2018; Richards, 1970). The research

also searched the levels of errors and categorized them as substance, text and discourse errors (James, 1998). In chapter 5, the data elicited from radiotelephony (RT) communication and language proficiency requirement (LPRs) assessment will identify major types of errors committed by Georgian controllers during RT and LPRs assessment and will address them to the linguistic categories of the errors to investigate main threats to validity of LPR assessment tool in use in Georgia. Finally, the research will provide the recommendations for modeling and refining LPR test instrument for Georgian controllers for more efficient, valid and equivalent test type formation.

Chapter 5: Research Methodology and Methods

The data elicited from the radiotelephony communication recordings and the recordings of the controllers' assessment, analysis of error samples through online survey, were studied through description of the results within the frame of qualitative and quantitative research methods (Schreiber & Asner-Self, 2011). For supporting quantitative study of the research, SPSS software descriptive analysis was also applied, which calculated standard deviation, mean, median and mode of the error analysis of the phase one.

The data of RT between pilots and controllers are searched from Georgian Air traffic control including tower and Area Control Center (ACC), West and East part of the control. The time dimension when the recordings were recorded is from 2017 November-December to 2018 February, March, April, July-December. The samples involve only standard transmissions among Georgian controllers and international boards including Georgian airline. The length of each sample is approximately 5 seconds up to 2 minutes; Entire number of RT hours transcribed, recorded and analyzed corresponds to 60 hours, as for the sum of the erroneous samples it equals to 270.

Language proficiency requirements' (LPRs) test recordings involve only Georgian controllers' samples. Total number of the LPR test is 60 and they are conducted in 2016, 2017 and 2018.

As for the online questionnaire, conducted through the online platform SurveyMonkey, six operational experts (OPEs) who participated in it have active license of air traffic controllers, thus either some of them are active controllers, or hold leading positions at LTD "SAKAERONAVIGATSIA". Only two subjects out of six currently work for EUROCONTROL in Brussels as a Network Operations Controller and for Georgian Civil Aviation Agency (GCAA)

as a Flight Safety Inspector ATM/ANS, however both of them were ATCOs in the past at LTD "SAKAERONAVIGATSIA".

The Link between Findings and the Aim of the Research:

The aim of the research was to analyze factors affecting validity in aviation English assessment through evaluation errors of radiotelephony (RT) communication against language proficiency requirements (LPRs). In response to the first and the second research questions that are as follows:

1. What kind of errors are made by Georgian controllers on frequency during radiotelephony communication? And
2. What kind of errors are made by Georgian controllers during language proficiency requirements (LPRs) assessment?

Primary and secondary data ferreted out all possible categories of the errors made by Georgian controllers on frequency and during LPRs assessment. If start with errors committed on frequency during RT and LPRs, and errors committed by the controllers can be applied to the performance and competence errors. The secondary data reveals that if the errors do not interfere the meaning and do not contribute ambiguity during communication those types of local errors, in another words performance errors are labeled as mistakes rather than the errors (Heydari & Bagheri, 2012; James, 1998; Nemser, 1980) and they are the misuse of the prepositions, auxiliaries, articles etc. As for the wrong pronunciation, read beaks, clearances, call signs and transmission of way points, wrong word order, wrong word selection, sentence structures all of them are discussed under the umbrella term the competence errors, so called global errors and they interfere with meaning, provoke ambiguity and endanger safe communication in the air and on the ground as well.

Nevertheless, the role of interlingual errors should be noted especially while speaking of pronunciation. The number of examples ferreted out that Georgian ATCOs tend to use Georgian phoneme pronunciation while using English language, L1 interference over target language (TL). It is not only pronunciation. Intralingual errors including overgeneralization, ignorance of rule restriction, incomplete application of rules; fossilization, hypercorrection, avoidance are the major sources of errors amongst Georgian controllers. Out of intralingual errors overgeneralization, ignorance of rule restrictions, incomplete application of rules and fossilization take place in RT. In contrast to RT communication, during LPR assessment, when the Georgian language users perform within the frame of plain English language, they tend toward the avoidance and communication strategy-based errors alongside the overgeneralization, ignorance of rule restrictions, incomplete application of rules and fossilization.

Permanent usage of singular auxiliary verb "is" instead of the plural "are" during RT, even omission of them represent the obvious sample of overgeneralization, when the language user "creates a deviant structure on the basis of his experience of other strictures in the target language" (Richards, 1970, p. 6). As for the misuse of prepositions, and articles they are applied to the ignorance of rule restrictions. Though the controllers had acquired the rules while learning English language with respect the usage of prepositions and articles, subjects tend to use them against the rules. It is worth noting that Georgian language does not have articles and this factor also plays the main with this regard. From the error analysis routed out from RT communication the ignorance of rule restrictions and incomplete application of rules overlaps each other. Both of them unify not only linguistic aspects like using simple rules for communication by avoiding grammatical correctness, but more importantly cover wrong and incomplete read-backs, clearances, call sign transmissions, pronunciation of standard words, the usage of non-standard words/phrases, and as the searched data revealed all of them provoking hazard for safe flight operations. The same can be said with respect the errors found out through LPRs' assessment, aligned to overgeneralization and ignorance of rule restrictions. Under the frame of overgeneralization ATCOs omit permanently auxiliary verbs "am, is are" through their introduction, interview and description of the silent video footage or a picture. Inappropriate use of articles, prepositions, pronouns during LPR assessment are identical to the RT communication and is contributed by the lack of knowledge of TL's system (James, 1998).

Of the Intralingual errors, namely fossilization is provided widely through the pronunciation, since controllers tend to use Georgian phonemes' pronunciation instead of English phonemes' pronunciation as it is given in the description of the research phase one and the phase two. Phonemes and letter combinations articulated on the frequency during RT and during LPR assessment are similar, thus there is a discrepancy as well. For instance, phonemes "d, f," and their identical pronunciation are identified in the both data. If controllers pronounce the phoneme "d" as "t" the waypoint name BARAD on frequency, they use the same articulation of this letter indeed in another context during LPR assessment in the verb "descend" and adjective "packed". Again, the last phoneme "d" is pronounced as "t". If on frequency, there is a noun "traffic" /ˈtræfɪk/ with strong stress on the phonemes "ff" enunciated as Georgian phoneme "ჯ". there is an adjective "beneficial" /ˌbɛnəˈfɪʃəl/ while performing during the LPRs' assessment. Fossilization and interlingual errors overlaps each other with this respect. Georgian controllers' MT strongly influence TL. It is worth recognizing here that even though the third phase of the research, conducted amongst six specialists explored that pronunciation issues do not interfere safe air-

ground communication the opposite was verified by RT error analysis and LPRs error analysis conducted for this research.

Avoidance and communication strategy-based errors are typical while passing LPRs assessment. Avoidance is expressed through the usage of simple tenses rather than the complex once. If ATCOs perform with complex utterances, they deal with it by committing errors. For instance, the extract from the interview during introduction of the candidate #2 points out that he uses simple tense in order to respond the question provided by the examiner #2 "well I love to travel, when I have opportunity I always travel".

> "Examiner # 2: So do you have any interests, what you do in your free time?
>
> Examinee: Yee, well I love to travel, when I have opportunity I always travel. Mainly it's you know business travel by my company so but other than that I love to travel inside the Georgia, inside Georgia by my car. I enjoy being in the road"

The same passage from the performance of the candidate #2 reveals communication strategy-based error. when the test taker prolongs the idea he uses verb "travel" instead of the nouns "trip" or" journey". Even if the "travel" is used as a noun "business travel", it is not the expression that is used for that purposes.

The discussion of linguistic categories of errors in the literature review pointed out three dimensions: omission, addition and misformation. The analysis of RT and LPRs assessments' errors identified omission and misformation. Thus, there are some cases of addition expressed through double marking. For example "the EUROCONTROL itself does not gives out any regulations..", "does not gives" represents the sample of double marking used by the candidate #5. The study of the samples explored that function words like auxiliary verbs "is, are" are frequently omitted during RT and LPRs assessment as well. Omission makes focus on function and content words. According to the research omission of pronouns, prepositions were broadly presented in the both data. Another linguistic category misformation within its subcategory misselection, also occurs by using wrong form of the words in RT and LPR assessment. For instance "one departure traffic before.. " is a sample of misselection where the controller has to use "departing" rather than "departure" during RT. As for the LPR assessment of the candidate #4, he uses noun "trainee" instead of the noun "trainer" "I'm ee air traffic controller and also air traffic controllers' trainee".

Misordering, another concern of error analysis also can be identified during RT though it was rare case. For instance:

> "C - AC 293 continue taxi and you will be tow stand

P – Say again AC 293

C – AC 293 continue taxi to stand 100B and you will be tow by car"

The first clearance of the controller includes misselection and omission at the same time that led to the misordering. "You will be towed to the stand" should be the correct word order including preposition "to" and the word form "towed" instead of the used "tow". Therefore, errors made by controllers namely misordering and misselection overlaps each other in these linguistic categories. As the assessment data revealed there are frequent use of misordering. Almost all candidates including #18, #33, #40, #53, etc. are vulnerable to misordering.

Most probably, the rare cases of misordering was contributed by the absence of the data including non-standard situations.

Apart from error description and providing their typology, the levels of errors: substance errors, texts errors and discourse errors were provided through the analysis of RT and LPRs assessment.

If start with substance errors unifying three broad categories: segmental, combinatorial and suprasegmental. Only segmental is identified amongst Georgian controllers as the users of the second language (SL). For instance, well know example of the pronunciation of the waypoint of BARAD where the consonant [d] is pronounced as [t] at the end of the word is a common case. Generally, it is a frequent to hear how Georgian controllers pronounce the name of the waypoint as [bʌrʌ*t] instead of [bʌrʌ√d]. However, examination of the transcripts depicted that interdental fricative [ð] in "the" becomes /d/ almost in all cases whenever Georgian controllers pronounce the definite article "the" during RT and LPRs as well.

In RT and LPRs assessment the second level, text errors have routed out formal errors within its two categories formal misselection and misformation.

"Controller - AC 56 initially FL 110 aaa on RWY heading, squawk 6753 and further clearance from departure aaa"

The extract from RT where the word "further" /ˈfɚðɚ/ is pronounced as the word "father" /ˈfɑːðɚ/ due to common phonemes, and shared phoneme features. This is the characteristic of formal misselection covering errors of malapropism, so called synforms confusibles. The same example can be traced in the number of controllers' LPR assessment. For instance, the evaluation of the candidate #1 tackles pronunciation of nouns "nose" /ˈnoʊz/ instead of the noun "noise" /ˈnoɪz/.

As for the misformation within the frame of the formal text errors characterized through producing foreign language (FL) non-existent words that are produced either TL or MT interference, can also be seen in the Georgian airspace during the RT. For example:TL provokes creation of wrong word formation of "assumate" from the adjective "assumed" /əˈsuːmd/. The usage of the word "spectacle" instead of "spectacular" is a rare case, nevertheless identified in the second phase of the experiment which discuses errors of LPRs assessment. Appears that controllers show their bias to use words that do not exist when they perform in RT and LPR assessment as well.

The analysis of the searched data in RT come up with the last level of errors, discourse errors, disclosing receptive error combination: misunderstanding and misprocessing.

> "Controller – AC 712 cleared to Dubai flight level rout after take-off continue RWY heading climb FL 110 squawk 6774 when air born frequency approach 134.6
>
> Pilot – AC 712 cleared destination Dubai flight plan rout RWY heading initially up to FL 110 squawk 6774
>
> Controller – Frequency 134.6
>
> Pilot – 1134.6 "

The extract from RT points out that frequency numbers were not read-back correctly by the pilot. However, there was no correction made by the controller. The characteristic of misprocessing underlines that when a language user fails to obtain intended objective of the text, when a subject identifies unintended objective of the discourse or intended ones are not identified this is a level of substance referred as misprocessing (James, 1998). Extract from RT provided above represents sample of the misprocessing.

> "Controller – AC 315 good morning, Tbilisi tower – you are cleared to your destination LTFJ climb to the RWY heading FL 480 squawk 6755 when air born Tbilisi approach 134.6
>
> Pilot – Cleared destination LTFJ, FL 280 RWY heading and squawk 6751 air born 134.6 AC 315
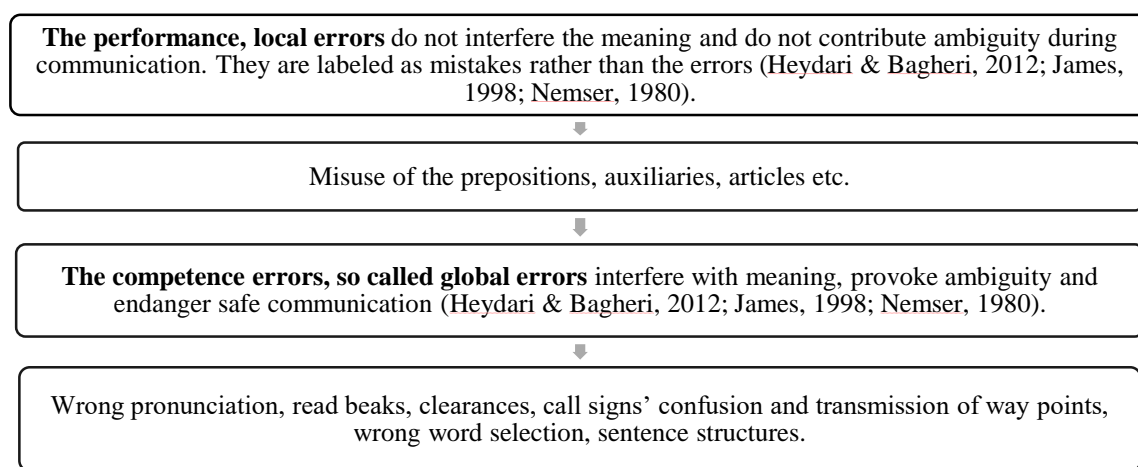>
> Controller – Correct "

Communication above ferrets out that pilot read-back wrong information of the flight level (FL) and the squawk. As for the ATCO he has confirmed the wrong read-back. From the perspective of the discourse errors, this is the case of communication failure, misunderstanding in the international air-ground communication held between the controller and the pilot.

As it can be seen errors explored from RT and assessment of LPRs strongly overlaps each other. There is no matter whether they are using the language in the air or on the ground, errors committed by them are pertained to linguistic error analysis (EA) through categorization sources of errors, linguistic categories of errors and the level of errors as well.

Figure #4 below finalizes two broad set of types of local and global errors analyzed through RT and LPRs' assessment of Georgian ATCOs.

Figure 4: Local and Global Errors Analyzed through RT and LPRs' Assessment of Georgian ATCOs

The performance, local errors do not interfere the meaning and do not contribute ambiguity during communication. They are labeled as mistakes rather than the errors (Heydari & Bagheri, 2012; James, 1998; Nemser, 1980).

Misuse of the prepositions, auxiliaries, articles etc.

The competence errors, so called global errors interfere with meaning, provoke ambiguity and endanger safe communication (Heydari & Bagheri, 2012; James, 1998; Nemser, 1980).

Wrong pronunciation, read beaks, clearances, call signs' confusion and transmission of way points, wrong word selection, sentence structures.

The outcomes of the first and the second research questions are tightly linked to the third research question: What kind of similarities and discrepancies are there between the types of errors elicited from Georgian controllers' radiotelephony communication and language proficiency requirements (LPRs) assessment?

The data depicts that yes there are similarities and discrepancies of the errors made on frequency during radiotelephony communication and during LPRs assessment. Regarding similarities, the following can be discussed. Georgian language users commit the same pronunciation errors in the air and on the ground. Erroneous utterance production of phonemes and letter combinations comprising the same phoneme characteristics are common cases while producing the language during RT and LPR assessment. Similarities are revealed within the frame of the usage of prepositions, pronouns, auxiliary verbs, articles, word selection, word order and sentence structures as well. As for the differences, in contrast to the data elicited from RT communication, which pointed out the number of read-backs, and transmitted clearance errors, the LPRs assessment error analysis did not identified these types of competence errors. Since the assessment tool, provided by the Georgian Aviation University International Aviation Training Center does

not include a section of the role-play, or an interview where controllers would be able to simulate real-life radiotelephony communication and provide adequate usage of the read-backs and the clearances as well.

In response to the fourth research question which is as follow:

4. Does the testing instrument in use in Georgia reflect all these types of linguistic challenges?

The findings searched from error analysis of radiotelephony communication, error analysis of language proficiency requirements (LPRs) assessment conducted in Georgia, overall errors linguistic categorization, the summary of the survey aimed to find out the types of errors that may lead to ambiguity or endanger safe flight operations and detailed description of LPR assessment tool in use in Georgia, revealed:

- Assessing speaking skills of controllers by introduction with follow up questions and description of silent video footage or a picture reflects of the linguistic challenges of wrong word order, sentence structure, the usage of prepositions, articles and pronouns.

To look through the findings from general English knowledge, communication and speaking skills perspective, Georgian controllers lack of general English knowledge, communication and speaking skills. If start with radiotelephony communication skills controllers have to demonstrate skills within "clarity, sufficiency, conciseness, managing misunderstandings, adopting language to suit others" (ICAEA, 2019, p. 49). However, the error analysis, the error categorization and the survey summery revealed that controllers fail to clarify information on frequency during communication; they also lack sufficiency and conciseness and do not deal with misunderstandings frequently. Standard communication samples have not identified controllers' ability of adapting language to suit others (ICAEA, 2019). As for the communication skills necessary for general English communication "engagement, information sharing, turn taking" (ICAEA, 2019, p. 49) have not been identified neither by radiotelephony communication error analysis nor language proficiency requirements (LPRs) assessment error analysis. Since analyzed standard RT communication has provided only short standard transmissions, where controllers were involved in routine situations by giving standard clearances or requesting standard information and secondly, assessment tool in use in Georgia does not provide tasks to engage test takers through turn taking and sharing information according to LPR assessment requirements (ICAO, 2010a) (ICAEA, 2019) (ICAO, 2009a). Errors searched from radiotelephony communication committed across the speaking skills: pronunciation, vocabulary, structure,

comprehension, fluency, strategic competence, discourse management depicted that controllers commit the same errors during LPRs assessment and apply the same strategy of RT communication to interact during the assessment. As a result, the number of erroneous utterances are increase during speaking skills assessment. Communication requiring extended responses is not sufficient, ideas are vague, test takers repeat the same expressions to come up with the responses. Overall speaking assessment tool:

- does not provide adequate number of tasks to deal with misunderstandings, conciseness and clarifications;
- does not enable examinees to use adequate standard phraseology;
- does not enable examinees to use code switching ability to shift from the standard phraseology to the plain language;
- does not enable examinees to sharp, tailor and give opinions based on the given tasks;
- does not enable examinees to negotiate, evaluate and deal with standard and non-standard situations and make a chronological report of the events;
- It is vulnerable to guessing;
- candidates are familiar with the procedure they know that introduction is a part of the assessment and it is prepared beforehand;
- contains follow up yes or no questions;
- questions put by the examiners are vague and the candidates lose fluency;
- questions lead the interview to more friendly chat;
- does not provide appropriate number of speaking tasks linked to real-world context;
- there is no separate test format in use to assess controllers and pilots;

In sum, high construct validity to assess adequate knowledge of communication and speaking skills (ICAEA, 2019) within the frame of standard radiotelephony communication and LPR assessment is not provided, assessment tool in use in Georgia does not reflect all types of linguistic challenges. Based on the findings and the literature review the first and second hypotheses of the study are verified and the third hypothesis of the research is neglected.

Errors made on frequency and during aviation English assessment of language proficiency requirements (LPRs) of Georgian controllers have an interactive effect on each other.

International Civil Aviation Organization (ICAO) rating scale captures types of linguistic challenges elicited from Georgian controllers' radiotelephony communication and language proficiency requirements' (LPRs) assessment.

Testing instrument of language proficiency requirements (LPRs) in use in Georgia is not sufficiently valid and does not comply with International Civil Aviation Organization (ICAO) language proficiency requirements (LPRs) and International Civil Aviation Organization (ICAO) rating scale.

Conclusion and Recommendations

Based on both primary and secondary data analysis factors affecting validity of LPR assessment in Georgia can be categorized as linguistic challenges of Georgian controllers and LPR assessment instrument in use in Georgia. The test, which does not reflect Georgian controllers speaking and listening linguistic challenges, represents a treat to assessment and leads to the risk to grant the test takers with the language proficiency they might have not at all. Appears that test instrument tasks provided by Georgian Aviation University International Aviation Training Center needs to be refined, and improved to comply with LPR requirements. However, apart from linguistic challenges, the facts searched and analyzed in chapter 2 and chapter 5 shall be considered for providing recommendations for tasks' modification. They are as follows:

- Neither Georgian Aviation University nor Georgian Air Navigation Service Provider (GNSP) do not provide EUROCONTROL Specification for the ATCO Common Core Content Initial Training (EUROCONTROL, 2015);
- Elder generation of Georgian controllers are trained on abroad mainly in the Ukraine;
- Younger generation of Georgian controllers are trained on abroad mainly in France and Czech Republic;
- Both generation of Georgian Controllers are initially granted with language proficiency by the training organizations abroad;
- Georgian controllers apply for LPRs assessment in Georgian Aviation University International Aviation Training Center only after their language proficiency license is expired; once every 3 years if they hold ICAO operational level 4, once every 6 years if the hold ICAO extended level 5;
- There is no official requirement for Georgian controllers to refresh English language knowledge periodically;
- There is no language-training course designed for controllers in Georgia so far;
- There is no an evidence that Georgian controllers refresh English language knowledge permanently;

- Based on the research results everyday RT communication enables controllers to maintain English language proficiency at the extent of standard phraseology;

- Practical use of English language under the working environment is applied to accomplish LPRs assessment;

- 58 out 60 candidates, whose assessment recordings were analyzed within the frame of error analysis, dealt successfully with listening comprehension tasks during LPRs assessment; all of them achieved ICAO operational level 4 in the listening part of the test;

Based on the findings the research come up with the recommendations for modeling the frame of the speaking and the listening tasks for Georgian controllers LPR assessment. Recommendations are based on: International Civil Aviation Organization (ICAO) language proficiency requirements (LPRs), International Civil Aviation English Association (ICAEA) Test Design Guidelines' (TDG) 8 criteria, International Civil Aviation Organization (ICAO) rating scale, error analysis of radiotelephony communication and LPR assessment conducted in Georgia, and Georgian Civil Aviation Agency (GCAA) Mandatory Occurrence Reporting (MOR) Scheme forms in use in Georgia (see the MOR sample in the appendix 10). The recommendations also consider current LPRs assessment format in use in Georgian Aviation University International Aviation Training Center.

Recommendation #1: Separate LPR test model should be designed for Georgian controllers;

Recommendation #2: Appropriate number of test versions should be no less than 6 versions (ICAEA, 2019; ICAO, 2010a; ICAO, 2009b);

Recommendation #3: LPR Test should include three parts: I. Introduction; II. Listening comprehension; III. Verbal communication;

Recommendation #4: The first part of the test format introduction should cover filling in the test takers personal file and introduction to the procedure of the test;

Recommendation #5: Speaking test task format should provide visual and non-visual tasks to enable test takers perform in the real-life resemble situation;

Recommendation #6: Speaking test task format should include different sections;

Recommendation #7: Speaking test task section 1 should include role-plays in radiotelephony communication comprising standard and non-standard situation by using non-visual, (face to face), interaction with the examiners; Timing 6-7 min.

Recommendation #8: Visual, face to face interaction with the examiner during the speaking test task section 2 should be debriefing of the first section with follow up three questions; Timing 3-4 min.

Recommendation #9: Visual Speaking test task section 3 should be description of a picture with follow up four questions related to the picture on a more general or abstract level; Timing 3-4 min.

Recommendation #10: Separate listening comprehension test tasks should be modified for Georgian controllers;

Recommendation #11: Listening comprehension test task should include different sections;

Recommendation #12: Listening comprehension test task section 1 should include six audio recordings from radiotelephony communication comprising standard and non-standard situations; Timing 17 min.

Recommendation #13: Listening comprehension test task section 2 should include audio recordings of 15 short messages from radiotelephony communication; Read-back of those short massages should be provided by the test taker; Timing 3-4 min.

Recommendation #14: Listening comprehension test task section 3 should be short audio file description providing information of work-related aviation context; Timing 3-4 min.

Recommendation #15: A full sample test should include organizational documentations: Test takers personal file; Test takers attendance worksheet; Examiner's script for Introduction to test procedures; Examiner's scripts for role-plays; Examiner's scripts of follow up questions dedicated to role-plays' debriefing; A separate paper of a picture for picture description; Examiner's scripts of follow up questions dedicated to picture description; Test taker's test card for listening comprehension dedicated to the Section 1 and Section 2; All audio recordings and transcripts; Keys, worksheets and checklists for listening comprehension tasks; Assessment forms for examiners; ICAO rating scale; Examiner's attendance worksheet; Technical equipment: video recorder; audio player, headphones;

A full sample of the LPRs Test model for Georgian controllers, based on the recommendations above, with rubrics and inputs are discussed in the dissertation in details. On the one hand, recommended model of the test tasks underlines that test taker is able to produce both aviation and general English knowledge and speaking skills as well, his/her background and experience. On the other hand, examiner/raters are able to evaluate nature of a verbal communication of the examinees, test takers' abilities to comprehend, analyze, sharpen and tailor discourse within

aviation English and general English context, produce adequate, fluent knowledge of structure, vocabulary, sounds in English to prevent from ambiguity.

Primary and secondary data analyzed for this research revealed that aviation English is complex and the users are specific target audience. Controllers ensure international safe flight operations over the Georgian airspace, from that perspective they also have to hold adequate language knowledge and should be supported with an appropriate assessment tool. It is worth recognizing once again that while refining the LPR test tool, participation of operational and language experts should be ensured for providing valid test (ICAO, 2010a; ICAEA, 2019; ICAO, 2009b).

The major results of the dissertation were published in the following articles:

1. Pipia, E., Clark, B. & Tephnadze, I. (2019). Inter-rater agreement of Georgian raters between two assessment cycles of Georgian controllers. In M. Schaefer, *Innovation in the Modern World (2019)* (pp. 55-62). Poitiers, Frankfurt, Los Angeles;: Association 1901 "SEPIKE". Retrieved from https://5b925ea6-3d4e-400b-b5f3-32dc681218ff.filesusr.com/ugd/b199e2_66fbac5a13f24d969a54e0255b0c06d3.pdf

2. Tephnadze, I. (2015). English for specific purposes . *Актуальні Проблеми Вищоі Професійноі Освіти* (pp. 140-141). Kiev : Національний авіаційний університет.

3. Tephnadze, I. (2017). The Efficiency of measuring reliability and validity in assessing English language proficiency requirements of Georgian pilots and air traffic controllers. *IRCEELT* (pp. 274-280). Tbilisi: International Black Sea University.

4. Tephnadze, I. (2018). Assessment as a tool for defining knowledge within the frame of English for specific purposes (ESP). *Topical Issues of higher vocational education* (pp. 225-226). Kiev: National Aviation University.

5. Tephnadze, I. (2018). Syllabus design characteristics and planning steps for aviation English. In N. Doghonadze, J. Krajka, & J. Smeds, *New Trends in Education in Georgia* (pp. 116-133). Baznīcas iela 13-17, Rīgā, Latvia: Lambert Academic Publishing.

6. Tephnadze, I. (2019). What test developers have to take into consideration with respect to proficiency test of speaking and listening for pilots and air traffic controllers? In N. Parjanadze, & E. Pipia, *Modern Trends in Education; Perspectives for Reform Initiatives in Georgia* (pp. 1-184). Baznīcas iela 13-17, Rīgā, Latvia: Lambert Academic Publishing.