

May 10th, 9:00 AM - 9:55 AM

Workshop L: From a Language-Only Approach to a Broader View of Communicative Competence for Intercultural Communications in Aviation

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From a language-only approach to a broader view of communicative competence for intercultural communications in aviation

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Abstract

During the last 10 years of the ICAO Language Proficiency Requirements (LPRs) we have seen a focus on the training and assessment of pilots and controllers, mainly regarding their language proficiency. However, as aviation has grown in complexity and aeronautical communications have turned into a globalized and intercultural enterprise, training these professionals for effective communication requires a more comprehensive approach. Aiming to explore the real-world communication needs and the several competencies required by this multicultural workplace, a study was conducted (Monteiro, 2019) giving voice to aviation stakeholders from diverse ‘linguaculture’² backgrounds. This paper reports on results from the second phase of this study. First, drawing on a review of theoretical and empirical research on Aviation English, English as a Lingua Franca, Intercultural Awareness, and Interactional Competence, models of language use accounting for the aviation workplace were developed. Then, a preliminary matrix, specifying what is relevant to the context of radiotelephony (RT) communications was generated and validated by 128 aviation stakeholders. Participants’ comments on authentic RT scenarios were categorized according to what they perceived as necessary to improve the effectiveness of communication in terms of awareness, knowledge, skills and attitudes, and then organized along with the four inter-related domains: Aviation English, English as a Lingua Franca, Intercultural Awareness and Interactional Competence. Findings disclose what aviation stakeholders found as most relevant for successful RT communications and confirm the narrow view of proficiency defined by the current ICAO LPRs.

Keywords: aviation radiotelephony communication; multicultural workplace interactions; Language for Specific Purposes testing; matrix of construct specification; intercultural awareness.

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² The expression *linguaculture* was first used by Jenkins (2006), in her definition of English as a lingua franca (ELF), but Baker (2009) reinforces the relevance of the term “to highlight the language-culture connection and the importance of different languages and cultures in communication” (p. 569).

Introduction

In 2019, the International Civil Aviation English Association (ICAEA) Conference was hosted by Air Nippon Airways (ANA) in Chiba, Tokyo - Japan. The conference addressed the theme “Exploring the Aviation English training needs of: Ab-initio Pilots and Air Traffic Controllers, and Aircraft Maintenance Personnel”. Participants from a variety of cultural backgrounds had the opportunity to know more about what different countries have been doing regarding language and communication training, as well as to discuss related topics and engage in practical workshop activities. These topics were organized in five different sections:

- 1) Training the next generation of pilots and controllers for effective and efficient communication;
- 2) Guidelines and experiences in providing training for ab-initio pilots and controllers;
- 3) Equipping ab-initio pilots and controllers with language skills for operational training;
- 4) The language and communication training needs of aircraft maintenance personnel;
and
- 5) Recommendations for the development and implementation of training.

Aiming to contribute to the discussions related to the conference theme, to address communication issues that arise from the growth of aviation, with its new dynamics, complexity and intercultural nature, and to reflect on ways to align training and testing practices with the real-world communication needs of pilots and air traffic controllers (ATCOs), both ab-initio and experienced professionals, I prepared and delivered Workshop L, in Session 5 of the conference.

Workshop L had two main objectives. First, to present results from a research study that explored the communicative needs and the several competencies required by the multicultural context of international radiotelephony, giving voice to aviation stakeholders from diverse

linguistic and cultural backgrounds. This is, in fact, an English for Specific Purposes (ESP) perspective on construct definition, which values the voice of domain experts to determine what really matters for successful communication in a specific context. This study is part of a larger multiphase mixed methods study that addresses the construct of pilots and ATCOs` international radiotelephony (RT) communications and its operationalization in test design (Monteiro, 2019). And second, the workshop had the objective of engaging workshop participants in discussions based on research findings, in relation to the dimensions of awareness, knowledge, skills and attitudes and across the domains of Aviation English, English as a Lingua Franca, Intercultural Awareness, and Interactional Competence.

The present paper aims to summarize the research study presented in the first part of Workshop L, including results on what aviation stakeholders found as most relevant for successful RT communications, and to present workshop participants` suggestions on how to apply these research findings to the development and implementation of training activities for pilots and ATCOs.

Background to the study

The constant growth of aviation in a global scale has brought challenges to safe operations and communications. On top of that, the growing number of professionals from different `linguaculture` backgrounds has shown the need to expand notions of English language proficiency, based on native speaker norms, to incorporate more updated theoretical understandings of language use, as these change over time (Shohamy, 2017). In addition, as international radiotelephony exemplifies a specialized and professional multicultural context of language use, pilots and ATCOs need to be aware of the multiple factors that impact communications and to acquire a range of knowledge, skills and attitudes in order to communicate effectively and efficiently.

Effective communication and collaboration are essential in the multicultural, complex and dynamic context of international aeronautical communications, in which pilots and ATCOs use aviation English (AE) to interact over the radio. However, in this specific context of language use, participants have distinct levels of language proficiency and potentially conflicting perspectives, values, beliefs, and attitudes. They operate in busy airports and airspaces that demand expeditious communications without the benefit of visual cues, which puts increased reliance on clear, concise and unambiguous speech. Moreover, the separation of speakers in space, and the resulting absence of common points of reference, means that much more information needs to be exchanged in order to establish common ground, although at times the acoustic conditions under which communication takes place are poor. Aeronautical RT communications are also highly context-dependent since they rely on a great deal of specific technical knowledge related to aviation themes or topics such as aircraft, navigation, air traffic control procedures, and equipment (ICAO, 2010).

It is important to stress that tensions and friction occur in the aviation workplace, which although not envisioned by the policy-maker, is part of the lived experience of professionals communicating via radiotelephony, even between speakers of English as a first language (L1). As a result, non-compliance with existing standards coupled with language and cultural issues can lead to misunderstandings, compromising safety.

After more than 10 years of the Language Proficiency Requirements (LPRs) for pilots, ATCOs and aeronautical station operators required to communicate over the radio, some questions still remain: Does the ICAO testing policy³ address all the multiple factors that affect communication in this occupational domain? Is the testing policy aligned with current theories of language use brought up by the changing global roles of English and the growth of aviation

³ The ICAO testing policy was introduced by Amendment 164 to the Standards and Recommended Practices (SARPs) in Annex 1 to the Convention on International Civil Aviation. It includes the ICAO Rating Scale and the Holistic Descriptors (ICAO, 2004).

worldwide? Research in the field of pilot-ATCO communication suggests that crucial features of the aviation RT-specific construct, that is, what needs to be measured in a language proficiency test for this occupational context, may be absent in the assessment of these professionals (e.g. Douglas, 2014; Kim, 2012, 2018; Monteiro, 2017). The fact that the construct of international RT communication might be underrepresented in the ICAO testing policy, may also lead to questions regarding the validity of inferences drawn from current testing practices (Messick, 1996). As a result, Kim and Elder (2015) remind us that “questions of justice may arise when the construct espoused by a particular policy, and reflected in tests used to implement this policy, fails to reflect the real-life situation or to accord with the views of relevant stakeholders” (p. 2).

Since the adoption of the LPRs, different tests for aviation personnel have been developed in order to implement those requirements and comply with the assessment criteria designed by ICAO (ICAO, 2010). However, lack of standardization is still prevalent in this language for specific purpose (LSP) testing field, mainly due to different interpretations of the ICAO guidance material and the absence of a clearer definition of the construct to be measured. Besides that, the assessment criteria still place a great emphasis on native speakers (NSs) norms and on linguistic-oriented components, which do not take into consideration what domain experts value for effective communication in this occupational context (Elder, McNamara, Kim, Pill & Sato, 2017; Harding & McNamara, 2017; Kim, 2018; Kim & Elder, 2015).

Responding to these needs, the research questions (RQ) that guided this phase of the study were:

- RQ 1: What theoretical models of language use would account for the communicative needs of pilots’ and ATCOs’ occupational domain?
- RQ 2: How can this construct be articulated and specified from the models to a framework which informs test development?

- RQ 3: What components of the construct are validated by key aviation stakeholders?

Overarching framework

The overarching framework that informed this phase of the study is based on Fulcher and Davidson's (2007, 2009) representation of the test development process. The authors' use of architecture as a metaphor for test development proves to be helpful in identifying the layers and sub-layers of architectural documentation that articulate design decisions. Three main layers or levels of design, which move from the general to the specific, are identified in terms of test purposes and contexts of test use: models, frameworks and test specifications. *Models*, as Fulcher and Davidson (2009) define the first layer, provide "a theoretical overview of what we understand by what it means to know and use a language" (p. 126). The second layer, *Frameworks*, "lays out the constructs to be tested, selected from models, because they are shown to be relevant to the specific context in question, and useful in the decisions that need to be made" (p. 127). Finally, the third layer includes *Test Specifications*, "where we find the detail that is specific to a particular test for use in the context specified in the [construct] framework" (p. 128).

It is important to note that the mandate (regulations, testing policy) is generally the starting point of a test development process, a process which is also subject to iterative feedback for test revision and improvements (Davidson & Lynch, 2002). As *Figure 1* shows, the entire process is situated within a social and policy context, with consequences to all stakeholders involved. McNamara (2007) explains that an awareness of tests as "site[s] of social recognition and control" (p. 135) appears as a way to understand the values implicit in test constructs. Thus, including key aviation actors in the entire process seems crucial in the development of a test to identify professionals who are competent to communicate effectively in routine and non-routine situations within the context of multicultural RT communications.

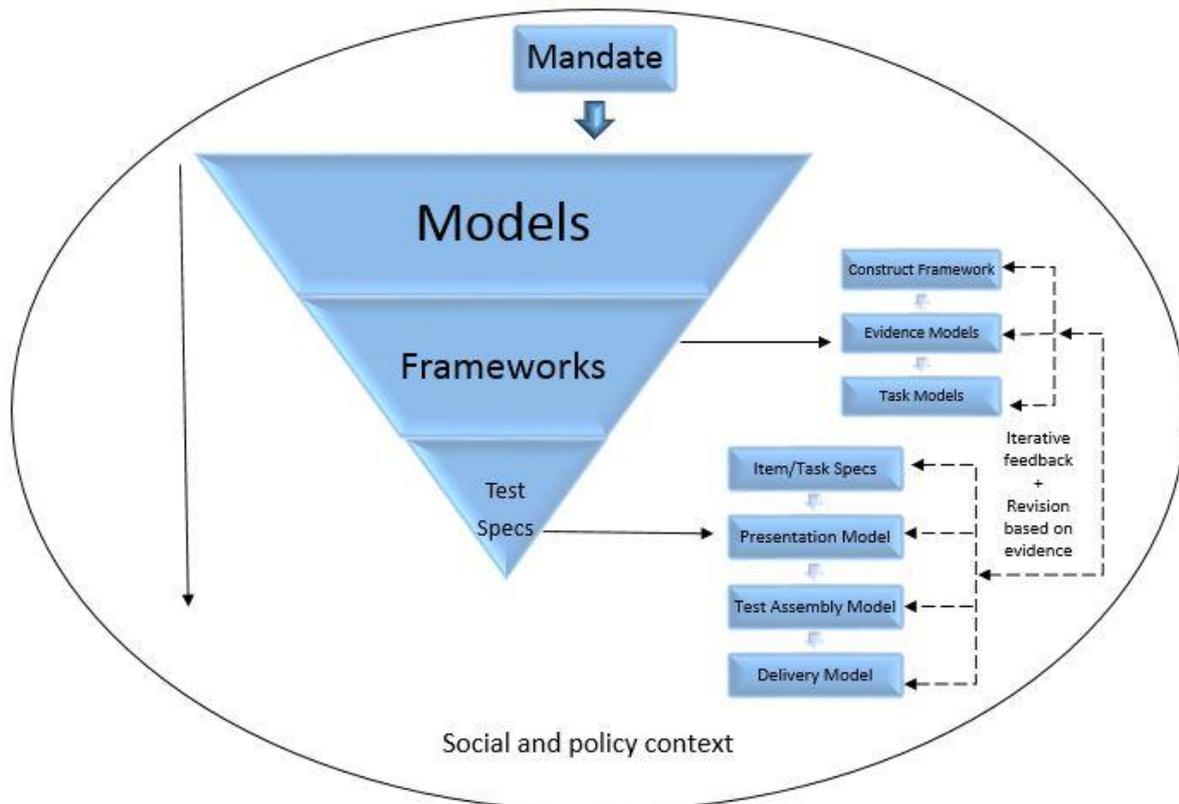


Figure 1. The test development process including layers and sub-layers of architecture documentation (adapted by Monteiro from Fulcher and Davidson, 2007, 2009)

Method

In terms of methodology and design, this qualitative study was organized in four sequential steps. The focus of the presentation was on Step 4, the validation of the matrix of construct specification, but an overview of Steps 1 to 3 is provided below.

Step 1: A systematic review of theoretical and empirical research

Step 1 consisted of a theoretical and empirical review and synthesis of the literature regarding three domains that are of relevance to RT communication within the context of aviation workplace, namely, English as a Lingua Franca (ELF), intercultural awareness/competence (ICA) and interactional competence (IC). The interfaces of Aviation English and intercultural communications highlighted in Phase 1 of the larger multiphase mixed methods study (see Monteiro, 2018, 2019) and confirmed by the taxonomy of intercultural

factors suggested points of contact with these other disciplines and served as a basis to guide the selection of studies to be included as part of the systematic review of theoretical and empirical research. First, I selected conceptual papers from each domain and then studies at the interface with Aviation English (AE). Some of these studies are organized in *Figure 2*.



Figure 2. Summary of studies included in the review of theoretical and empirical research

Step 2: Models of language use

All the readings considered in Step 1 made it possible to build different representations of the specific occupational context of international communications between pilots and ATCOs. Relevant features of each domain (AE, ELF, ICA and IC) that apply to the context of RT communications, and/or that could somehow have an impact on their outcomes, were carefully chosen according to their importance to the context and suitability to build theoretical models. The criteria that guided the design of the models are based on comprehensiveness, interpretability and usefulness to support test development. As a result, these representations or models convey: (a) what is required for effective communication in the intercultural and highly

specific context of RT – Model of the discursive space; (b) what affects the interaction between pilots and ATCOs in terms of fixed cultural frames of reference and emergent features – Model of the communicative demands of the RT occupational context; and (c) what needs to be included in a test to identify if a pilot or ATCO is ready to communicate successfully in intercultural RT communications – Model of the AE, ELF, ICA and IC overlap. In response to RQ 1, the three proposed models account for a wider range of competencies related to the communicative needs of pilots and ATCOs' occupational domain (see slides 8, 9, and 10 of the Workshop Presentation, in Additional Files; for a detailed explanation of the models, see Monteiro, 2019).

Step 3: Frameworks – Matrix development

In order to move from these models to the specification of a framework that maps the constructs considered to be relevant to the target language use (TLU) domain of pilot and ATCO interactions, the structure of the matrix was defined, specifically in what relates to the four key domains to be included, i.e., AE, ELF, ICA, and IC. Added to that, the aspects that would constitute the dimensions of interest, also drawn from the proposed models, were defined, namely the dimensions of awareness, attitudes, knowledge, and skills. Second, a synthetic organization (Li & Wang, 2018) of recurring themes and patterns emerging from the studies was conducted, followed by a categorization of components of the construct, i.e., relevant features of the RT context that pilots and ATCOs should be aware of, know, use appropriately, and display as attitude for successful intercultural encounters over the radio. Finally, these components were organized according to their best fit to each domain and dimension intersection, generating the preliminary matrix of construct specification.

Although the components of the construct that populated the preliminary matrix were drawn from the models of language use and from theoretical and empirical studies addressing

the communicative needs of pilots and ATCOs, it was necessary, as well, to give voice to domain experts in order to confirm such components as relevant to the specific context of RT communications. Thus, an initial group of stakeholders (e.g., language testers, English as a Second Language (ESL) teachers) contributed to the specification of the matrix. Their perceptions of what components should be included in the construct framework are highlighted in Appendix A: in bold, the ones that were already part of the draft matrix, and as underlined text, new components suggested by language testers and ESL teachers. In response to RQ 2, this preliminary matrix constitutes the specification of the construct from the *models* to a *framework*, aiming to inform test development.

Step 4: Frameworks – Matrix validation

An ESP perspective on construct definition takes into account the TLU’s ‘indigenous’ assessment criteria (Douglas & Myers, 2000; Elder & McNamara, 2016; Elder et al., 2017; Fox & Artemeva, 2017; Jacoby & McNamara, 1999; Knoch 2014; Pill, 2016). Within international RT communication, these criteria should inform evaluation of the language proficiency requirements applied to this professional/workplace context. Jacoby & McNamara (1999) note the importance of “an insider’s view” and point out that such a view is essential in identifying (and addressing) “. . . the complex issues involved in communicating competently” (p. 214) in a TLU domain.

Therefore, in Step 4 I moved to the validation of the matrix of construct specification with aviation stakeholders, aiming to elicit their perceptions of the communicative needs of pilots and ATCOs in the multicultural context of international radiotelephony and also to have an idea of how important each construct component is, which is of crucial importance to LSP test design. Table 1 provides details of Step 4, including participants, instruments, procedures and analysis.

Table 1. Method used in the matrix validation (Step 4)

	Participants	Instruments	Procedures	Analysis
Step 4	128 aviation stakeholders: ➤ 20 NSs + 108 NNSs of English ➤ 52 males + 76 females ➤ 22 pilots 21 ATCOs 36 AE teachers 36 AE examiners 6 AE researchers 6 regulators 1 AE curriculum developer	Focus group discussions triggered by a scenario of authentic international RT communication and a set of six questions	Intra-group discussions – 26 groups: ➤ 13 multilingual ➤ 13 monolingual (audio-recorded and transcribed) Inter-group discussions (audio-recorded and transcribed)	<i>Nvivo</i> software 1st cycle: Provisional Coding (dimensions of AW, K, S, AT) Inter-coder reliability 2nd cycle: Provisional Coding (construct components)

Results and discussion

Coding of data yielded during the focus group discussions suggests the extent to which participants of the 26 groups accounted for the importance of aspects related to the four dimensions and also the four domains of interest. This information is crucial to inform test development. As it indicates the degree of importance or the weight of each cell in the matrix, it ultimately guides the test developer in the test assembly model to produce test forms, in such a way as to consider the “mix of items or tasks on the test that must be included in order to represent the domain adequately” (Fulcher & Davidson, 2007, p. 67). In terms of number of coding references, Table 2 provides the weighting of construct components based on these numbers.

Table 2. Weighting of construct components based on coding references

	AW	K	S	AT	Total
AE	189	160	165	552	1066
ELF	82	14	105	178	379
ICA	143	37	26	159	365
IC	9	14	123	30	176
Total	423 ^a	225 ^a	419 ^a	919 ^a	1986 ^a

Note: ^a Overlap counted.

As can be noted, the total number of coding references for each domain is included in the last column of Table 2 and decreases as it moves down from AE to IC. Regarding the four dimensions, one interesting finding is the greater number of references for the dimension of attitude (AT). While some authors consider awareness as being at the core of all four dimensions (e.g. Fantini, 2000), attitude may also be understood as putting one's awareness, skills and knowledge into practice.

In contrast to the previous discussion centered in the number of total coding references for each component of the construct, it is also important to note the number of focus groups in which a certain component was mentioned. This information gives us another perspective on the importance of such a component based on its spread across all groups. A list of the 26 construct components that were mentioned by the highest number of focus groups was organized in a table, applying a specific color to each of the four domains for ease of contrast and comparison: green for AE, blue for ELF, orange for ICA and pink for IC (see Table 2, slide 16 of the Workshop Presentation, in Additional Files). The table highlights the top ones in green, related to the domain of Aviation English: background knowledge, professional tone and attitude, compliance with rules and procedures, which are all related to the specific purpose language ability of this professional domain.

The process of coding during the Second Cycle disclosed that most components of the construct in the preliminary matrix were confirmed by aviation stakeholders, i.e., appeared in their discussions of the RT scenarios, and are highlighted in yellow in Table 3. Some components not included in the preliminary matrix emerged during participants' discussions and are highlighted in blue. Based on the number of coding references, the four most relevant components of each cell of the matrix were identified and included in the final matrix.

Table 3. Final matrix of construct specification

Construct definition within the aviation radiotelephony domain				
	Awareness	Knowledge	Skills	Attitudes
Aviation English	<ul style="list-style-type: none"> - situational awareness (67) - group identities and authority gradients in aviation^c (50) - rules of use that characterize the domain^a (27) - threats presented by cross-cultural communications (19) 	<ul style="list-style-type: none"> - background knowledge (rules and procedures) (78) - standard phraseology (36) - plain English for the specific purpose of aeronautical RT communications (26) - communication as a Human Factor^b (6) 	<ul style="list-style-type: none"> - Crew Resource Management (CRM) (55) - language proficiency (ability to use the language) (45) - communicate effectively in routine and in highly unpredictable situations (39) - conflict management (12) 	<ul style="list-style-type: none"> - professional tone and attitude (195) - compliance with prescribed rules and procedures (e.g. use of phraseology, read back/hear back) (193) - assertiveness (87) - clarity, conciseness and correctness (37)
English as a lingua franca	<ul style="list-style-type: none"> - challenges faced by speakers of EFL and interlocutors' possible linguistic difficulties (34) - difficulty presented by the use of jargon, idioms, slang and colloquialisms (17) - the need to speak English as a lingua franca^d (17) - different varieties of English and speech communities (9) 	<ul style="list-style-type: none"> - nuances of the language (5) - language as a social practice (4) - one's own communicative style and the problems it could pose to ELF interactions (3) - characteristics of one's L1 phonology that may influence English pronunciation (2) 	<ul style="list-style-type: none"> - adjust and align to different communicative systems (new patters of phonology, syntax, discourse styles) (23) - eliminate ambiguous expressions and sentence patterns (21) - adapt linguistic forms to the communicative needs at hand (20) - self-repair, rephrase, paraphrase, and clarify (13) 	<ul style="list-style-type: none"> - patience (68) - collaborative behavior (45) - avoidance of any kind of superiority of one variety over another (39) - tolerance (12) - openness and humility to negotiate differences (12)
Intercultural Awareness/Competence	<ul style="list-style-type: none"> - how the cultural background of participants can impact the complex and dialogic nature of their communications (58) - power distance (27) - gender expectations (17) - face concern (12) 	<ul style="list-style-type: none"> - what is involved in intercultural interaction (11) - potential threats posed by intercultural communications (11) - different cultural frames of reference (communication style, conflict management, face-work strategies, etc) (10) - how social groups and identities function (3) 	<ul style="list-style-type: none"> - move beyond cultural stereotypes and generalizations (11) - engage with and negotiate sociocultural differences (5) - engage with politeness conventions (5) - accommodate to difference and to multilingual aspects of intercultural communication (4) 	<ul style="list-style-type: none"> - politeness (90) - willingness to cooperate (25) - respect (20) - readiness to suspend disbelief about other cultures and belief about one's own (9) - willingness to relativize one's own values, beliefs, behaviors (9)
Interactional Competence	<ul style="list-style-type: none"> - shared responsibility for successful communication (5) - discourse as co-constructed among participants (3) - communication as 'a two-way negotiative effort' (1) 	<ul style="list-style-type: none"> - register specific to the practice (10) - an appropriate participation framework (3) - the processes we go through to solve communication issues (1) 	<ul style="list-style-type: none"> - deal adequately with apparent misunderstandings, by checking, confirming and clarifying (44) - use of communicative/interactional skills (36) - accommodate to the constraints of the context and perceived ability of the hearer (20) - declare non-understanding (9) 	<ul style="list-style-type: none"> - avoidance of intimidation and threatening behavior (10) - cooperation (9) - tolerance (6) - flexibility (4)

Note: ^aIn yellow, components of the construct confirmed by aviation stakeholders.

^bIn bold, components of the construct confirmed by language testers/EFL teachers.

^cIn blue, additional components of the construct suggested by aviation stakeholders.

^dAs underlined text, additional components of the construct suggested by language testers/EFL teachers.

Selected quotes from participants' comments provide a sense of the kind of statements that were made in support of particular construct components. Due to limitations of space, only a few are provided in this paper, but more examples can be found in Monteiro (2019).

Regarding the domain of AE, specifically in terms of attitudes, *compliance with prescribed rules and procedures* (e.g., *use of phraseology, read back/hear back, etc.*) was a recurring topic and deemed crucial also, or mainly, for native speakers of English: “Yes, I think what you said is ok, because they speak the same language, they are both native speakers, so I think they didn't care about the regulations, I don't know....phraseology” (M – FG 11 of 26 Scenario 1⁴).

Within the domain of ELF, being aware of *the challenges faced by speakers of ELF* was considered important for effective communications, as cited by one of the participants:

Yes, they take for granted and they have, they need to have this awareness, that it's not just... they have to be involved in the whole process. They have to be involved not only in speaking, but also in receiving and understanding and trying to accommodate the necessity of specific communication that is being held in the ATCO-pilot situation. They need to know that on the other side they have a non-native speaker. They need to be aware that they can't just throw out their speech... (M – FG 23 of 26 Scenario 3)

In order to participate in international RT communications, it is essential to know *what is involved in intercultural interaction*, a construct component within the domain of ICA, and participants discussed issues related to the several layers of culture that affect the way an individual communicates, including gender expectations and professional culture, related to the concept of communities of practice : “There may be gender issues, male and female, and much

⁴ Participants' comments are identified by the number of focus group and scenario analyzed, with an “M” or “F” indicating whether it was said by a male or female.

more likely a tribal issue, ATC tribal needs versus the pilot's community needs...some big issues there” (M – FG 1 of 26 Scenario 1).

Within the domain of IC, the need to *accommodate to the constraints of the context and perceived ability of the hearer* was also highlighted as a central skill in the international RT context, as the following example illustrates: “The end of the story was that we realized there was lack of accommodation on both parts, because the ATCO, who was the native speaker, could have accommodated, the pilot did not try to use any strategy to clarify or try to negotiate, because he could not understand, perhaps” (FG 14 of 26 Scenario 4).

Some components in the draft matrix were not mentioned in the focus group discussions or did not receive a lot of comments. Therefore, they do not appear in the final matrix. For example: i) AE: knowledge of “*language functions used in RT*”; ii) ELF: knowledge of “*different pragmatic norms for different contexts*”; iii) ICA: knowledge of “*causes and processes of misunderstandings between members of different cultures*”; and iv) IC: skills to “*build a sphere of ‘inter-subjectivity’ through collaborative efforts*”. However, they are also relevant for successful international RT communications. This may suggest that a greater awareness still needs to be achieved among those involved in RT communications.

Workshop activities

As stated at the beginning of this paper, apart from presenting results from a research study on the development and validation of a construct framework to inform test development in the context of intercultural RT communications, the workshop also had the objective to create opportunities for discussions on how to apply the research findings to the development and implementation of training activities for pilots and ATCOs.

Participants

Two sessions of Workshop L were conducted during the conference. In the first, 24 participants engaged in the practical activities, whereas 22 participated in the second session.

A mix of language background was noted in the groups as well as a variety of professional expertise, including pilots, ATCOs, AE teachers, AE examiners, regulators, Human Factors specialists and researchers.

Materials

In each session, workshop participants were divided into four groups and each group received:

- a coloured handout including one domain of the matrix of construct specification (either AE, ELF, ICA or IC), with enough space to write suggestions and comments related to the four dimensions, i.e., awareness, knowledge, skills, and attitudes (see an example for the domain of AE in Appendix B);
- a white handout containing relevant definitions and a list of references that appeared during the workshop presentation (Appendix C).

Procedures

Workshop participants were organized in four groups and asked to read the extract of the matrix they received. Group 1 received the matrix related to Aviation English; Group 2, the matrix related to English as a Lingua Franca; Group 3, the one related to Intercultural Awareness/Competence; and Group 4 received the matrix related to Interactional Competence. The activity consisted of selecting at least one construct component from each cell of the matrix and discuss possible training activities directed at: i) raising awareness; ii) imparting knowledge; iii) developing skills; and iv) improving attitudes.

Contributions from workshop participants

Workshop participants' suggestions of training activities for pilots and ATCOs were organized into four distinct tables (see Tables 4, 5, 6, and 7), according to the specific domain of the matrix and the construct components selected by each group.

Table 4. Suggestions for training activities in the domain of Aviation English

Construct definition within the aviation radiotelephony domain				
	Awareness	Knowledge	Skills	Attitudes
Aviation English	<ul style="list-style-type: none"> - situational awareness (67) - group identities and authority gradients in aviation (50) - rules of use that characterize the domain (27) - threats presented by cross-cultural communications (19) 	<ul style="list-style-type: none"> - background knowledge (rules and procedures) (78) - standard phraseology (36) - plain English for the specific purpose of aeronautical RT communications (26) - communication as a Human Factor (6) 	<ul style="list-style-type: none"> - Crew Resource Management (CRM) (55) - language proficiency (ability to use the language) (45) - communicate effectively in routine and in unpredictable situations (39) - conflict management (12) 	<ul style="list-style-type: none"> - professional tone and attitude (195) - compliance with prescribed rules and procedures (e.g. use of phraseology, readback/hearback) (193) - assertiveness (87) - clarity, conciseness and correctness (37)
Group 1	<u>Threats presented by cross-cultural communications:</u> <ul style="list-style-type: none"> - Research and present case studies relating to language-related crashes 	<u>Standard phraseology:</u> <ul style="list-style-type: none"> - Video watching of real RT communications - Listen once without script, discuss, then listen again with transcriptions - Discuss what should have been said in standard phraseology (where appropriate), and how to improve it - Role-play with improved script 	<u>Communicate effectively in routine and in unpredictable situations:</u> <ul style="list-style-type: none"> - Establish the importance of keeping calm for effective RT communications - Role-play with vague details of a scenario to explain over RT communication, within a short time limit 	
Group 2	<u>Situational awareness:</u> <ul style="list-style-type: none"> - Listening activity: put a storyline in order 	<u>Communication as a Human Factor:</u> <ul style="list-style-type: none"> - The ability to clarify and correct even if you are L1 speaker, and understand when you have made a mistake 	<u>Communicate effectively in routine and in unpredictable situations:</u> <ul style="list-style-type: none"> - Lower level speakers: paraphrasing an emergency situation 	<u>Clarity, conciseness and correctness:</u> <ul style="list-style-type: none"> - Listening activity: the difference between standard phraseology and plain language, and which is most important

Table 5. Suggestions for training activities in the domain of English as a Lingua Franca

Construct definition within the aviation radiotelephony domain				
	Awareness	Knowledge	Skills	Attitudes
English as a lingua franca	<ul style="list-style-type: none"> - challenges faced by speakers of EFL and interlocutors' possible linguistic difficulties (34) - difficulty presented by the use of jargon, idioms, slang and colloquialisms (17) - the need to speak English as a lingua franca (17) - different varieties of English and speech communities (9) 	<ul style="list-style-type: none"> - nuances of the language (5) - language as a social practice (4) - one's own communicative style and the problems it could pose to ELF interactions (3) - characteristics of one's L1 phonology that may influence English pronunciation (2) 	<ul style="list-style-type: none"> - adjust and align to different communicative systems (new patters of phonology, syntax, discourse styles) (23) - eliminate ambiguous expressions and sentence patterns (21) - adapt linguistic forms to the communicative needs at hand (20) - self-repair, rephrase, paraphrase, and clarify (13) 	<ul style="list-style-type: none"> - patience (68) - collaborative behavior (45) - avoid any kind of superiority of one variety over another (39) - tolerance (12) - openness and humility to negotiate differences (12)
Group 1		<p><u>Nuances of the language:</u></p> <ul style="list-style-type: none"> - Practical language – ellipsis (warmer: play short extract) - Going/around/cards – group matching (literal vs. metaphor/nuanced) - Listening for nuance (or reading) – discuss, complete worksheet with literal vs. metaphor <p><u>Language as a social practice:</u></p> <ul style="list-style-type: none"> - Captain talking to a colleague on diversion: <ol style="list-style-type: none"> a) Then has to come out and talk to passengers. Class as group of passengers – diffuse anger/anxiety (elicit from speakers; functional language; multi-cultural passengers on long haul; Monty Python video) b) Handling unruly passenger – class exercise role-play; then groups to discuss <p><u>One's own communicative style and the problems it could pose to ELF interactions:</u></p>		

		- Various YouTube videos (JFK, etc.): role-plays; honorifics (exercise)		
Group 2	<u>Difficulty presented by the use of jargon, idioms, slang and colloquialisms:</u> <ul style="list-style-type: none"> - Expose students to live RT communications (different nationalities and accents) - Use different vocabulary (idioms, slangs, etc) from different countries (*depending on the type of students in class) 		<u>Self-repair, rephrase, paraphrase, and clarify:</u> <ul style="list-style-type: none"> - Speaking activity – describe a routine scenario with an unexpected event - Role-play – reporting to supervisor - Picture description or listening to RT recordings and students paraphrase and clarify what they heard. 	<u>Collaborative behavior:</u> <ul style="list-style-type: none"> - Group activity – two groups of students are given instructions and the group has to work together to follow through and comply - Reverse role-play – pilots play the role of ATCOs and vice-versa - Intercultural exchange activity

Table 6. Suggestions of training activities in the domain of Intercultural Awareness/Competence

Construct definition within the aviation radiotelephony domain				
	Awareness	Knowledge	Skills	Attitudes
Intercultural Awareness/Competence	<ul style="list-style-type: none"> - how the cultural background of participants can impact the complex and dialogic nature of their communications (58) - power distance (27) - gender expectations (17) - face concern (12) 	<ul style="list-style-type: none"> - what is involved in intercultural interaction (11) - potential threats posed by intercultural communications (11) - different cultural frames of reference (communication style, conflict management, face-work strategies, etc) (10) - how social groups and identities function (3) 	<ul style="list-style-type: none"> - move beyond cultural stereotypes and generalizations (11) - engage with and negotiate sociocultural differences (5) - engage with politeness conventions (5) - accommodate to difference and to multilingual aspects of intercultural communication (4) 	<ul style="list-style-type: none"> - politeness (90) - willingness to cooperate (25) - respect (20) - readiness to suspend disbelief about other cultures and belief about one's own (9) - willingness to relativize one's own values, beliefs, behaviors (9)
Group 1				<p><u>Politeness:</u></p> <ul style="list-style-type: none"> - Conveying emotions through tone of voice (using a barrier between interlocutors) - Practice language strategies to handle different emotions <p><u>Respect:</u></p> <ul style="list-style-type: none"> - CRM training: switch roles within the aircraft <p><u>Willingness to relativize one's own values, beliefs, behaviors:</u></p> <ul style="list-style-type: none"> - Information gap – introduce an incident; predict what was said between crew members and over the radio
Group 2			<p><u>Accommodate to difference and to multilingual aspects of intercultural communication:</u></p> <ul style="list-style-type: none"> - Communication vs. cultural background – focus on something in common (e.g., procedures) and share - Lecture discussion - Simulation 	<p><u>Willingness to cooperate:</u></p> <ul style="list-style-type: none"> - Learn about each other's jobs followed by a discussion - Phraseology is politeness?

Table 7. Suggestions of training activities in the domain of Interactional Competence

Construct definition within the aviation radiotelephony domain				
	Awareness	Knowledge	Skills	Attitudes
Interactional Competence	<ul style="list-style-type: none"> - shared responsibility for successful communication (5) - discourse as co-constructed among participants (3) - communication as ‘a two-way negotiative effort’ (1) 	<ul style="list-style-type: none"> - register specific to the practice (10) - an appropriate participation framework (3) - the processes we go through to solve communication issues (1) 	<ul style="list-style-type: none"> - deal adequately with apparent misunderstandings, by checking, confirming and clarifying (44) - communicative/interactional skills (36) - accommodate to the constraints of the context and perceived ability of the hearer (20) - declare non-understanding (9) 	<ul style="list-style-type: none"> - avoid intimidating/threatening (10) - cooperation (9) - tolerance (6) - flexibility (4)
Group 1	<p><u>Shared responsibility for successful communication:</u></p> <ul style="list-style-type: none"> - Authentic recordings with miscommunication – identify it - Videos – NSs-NSs miscommunication - Situational awareness - Forum for ATCOs and pilots (e.g., Singapore) 	<p><u>The processes we go through to solve communication issues:</u></p> <ul style="list-style-type: none"> - Brainstorm techniques to say you don’t understand - Apply strategies - Rephrasing/using synonyms - Repairing miscommunications - Clarifying (paraphrasing) 		<p><u>Tolerance:</u></p> <ul style="list-style-type: none"> - Be respectful of others’ experiences <p><u>Flexibility:</u></p> <ul style="list-style-type: none"> - Ask for feedback along the way – how the exercises in a textbook can be applied to students’ particular contexts (airport, ground, tower, etc.)
Group 2	<p><u>Discourse as co-constructed among participants:</u></p> <ul style="list-style-type: none"> - Show real examples of RT communication - Case studies - Simulate scenarios - Role-plays 	<p><u>Register specific to the practice:</u></p> <ul style="list-style-type: none"> - Understanding RT phraseology, applying the correct usage of ICAO phraseology and adapting to the local environment 		

The proposed tasks represent brainstormed ideas, which can be expanded, modified, or incorporated into training materials based on specific training objectives, having the target audience in mind. A number of the proposed activities involve the use of authentic RT material to trigger discussions, simulations, recognition of communication clashes and how to improve the outcomes of interactions between pilots and ATCOs from different cultural backgrounds. Role-play tasks (and also reverse role-plays, where pilots exchange roles with ATCOs) were repeatedly suggested as a way to practice the use of interactional skills, strategies to solve communication issues, to accommodate to difference and show professional attitudes, to name a few.

This type of activity can be used either in teacher training courses, by engaging teachers in discussions on how to address specific construct components in the development of training materials, or in test development, by engaging test task designers in discussions on how to operationalize the components of the construct as test tasks.

Conclusion

Findings from the study revealed that some construct components overlap across the domains and dimensions, but more critically, a problem with one of them can be, many times, exacerbated by other issues specified in different cells of the matrix. This not only confirms the complexity of professional communication in a multicultural context, but also reinforces the narrow view of proficiency defined by the current ICAO LPRs, that is, the current language proficiency testing underrepresents the international RT communication construct. These results are substantiated by some scholars in the fields of LSP testing, intercultural communication and, more specifically, by other researchers investigating the domain of Aviation English. For example, Douglas (2000) argues that “when test content is highly specialized, and is based on complex concepts which are familiar to only a limited group of

language users, good language proficiency alone will no longer be sufficient for effective performance” (p. 34). Consonant with that, Kim (2012) states that “linguistically oriented criteria alone cannot capture the key aspects of communication in this professional setting” (p. 229) and adds that “the co-constructed nature of interactional competence is not at all reflected in the traditional linguistic-based ICAO rating scale. Interaction in the setting of air traffic control demands not just good language skills but also sufficient professional knowledge” (Kim, 2018, p. 420). What these quotes have in common is that they underscore the need to move from a language-only approach to a broader view of communicative competence in the occupational context of international radiotelephony. On top of that, when emphasizing the growing role of English as a lingua franca, Snow (2018) argues that “building effective intercultural communication skills is at least as important as building linguistic accuracy, if not more so” (p. 69).

In sum, study results signpost what is required for effective communication in the professional, specialized and multicultural context of aviation international radiotelephony: specific purpose language ability and background knowledge (AE), the need to speak English as a lingua franca and to adjust to the communicative needs at hand (ELF), to accommodate and negotiate sociocultural differences (ICA), and to solve misunderstandings between members of different cultures, while at the same time sharing responsibility for successful communication (IC). The development of this wider range of competencies applies to both first language (L1) speakers of English and those who speak English as a second (L2) or additional language. Consequently, exempting native speakers of English from being tested in their specific purpose language ability to communicate in international radiotelephony seems to go against the safety requirements of aviation.

Finally, in order to address the training needs of the next generation of pilots and ATCOs we need teachers that are mindful of the multiple factors that impact multicultural RT

communications in aviation. The workshop activities proved useful to raise workshop participants' awareness of what is relevant for communicative success in relation to the four domains of interest, i.e., AE, ELF, ICA and IC, across the dimensions of awareness, knowledge, skills and attitudes. Working collaboratively, participants engaged in discussions on how to apply these research findings to the development of practical training activities, which may support teachers in implementing what was proposed according to their students' needs.

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Appendix A – Preliminary matrix of construct specification

Construct definition within the aviation radiotelephony domain				
	Awareness	Knowledge	Skills	Attitudes
Aviation English	<ul style="list-style-type: none"> - rules of use that characterize the domain - safety-critical requirements for intelligibility^a, directness, appropriacy, non-ambiguity and concision - threats presented by cross-cultural communications - impact of communication on safety and efficiency - social and occupational context in which AE is used 	<ul style="list-style-type: none"> - standard phraseology - plain English for the specific purpose of aeronautical RT communications - syntactic structures and language functions used in RT - aviation lexicon - aviation phonetic alphabet and pronunciation of numbers - prosodic features of RT - background knowledge 	<ul style="list-style-type: none"> - apply speech transmitting techniques - use the linguistic features of AE meaningfully - communicate effectively in routine and in highly unpredictable situations - use strategic skills to deal with aviation personnel with different levels of expertise 	<ul style="list-style-type: none"> - compliance with prescribed rules and procedures (e.g. use of phraseology, read back/hear back) - discipline - professional tone and attitude - clarity, conciseness and correctness
English as a lingua franca	<ul style="list-style-type: none"> - different varieties of English and speech communities - challenges faced by speakers of EFL and interlocutors' possible linguistic difficulties - difficulty presented by the use of jargon, idioms, slang and colloquialisms - <u>the need to speak English as a lingua franca^b</u> - <u>language use and language processing</u> 	<ul style="list-style-type: none"> - language as a social practice - different pragmatic norms for different contexts - one's own communicative style and the problems it could pose to ELF interactions - characteristics of one's L1 phonology that may influence English pronunciation - <u>exposure to different international accents</u> 	<ul style="list-style-type: none"> - mediate and negotiate meaning - accommodate different accents and dialects - adapt linguistic forms to the communicative needs at hand - adjust and align to different communicative systems (new patterns of phonology, syntax, discourse styles) - self-repair, rephrase, paraphrase, and clarify - notice and repair breakdowns in communication - preempt misunderstanding - ascertain and deploy appropriate pragmatics - <u>eliminate ambiguous expressions and sentence patterns</u> - <u>adapt speed and rate of speech</u> - <u>use auditory skills to perceive a wide variety of Englishes</u> 	<ul style="list-style-type: none"> - collaborative behavior - patience - tolerance - flexibility - openness and humility to negotiate differences - <u>avoidance of any kind of superiority of one variety over another</u>

<p>Intercultural Awareness/ Competence</p>	<ul style="list-style-type: none"> - culture as having <i>a priori</i> elements (ethnic or cultural marking in communicative behavior) and emergent features (co-constructed in the moment of interaction) - impact of the cultural background of participants on the complex and dialogic nature of their communications - individuals with multiple membership in various cultural groups - importance of being a multilingual communicator - critical cultural awareness - <u>tone as a potential cause of cultural misinterpretation</u> 	<ul style="list-style-type: none"> - theories of cross-cultural communication - how social groups and identities function - different cultural frames of reference (communication style, conflict management, face-work strategies, etc) - what is involved in intercultural interaction - causes and processes of misunderstanding between members of different cultures - <u>potential threats posed by intercultural communications</u> 	<ul style="list-style-type: none"> - adjust (cultural) ways of speaking - apply and refine one's own cultural schemata - engage with and negotiate sociocultural differences - accommodate to difference and to multilingual aspects of intercultural communication - engage with politeness conventions - act as mediator between people of different cultural origins - analyze, interpret, and relate - acquire new knowledge of cultural practices and operate it in interaction - move beyond cultural stereotypes and generalizations 	<ul style="list-style-type: none"> -willingness to cooperate - respect - flexibility - openness - curiosity - readiness to suspend disbelief about other cultures and belief about one's own - willingness to relativize one's own values, beliefs, behaviors
<p>Interactional Competence</p>	<ul style="list-style-type: none"> - shared responsibility for successful communication - communication as 'a two-way negotiative effort' - discourse as co-constructed among participants 	<ul style="list-style-type: none"> - rhetorical scripts - register specific to the practice - patterns of turn-taking - topical organization - an appropriate participation framework - signaling of boundaries between practices - the processes we go through to solve communication issues 	<ul style="list-style-type: none"> - build a 'sphere of inter-subjectivity' through collaborative efforts - accommodate to the constraints of the context and perceived ability of the hearer - eliminate idioms, cultural references and syntactic complexity from speech - deal adequately with apparent misunderstandings, by checking, confirming and clarifying -attenuate unintelligible features of one's own speech 	<ul style="list-style-type: none"> - cooperation - openness - flexibility - tolerance

Note. ^a In **bold**, components of the construct confirmed by language testers/ESL teachers.

^bAs underlined text, additional components of the construct suggested by language testers/ESL teachers.

Appendix B – Workshop handout

ICAEA International Conference – Chiba, Tokyo/Japan – May 8-10, 2019

“Exploring the Aviation English training needs of ab-initio pilots and air traffic controllers, and aircraft maintenance personnel”

Workshop Title: From a language-only approach to a broader view of communicative competence for intercultural communications in aviation

Presenter: Ana Lúcia Tavares Monteiro

Organization: Carleton University (Canada) and ANAC (Brazil)

- a) Please write the number of participants in your group according to their roles. If anyone has overlapping roles, include him/her in the option that best represents his/her main activity:
 pilots ATCOs aviation English teachers aviation English examiners/test developers
 researchers regulators Human Factors specialists other: _____
- b) Please write the number of participants in your group according to their language background:
 English as L1 English as L2/foreign language
- c) Do you consent to use your notes anonymously for research purposes? Yes No

Workshop activity: Applying research findings to the development and implementation of training

In groups, consider one domain of the matrix and discuss:

What practical activities would you suggest to:

- Raise **awareness**?
- Impart **knowledge**?
- Develop **skills**?
- Improve **attitudes**?

Choose at least one component from each cell of the matrix to brainstorm possible activities.

Turn the page and fill in the blank spaces of the table with your suggestions. Choose one member of your group to present your ideas. Please, return one completed table from your group to the presenter/researcher.

Thank you for your participation!!
If you have any further comment, do not hesitate to contact me at
anatavareshmonteiro@cmail.carleton.ca
ana.monteiro.icaea@gmail.com

Construct definition within the aviation radiotelephony domain

	Awareness	Knowledge	Skills	Attitudes
Aviation English	<ul style="list-style-type: none"> - situational awareness (67) - group identities and authority gradients in aviation (50) - rules of use that characterize the domain (27) - threats presented by cross-cultural communications (19) 	<ul style="list-style-type: none"> - background knowledge (rules and procedures) (78) - standard phraseology (36) - plain English for the specific purpose of aeronautical RT communications (26) - communication as a Human Factor(6) 	<ul style="list-style-type: none"> - Crew Resource Management (CRM) (55) - language proficiency (ability to use the language) (45) - communicate effectively in routine and in unpredictable situations (39) - conflict management (12) 	<ul style="list-style-type: none"> - professional tone and attitude (195) - compliance with prescribed rules and procedures (e.g. use of phraseology, readback/hearback) (193) - assertiveness (87) - clarity, conciseness and correctness (37)
1				
2				

Appendix C – Workshop handout: Definitions and references

ICAEA International Conference – Chiba, Tokyo/Japan – May 8-10, 2019

“Exploring the Aviation English training needs of ab-initio pilots and air traffic controllers, and aircraft maintenance personnel”

Workshop Title: From a language-only approach to a broader view of communicative competence for intercultural communications in aviation

Presenter: Ana Lúcia Tavares Monteiro

Organization: Carleton University (Canada) and ANAC (Brazil)

Definitions:

English as a Lingua Franca (ELF) – “an additionally acquired language system which serves as a common means of communication for speakers of different first languages” (Jenkins, Cogo & Dewey, 2011, p. 283).

Intercultural communicative competence (ICC) – “someone with Intercultural *Communicative* Competence is able to interact with people from another country or culture in a foreign language. They are able to negotiate a mode of communication and interaction which is satisfactory to themselves and the other and they are able to act as mediator between people of different cultural origins” (Byram, 1997, p. 71).

Intercultural awareness (ICA) – “a conscious understanding of the role culturally based forms, practices and frames of reference can have in intercultural communication, and an ability to put these conceptions into practice in a flexible and context specific manner in real time communications” (Baker, 2011, p. 202).

Intercultural communication: A discourse approach – “Each of us is simultaneously a member of many different discourse systems. We are members of a particular corporate group, a particular professional or occupational group, a generation, a gender, a region, and an ethnicity. As a result, virtually all professional communication is communication across some lines which divide us into different discourse groups or systems of discourse” (Scollon & Scollon, 2001, p. 3).

Interculturality - “a phenomenon that is not only interactionally and socially constructed in the course of communication but also relies on relatively definable cultural models and norms that represent the speech communities to which the interlocutors belong” (Kesckes, 2014, p. 14).

Culture is “neither relatively static nor ever-changing, but both” (Kesckes, 2014, p. 4). He argues that culture has a priori elements (ethnic or cultural marking in communicative behavior) and emergent features (co-constructed in the moment of interaction), which should be combined to approach culture in a dialectical and dynamic way (p. 5).

Interactional competence (IC) – Kramsch (1986) states that “successful interactions presupposes not only a shared knowledge of the world, the reference to a common external context of communication, but also the construction of a shared internal context or ‘sphere of inter-subjectivity’ that is built through the collaborative efforts of the interactional partners” (p. 367).

In addition, Roever and Kasper (2018) state that “in any activity, at any moment, participants calibrate interactional methods and resources to the interactional goals and circumstances at hand. Their IC allows them to deploy these methods for local, context sensitive and practice specific use (Young & Miller, 2004) and the achievement of mutual understanding” (p. 334).

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