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SEÇÃO: TEMÁTICA LIVRE

Communication in the Oil and Gas Industry: contributions from Applied Linguistics and Aviation English[1]

Comunicação na Indústria de Óleo e Gás: contribuições da Linguística Aplicada e do Inglês para Aviação

Comunicación en la Industria del Petróleo y el Gas: aportes de la Lingüística Aplicada y el Inglés Aeronáutico

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Abstract: This article aims to describe some features of communication in the oil and gas industry considering contributions from applied linguistics and Aviation English. Fostered by the need to have a picture of communication dynamics taking place in the proposed scenario, studies were conducted within the HF2 Project and were organized in three stages. Stage 1 revised accident reports to find out communication factors that could be associated with safety and help build a tentative version of a taxonomy based on the Taxonomy of Communication and Language factors in Aviation used for language analysis in aviation. Stage 2 comprehended interviews with workers from two different offshore operations so to assess metalinguistic information regarding a possible standardized language training and use during the performance of activities. Stage 3 encompassed in-loco data collection and analysis of linguistic information. Corpus Linguistics, Conversational Analysis, The Cooperative Principle, and the Taxonomy of Communication and Language factors in Aviation were some of the theoretical references that guided the analysis. The results presented are preliminary, yet significant, and show that procedural factors are outstanding when contemplating the possibility of miscommunication and, because of that, could be considered the core of a taxonomy. Additionally, metalinguistic data from the interviews show that there seems to be a standardized communicative behavior in the operations given the strict technical training to which the workers are submitted to. However, the misuse or non-use of certain lexical-morphological structures and strategies, and procedures could impact safety. In this line, the article also addresses some suggestions for optimized communication practices.

Keywords: Communication. Oil and gas industry. Aviation English. Applied Linguistics. Human Factors.

Resumo: Este artigo tem como objetivo descrever algumas características da comunicação na indústria de óleo e gás considerando as contribuições da linguística aplicada e do inglês de aviação, tais como particularidades de natureza sintática, semântica e pragmática. Os estudos foram motivados pela necessidade de se ter um retrato da dinâmica comunicacional que ocorre no cenário proposto, realizados no âmbito do Projeto HF2 e organizados em três etapas. A Fase 1 revisou os relatórios de acidentes para descobrir fatores de comunicação que poderiam estar associados à segurança e ajudar a construir uma versão preliminar de uma taxonomia baseada na Taxonomia de Fatores de Comunicação e Linguagem na Aviação usada para análise linguística na aviação. A segunda etapa compreendeu entrevistas com trabalhadores de duas diferentes operações *offshore*, a fim de avaliar as informações metalinguísticas a respeito de possível treinamento e uso padronizado da linguagem durante a realização das atividades. A terceira etapa compreendeu a coleta de dados *in loco* e a

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análise das informações linguísticas. A Linguística de Corpus, a Análise Conversacional, o Princípio Cooperativo e a Taxonomia dos Fatores de Comunicação e Linguagem na Aviação foram alguns dos referenciais teóricos que orientaram a análise. Os resultados apresentados são preliminares, porém significativos, e mostram que fatores procedimentais são marcantes quando se contempla a possibilidade de falha na comunicação e, por isso, podem ser considerados o cerne de uma taxonomia. Adicionalmente, os dados metalinguísticos das entrevistas mostram que parece haver um comportamento comunicativo padronizado nas operações dado o rigoroso treinamento técnico a que os trabalhadores são submetidos. No entanto, o uso indevido ou a não utilização de certas estruturas léxico-morfológicas e de estratégias e procedimentos comunicativos podem impactar a segurança. Nessa linha, o artigo também aborda algumas sugestões para práticas de comunicação otimizadas.

Palavras-chave: Comunicação. Indústria de óleo e gás. Inglês para Aviação. Linguística Aplicada. Fatores Humanos.

Resumén: Este artículo tiene como objetivo describir algunas características de la comunicación en la industria del petróleo y el gas considerando las contribuciones de la lingüística aplicada y el inglés aeronáutico. Impulsados por la necesidad de tener un panorama de las dinámicas de comunicación que se desarrollan en el escenario propuesto, los estudios se realizaron dentro del Proyecto HF2 y se organizaron en tres etapas. La etapa 1 revisó los informes de accidentes para descubrir los factores de comunicación que podrían estar asociados con la seguridad y ayudar a construir una versión tentativa de una taxonomía basada en la Taxonomía de los factores de comunicación y lenguaje en la aviación utilizada para el análisis del lenguaje en la aviación. La etapa 2 comprendió entrevistas con trabajadores de dos operaciones costa afuera diferentes para evaluar la información metalingüística con respecto a una posible capacitación y uso del idioma estandarizado durante el desempeño de las actividades. La etapa 3 abarcó la recopilación de datos in-loco y el análisis de la información lingüística. La Lingüística de Corpus, el Análisis Conversacional, el Principio Cooperativo y la Taxonomía de los factores de la Comunicación y el Lenguaje en la Aviación fueron algunos de los referentes teóricos que guiaron el análisis. Los resultados presentados son preliminares, pero significativos, y muestran que los factores procedimentales son sobresalientes cuando se contempla la posibilidad de falta de comunicación y, por lo tanto, podrían considerarse el núcleo de una taxonomía. Adicionalmente, los datos metalingüísticos de las entrevistas muestran que parece existir un comportamiento comunicativo estandarizado en las operaciones dado el estricto entrenamiento técnico al que son sometidos los trabajadores. Sin embargo, el uso indebido o no uso de ciertas estructuras y estrategias léxico-morfológicas y procedimientos podría afectar la seguridad. En esta línea, el artículo también aborda algunas sugerencias para optimizar las prácticas de comunicación.

Palabras Clave: Comunicación. Industria de petróleo y gas. Inglés para la aviación. La lingüística aplicada. Factores humanos.

Introduction

Communication is a critical feature in human operations. (CUSHING, 1997; DIETRICH; MELTZER, 2002; MATHEWS, 2019; NEVILLE, 2004). In the context of aviation, Sexton and Helmreich (2000, p. 63) say that "The role of language has been neglected, and researchers have recognized the need for a deeper understanding of its roles, characteristics and how it impacts in aviation". In the oil and gas industry (OGI), communication plays a key role in the performance of activities.

The coordination of operations in highly dependent on a clear knowledge of the tasks performed by the participants (KLEIN; FELTOVICH; WOODS, 2004). Yet consensually relevant, it is difficult to find orientations from research and referential material available. Studies conducted in regard to communication seem to be more focused on technology (FRANCONI *et al*., 2014; PREMPAIN, 2020) or management systems (WOLD; LAUMAN, 2015).

The Human Factors 2 Project (henceforth HF2) was a partnership between the Pontifical Catholic University of Rio Grande do Sul (PUCRS) and the LIBRA Consortium which aimed to join academic and operational forces towards safety in the OGI. Along three years (2020-2022), experts from diverse areas of knowledge conducted research to investigate multidisciplinary issues that characterize the operations in the industry, most specially the ones that can be potentially impactful to safety. One of these areas was communication and how it could be explored from the perspective of applied linguistics, including the possible interfaces with the studies more recently conducted on Aviation English. Applied Linguistics seems to be helpful to address certain possible miscommunication issues as it offers a wide array of fields, theories, and tools for language investigation (POERSCH, 1980). Recent studies on Aviation English show that in complex communication environments the contribution of language experts has been of utmost importance as for improvements (MATHEWS, 2019), such as the International Civil Aviation Organization (ICAO) Document 9835, the Manual of Language Proficiency Requirements, which sets standards

for aeronautical communications on behalf of the international aviation authority.

Knowingly, Aviation and the OGI are quite different in nature. Taxiing, takeoff, cruise flight and landing are the most complex operations that would come up when thinking about aviation. When having in mind the OGI, the number of operations would escalate considering production, drilling and offshore as major categories that comprehend activities. Yet, they both qualify as high-stakes systems, and communications are based on the use of language for specific purposes: players have to be aware of the objective of each and every word employed so to attain understanding and perform operations safely.

From this perspective, the overall goal of the article is to uncover the main communication issues in the OGI considering views from applied linguistics and Aviation English. As to language use, the study is intended to identify some of the main structures and strategies employed in this context of communication and to discuss possible improvements toward operational safety. To have elements that featured the communication dynamics in this context, the research had three stages. Stage 1 developed a theoretical analysis of the most known safety events in the OGI to spot factors that could be analyzed through the Taxonomy of Communication and Language factors in Aviation, which is used to investigate communication problems in aviation (MATHEWS, 2013) and presented a tentative version of this taxonomy for the OGI. Stage 2 proposed online interviews with workers from different activities in three offshore operations (offloading cargo handling, and BOP[2] landing) based on questions that tried to elicit the main communication challenges faced in the coordination of tasks. Stage 3 was based on in loco collection of language data from one cargo handling operation.

In order to describe the research conducted for the purposes of the HF2, the article is organized as follows: firstly, a literature review is presented to offer theoretical background to the ideas discussed. Next, the methodology describes the three stages of the research.. It is followed by a results section displaying a tentative version of a taxonomy, the main ideas collected from the interviews and specific language remarks observed in the in loco communication exchange. A conclusion section puts together ideas and suggestions to optimize communication practices. As we will see, the analysis of the safety events points to procedural factors as the most accountable for miscommunication, which is reflected in the metalinguistic data from the interviews and in the linguistic data. The latter also shows specific language structures and strategies employed and indicates that the OIG could benefit from a more standardized language use.

Literature Review

This section is designed to locate the study within the wide scope of areas that it entangles, so to bridge a gap and identify the strengths from the interface of applied linguistics, Aviation English and communication in the OGI. The main theoretical framework is supported by Corpus Linguistics, Conversational Analysis (NEVILLE, 2006), the Cooperative Principle (GRICE, 1975), and the Taxonomy of Communication and Language factors in Aviation (MATHEWS, 2013; MATHEWS; PACHECO; ALBRITTON, 2019), as better described below.

Prospective theoretical support in Linguistics

Linguistics is the science of language and, as such, features a wide array of interconnected fields of investigation of linguistic phenomena. Among them, there are Syntax – the study of language structure; Semantics, as to meaning; and, involving the study of language in its context of use, we have Pragmatics and Discourse Analysis – the former focusing on the effects of this context in meaning, whereas the latter investigating the language used in relation to its social context (CRYSTAL, 1995; FROMKIN; RODMAN; HYAMS, 2003).

Bearing that in mind and looking at the communication dynamics featured in the OGI along with the problems and challenges put by language

[2] Blow-out Preventer.

use in this context, any kind of language analysis tends to be more successful if approaching the phenomena within both quantitative and qualitative perspectives. More specifically, by conducting lexical and structural analyses and extending them to intended or communicated meanings, we might have a satisfactory description and explanation of certain communication issues that affect safety.

Quantitative information about the occurrences and co-occurrences of elements, on the level of syntax and morphology, can lead us to numbers that can reveal significant information when depicted within the framework of semantics and discourse analysis. However, specific context analysis should also be considered for a complete interpretation of the communicative event. Among the several theories available, there are some that deserve special attention in that they can be helpful to our purposes.

In the field of Pragmatics, the contributions of Paul Grice, especially in his 1975 paper, can be quite valuable. He coined the term implicature – what the speaker suggests or implies through an utterance, even if not literally put in it. The notion of implicature is extensively discussed (GRICE, 1975; LEVINSON, 2007) – types of implicatures, conversational and conventional), along with other concepts which are comprehended by it – inferences, entailments, such as what is said and what is implied. based on this theory, a speech act is successful when what is said by the speaker is clearly understood by the hearer along with what is implied. When there is a clash in these dynamics, communication is affected (FROMKIN; RODMAN; HYAMS, 2003; GRICE, 1975; LEVINSON, 2007).

Therefore, our conversations are cooperative efforts and each participant should recognize a common purpose and a mutual direction, and from this, he proposes the Cooperative Principle - a kind of rule in communication expected to be followed by participants, which could be determined as: "Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged" (GRICE, 1975, p. 45). This principle unfolds into four more specific categories, knows as maxims, namely: Quantity, Quality, Relation and Manner. The maxim regarding Quantity is about making your contribution as informative as required for the purposes of the exchange (not more, not less). Quality would refer not only to the degree of information offered (nor over informative), but also to the extent to which that information is true. As for Relation, Grice (1975) states "Be Relevant". Lastly, Manner should be understood as how things are said. When a participant in the communication exchange does not follow one of these maxims, he is said to break the Cooperative Principle, leaving a gap for misunderstandings. In contexts of language used for specific purposes, these assumptions can be quite relevant as for the possibility do describe and explain miscommunication episodes.[3]

In the field of Discourse Analysis, Conversational Analysis (CA) is a sociological academic research methodology and micro-analytical approach to the study of naturally occurring interaction (NEVILLE, 2006). Maurice Neville is an enthusiast of the approach and has extensively used it as a method in his research work in aviation (NEVILLE, 2004, 2006; NEVILLE; WALKER, 2005; TUCCIO; NEVILLE, 2017), claiming that it can be especially valuable for investigating transport occurrences because it focuses on examining the details of *communication in context*, as it actually occurs in real time (NEVILLE, 2006). In the author's view, the tools offer possible means for understanding communications and human factors as relevant circumstances in occurrences and are not supposed to be a comprehensive and definitive overview of all aspects of conversation analysis. "Rather, the tool can be used as a guide for using some important aspects of conversation analysis for recorded voice data in investigations" (NEVILLE, 2006, p. 14). CA is data-driven and

[3] For instance, in the Montara event, a renowned accident in the OGI, the sentence "*checked cement integrity*" is mentioned as a key element in the development of the facts apparently because what was said and implied by the speaker was not understood by the hearer.

highlights the contexts of occurrences, which can be possibly helpful when analyzing utterances in the oil and gas industry. One challenge that may be posed and anticipated, nonetheless, is the difficulty to gather in-loco information during the operation procedures.

Corpus Linguistics is also of great contribution to this research. One of the first and most introductory definitions is given by McEnery and Wilson (1996, p. 1): "Corpus linguistics is perhaps best described for the moment in simple terms as the study of language based on examples of real-life language use".

It is a methodology that may be used in different areas of linguistics – syntax, semantics, pragmatics, phonetics, as a descriptive, non-prescriptive approach. In other words, it is supposed to describe the language that is used, not to prescribe the language that should be used. Essentially, it is an empirical research approach to language use from a corpus, which is defined by Hunston (2002, p. 3) as "a collection of naturally occurring examples of language, consisting of anything from a set of a few sentences to a set of written texts or tape recordings which have been collected for linguistic study". More traditionally, McEnery and Wilson (1996) hold that a corpus is any collection of more than one text, which, in the context of modern linguistics tends most frequently to have more specific connotations, considered under headings such as sampling and representativeness, finite size, machine readable form which can be analyzed with the use of tools through specialized software. The most common ones are AntConc[4] and WordSmith Tools[5], easily found and widely used for language analyses, freely available in limited versions, along with tools such as WordLists, which provide lexical ranks and frequency; or Concordance tools, which make it possible to analyze the context of occurrence of a given word or group of words.

It should be noted that corpus-based research allows for both quantitative and qualitative analyses, since the specialized software and tools display possibilities to expand the contexts of investigation. On that account, it seems to be an interesting approach to spot the theme in texts and enlarge the scope of the analysis (MOTIN; SARMENTO; SARDINHA, 2015). In the Aviation English field, it has become of increasing interest because it enables the researcher to analyze real language occurrences from a variety of tools (PACHECO, 2021; PRADO; TOSQUI-LUCKS, 2019).

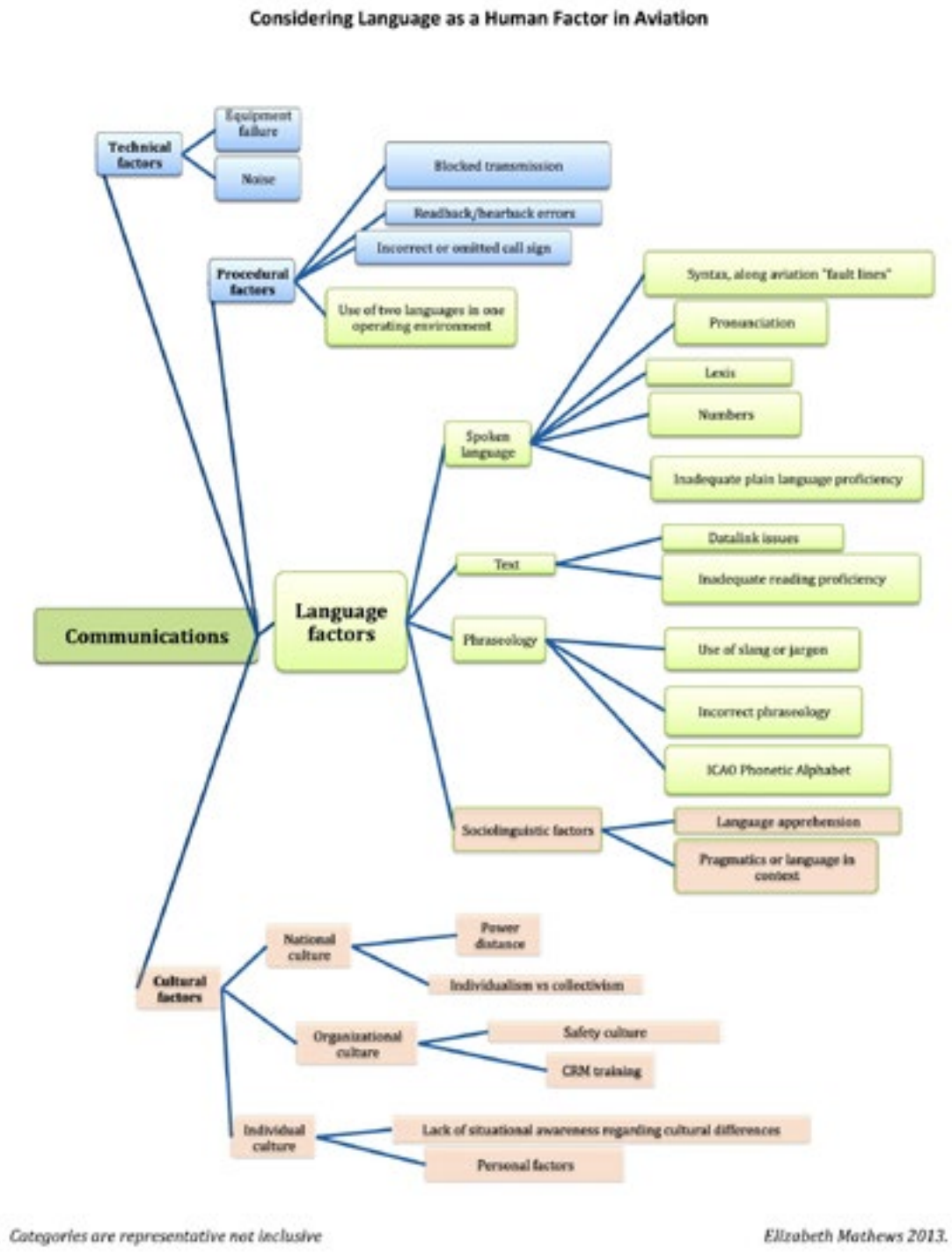
Aviation English and The Taxonomy of Communication and Language factors

Aviation English is the specialized language used in aviation and, overall, comprises Phraseology and Plain English. The former is the combination of around 400 words in strings to comply with communicative functions and the latter is the variety of language used when phraseology does not suffice (PACHECO, 2019). Pilots and air traffic controllers are supposed to go through extensive language training in order to master specificities of this language, regardless of their nationality.

Communication is consensually a factor in aviation safety (CUSHING, 1997; DIETRICH; MELTZER, 2002; MATHEWS, 2019; NEVILLE, 2004; PACHECO; SOUZA, 2018). Nevertheless, it has only been more punctually addressed since the adoption of the Language Proficiency Requirements mandated in ICAO Document 9835, which describe the communicative functions that should be observed by pilots flying internationally. Still, to approach specific language elements that impact aviation, Mathews (2013) proposed a Taxonomy of Communication and Language factors in Aviation, that considers four factors that interface when accounting for communication: technical, procedural, language and cultural, as sketched below.

[4] https://www.laurenceanthony.net/software/antconc/
[5] https://www.lexically.net/wordsmith/

Figure 1 – Taxonomy of Communication and Language factors in Aviation



Source: Mathews (2013).

These factors were obtained from the analysis of aviation accident and incident reports and were outlined from models such as featured in Wiegmann and Shappell (2003). The idea is to account for language aspects within a scope that also considers other closely related factors such as technical, procedural and cultural. Although theoretically limited, it works as a reference model to have a parameter to analyze communications and the use of language in high-stakes contexts (MATHEWS; PACHECO; ALBRITTON, 2019).

Technical factors that interfere or prevent communication are associated with equipment

failure or transmission noise. Procedural factors, in aviation, refer to blocked transmissions, omission of caller IDs, information confirmation errors and the use of two languages or more in the same operational environment. Cultural factors, on the other hand, can be associated with the cultural dimensions of Hofstede (1997), Assis and Pacheco (2020) that most directly affect communication and language, among them: national culture, which covers issues related to power distance and concepts of individualism and collectivism; the organizational culture, more particularly an organization's safety culture and safety training programs. Effects of individual culture include lack of situational awareness regarding linguistic and cultural differences and personal factors. Linguistic factors stand out in the taxonomy by presenting specific elements for linguistic analysis, such as spoken language (syntax, pronunciation, vocabulary, numbers, inadequate linguistic proficiency), written language (lack of proficiency in reading, for example), phraseology (use of slang, incorrect phraseology) and sociolinguistic factors (linguistic and pragmatic apprehension or language in context).

The Taxonomy offers a means of analyzing an aircraft accident that presents language issues as causes in a more specific way (PACHECO; SOUZA, 2018). Naturally, the analysis of an event requires careful research of official reports of accidents and incidents issued by competent authorities and other formally available materials and, mainly for purposes of linguistic analysis, a careful study of all aspects of communication dynamics; in the case of aviation, the recording of conversations between pilots and controllers, which, when accessed and investigated, allow the detailed exploration of linguistic factors relevant to operations, which can be used later for training and evaluation purposes.

Methodology

This section will describe the main aspects of the three stages of this mixed-method research and their propositions.

Stage 1: Accident Analysis based on Reports

Sixteen events were analyzed[6]. They were selected by the HF2 - Resilience Engineering (RE) research team based on the availability of official reports and on their impact in the industry.[7] The reports were organized into machine-readable form and submitted to Wordlists and Concordance tools in the software WordSmith to extract information regarding occurrences, following corpus linguistics orientations. The following research question guided the analysis: How do accident reports approach the theme "communication"? This research question was broken down into three other more specific questions, considering 'how' as (i) frequency, (ii) manner and (iii) intensity, as in:

> (i) How often is the word "communication" in the reports?
>
> (ii) Is it directly mentioned in the "causes" and "recommendations" sections?
>
> (iii) How detailed is it? What is the relevance attributed to it in the report?

Based on corpus analysis (wordlists) from each report, we were able to obtain information on (i) The number of occurrences of the word "communication/communications" in each report (ii) The number of occurrences of the word in the sections that can be considered crucial for the event and (iii) details of the developments based on the theme "communication", from the expansion of the context in which the word is spotted and on the association of the word with other co-occurring items, which can trigger other contributing facts to the analysis. The figures are presented in the Results and Analysis section along with a tentative version of the taxonomy applied to the OGI.

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[6] The reports used are written in either English or Portuguese and are not being bibliographically referenced for reasons regarding information disclosure and accessibility of material. They were made available to the RE research group.

[7] Details on this specific data collection can be found in Pacheco (2020).

Stage 2: Interviews

Five interviews were conducted in the second semester of 2021[8] with different workers of offloading, cargo handling and BOP landing operations. The interviews were online, recorded, lasted about 2 hours, and comprised a number of aspects involved in the investigation of the RE research group. In regard to communications, the guiding questions were[9]:

> (i) Is there a standardized language in your daily operational routine?
>
> (ii) Is there any kind of specific language training towards communication practices?
>
> (iii) As you see it, what can go wrong in communication?

The answers were explored in light of the Conversation Analysis perspective, taking also into account the procedural factors investigated previously for the taxonomy. Some highlighted extracts are presented and discussed in the results section.

Stage 3: In-loco language Data collection

Data were collected and recorded from an onsite communication exchange taking place during a cargo handling operation in May, 2022, in Rio de Janeiro, lasting approximately 1hour. It was transcribed, revised and described by one of the researchers of the RE group. The answers were analyzed from the angle of Conversation Analysis (NEVILLE, 2006) and the Cooperative Principle (GRICE, 1975) and are displayed in the next section.

[8] The study was conducted within the domain of the Human Factors 2 Research Project (HF2), a partnership between PUCRS and the LIBRA Consortium. Because of that, all data collection methods in the project had to be submitted to the authorization of committees such as Comitê de Ética em Pesquisa (CEP) and of specific committees inside the involved companies. All subjects were volunteers and agreed to participate. HF2 was a multi and interdisciplinary Project, covering areas that range from Engineering, Aviation, Business to Sociology, Psychology, Communication and Linguistics. The data collected for the purposes of the project was made available to all the researchers who were part of it.

[9] The interviews were in Portuguese and the questions were translated into English by the author of this article.

Results and Analysis

Stage 1: Taxonomy

The search in the 16 texts was conducted[10]. Thirteen out of sixteen accident reports have the item "communication/ communications" in their texts. This seems to be evidence that the theme is approached in most reports, as expected, given its importance in operations. It has formally been assigned as a causal factor in nine reports and was present in six recommendations.

The co-occurring or associated items are highly relevant to this study as they give indications about how to move forward with the qualitative analysis. The mentioning of certain items such as "phraseology" or "flowchart" encourage us to pursue and try to disclose more information about communication standards that we do not have knowledge of so far. Additionally, the high co-occurrence of items such as "protocol", "management", "poor", and "procedures" in different events allows us to explore the texts in a more in-depth perspective, in search of elements that could account for their causes.

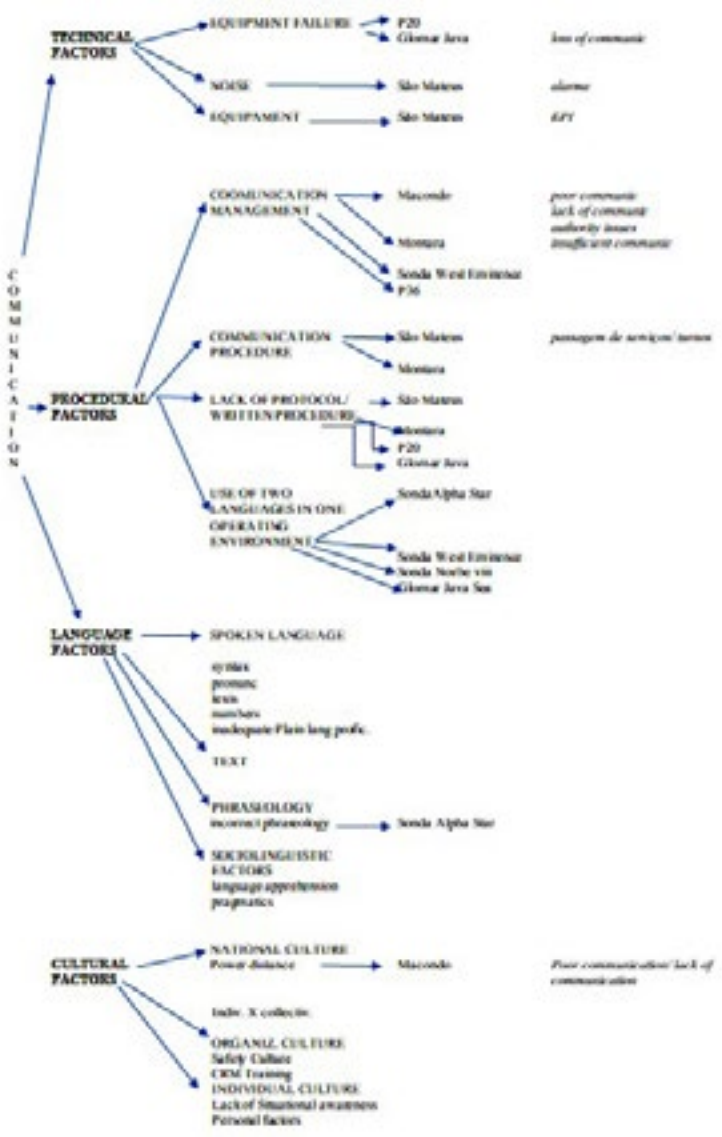
This quantitative analysis is the onset to a qualitative analysis: from the occurrences themselves, we are allowed to explore a wide number of possibilities to investigate the communication phenomena. Upon reading the reports, discussing the events with the RE research team, and exploring some specific language items, a draft of a taxonomy based on the one that is proposed by Mathews (2013) was outlined and is presented below in figure 2.

It features, sequentially, four factors associated with communications, their unfolding, the specific event that illustrates the problem, and language evidence that can justify the choice. It is important to remark that the Procedural Factors were found to be the most significant in the analysis so far, given the fact that they seem to comprehend impactful issues to safety associated to management and protocol guidance. The added factors are "communication management", "communication procedure" and "lack of protocol/ written procedure" – all clearly stated by the data.

[10] More Figures and tables are displayed in a working paper (PACHECO, 2020) written for the purposes of the HF2 Project.

The four major factors were kept; some branches were adapted in order to account for the peculiarities of the oil and gas context. This is especially observed in the Procedural factors: the original Taxonomy displays specific factors such as omitted callsign or readback and hear back failures. As we will see, the interviews and the language data collection indicate there may be problems regarding those. However, the accident reports seem to be too general regarding communication, and this is probably why peculiarities such as those are not yet mentioned.

Figure 2 – Tentative Taxonomy for Safety Events analyses in the Oil and Gas industry



Source: Pacheco (2020)[11].

[11] The reader is referred to this source for more details on this tentative taxonomy.

Interviews

The research greatly benefited from the interviews as they evidenced relevant and much-needed metalinguistic data regarding strengths and weaknesses of communication dynamics in the OGI. The answers to questions (i) and (ii) confirm there is neither a standardized language used in the performance of operations nor specific language training for communications in operations. Notwithstanding, there seems to be a standardized operational behavior underlying communication practices: it is widely known that workers go through strict operational training to perform tasks, and this seems to offer support for them to know what, when and how to communicate. Some sentences attest that[12]: "*people know what they have to do*"; "*it is assumed*"; "*they have a clear understanding of the role assumed by each one*"; "*things are kind of automatic*".

Communication procedures seem to be implicit in the operational procedures and it is assumed that all the participants in the activities know how to perform linguistically. As for question (iii) about possible risks for miscommunication, workers point to a different perspective of some of the above answers, highlighting especially the impact of experience. In other words, experience can be a positive feature as it empowers someone to perform more confidently, but it can also be negative when someone does not have it or has too much of it to the point of being extra confident.

The importance of politeness was also mentioned multiple times by workers: they seem to observe markers to sound polite and nice. The sentence *"é bacana você chegar e falar, comunicação, driller com licença, eu sei que você está ocupado, mas eu vou só ajustar a pressão para dar um ciente para a pessoa do que está acontecendo. Isso é importante, sabe, esse tipo de comunicação"13* can be evidence that they might use certain politeness related structures to avoid sounding authoritarian or to emphasize it is a group task.

Another significant remark mentioned in the interviews is about shared information: there is no formal linguistic indication as to what someone has understood or to when someone must stop moving a device, for example. One of the interviewees was clear in saying "*it is a process I will go on doing until someone says it is over*". As put before, the operational behavior seems to be the indication for one to regulate their actions. However, it can be risky (as put by the workers) because it is assumed and not formally expressed. The following subsection featuring linguistic data will show that as well.

In loco Data Collection

The extract analyzed reveals rich linguistic instances that appear to be peculiar in OGI communications. As the original language of the conversations is Brazilian Portuguese, the items used in the analysis in this article will follow the same language.

> (a) There are made of 1.460 tokens. The most frequent words are "*desce*" (94 occurrences), "*sobe*" (55), "*devagar*" (32) and "*parou*" (25)[14].
> A "briefing" is conducted before the operation, as put in the interviews, which confirms the importance of an effort for mutual awareness.
>
> (b) Use of certain technical items which are peculiar to the context and plain language to resolve problems. The importance of experience is clearly emphasized, as in the sentence "*Essa manobra aqui eu não tenho experiência*"[15], possibly implicating "because of that, I do not know what to do".
>
> (c) Use of names to address the message. Although not largely observed, this seems to be an indication of task assigning and should be included in operational training, as it would facilitate both mutual and particular understanding of who is supposed to do perform a certain activity.

[12] The interviews were in Portuguese and the sentences have been translated into by the author for the purposes of this article.
[13] "It's nice for you to show up and say, driller, excuse me, I know you are busy, but I will just adjust the pressure here to make the other person aware of what is going on. This is important, you know, this kind of communication".
[14] In English, "go down", "go up", "slowly" and "stopped", respectively.
[15] "I do not have any experience with this maneuver".

(d) The communicative functions of Commands/Orders/orientations are short, clear, repetitive, and repeated along the operation: they are limited regarding lexical variation assumedly for simplification purposes.

However, morphological variation is high: complex verbal inflections are observed with one same radical. For instance: "*desce*" (imperative), "*desceu*" (past simple), "*parado*" (past participle), "*vai descendo*" (compound structure: imperative + gerund), "*descendo*" (gerund). In other words, workers tend to use a limited range of lexical items with a variety of morphological inflections to comply with the communicative function, which can be a problem. Morphological markers have a motivation: they are used to assign tense and aspect. Communications in the OGI are complex as they are also performed by radio sometimes with no visual clue whatsoever, which means operations can only count on language clues. A verb used in the participle meaning an order, for instance, "*parado*"[16] can cause miscommunication.

For the communications to be successful (and to keep operations safe), workers have to rely on inferences and implicatures – Cooperative Principle (GRICE, 1975). That does not seem to be the ideal scenario for a high-stakes operational context: in this line, it is suggested a minimum of standardization regarding morphological forms. If possible, a limited number of lexical items with frozen inflections could be added to operational training in order to ensure mutual understanding.

(e) The extensive use constructions in the first-person plural (we) is an evidence of politeness markers, along with other structures such as "*só*"[17]. As mentioned in the interviews, workers seem to worry about "sounding" nice, not impolite, or authoritative. The negative aspect of an order can be demeaned through the use of some language resources such as including everyone in the activity or diminishing any kind of pressure with "just". It should be noted, however, that players in the dynamics need to have a clear understanding of commands and the severity involved. Because of that, more assertiveness could be considered in necessary moments in the speech acts in a way that the meaning is actually said, not implied (GRICE, 1975).

(f) The confirmation of information (readbacks/hearbacks) is observed in the extract either using more commonly employed items in technical communication such as "ok", "*positivo*", "*negativo*", "*entendeu*" or more informal ones, like "show de bola", "*cara, tem nada não, viu*?", "*Beleza*". Or by using direct questions with informal language, which seems to be clear and to the point. Given the importance of confirmation to mutual understanding in the performance of operations, the OGI would probably benefit from some orientations regarding the standardization of readbacks and hearbacks as communicative procedures to be done through a limited range of simple lexical structures, which would be suggested by the operators themselves.

Conclusions

The article set out to explore communications in the OGI taking into account some possible contributions from applied linguistics and aeronautical communications through the description of research conducted for the purposes of the HF2 Project. The article is not intended to be detailed and expanded in this description: on the contrary, it addresses the first impressions of an investigation in its first steps.

Despite difficulties imposed by the pandemic scenario, especially in regard to data assessment and collection, we managed to conduct theoretical and empirical analyses which show that communications taking place at the OGI seem to be successful probably because it is characterized as language used for specific purposes: language structures are employed for particular operational

16 "stopped".
17 "just".

purposes in which workers are highly trained for. These standardized operational behavior ends up reflecting a language behavior that guarantees the compliance of communicative functions.

However, some suggestions should be considered regarding a minimum standardized language. Procedures such as the inclusion of a message addressee and confirmation items could be included in operations that require special attention to mutual understanding. Additionally, a limited use of inflections so to ensure clear ideas about tense and more assertive structures when transmitting an order. In this line, orientations based on this research point to two directions: (i) the elaboration of a minimum set of terms following the above recommendations and (ii) the inclusion of awareness activities in regular operational training.

Unlike aviation, which has a limited number of operations, the OGI counts on a much wider range of activities which would make it impossible to have a Phraseology as we see in aeronautical communications. The industry could benefit from the creation of a Phraseology on a smaller scale, which would consider a minimum of items to be used in compliance with basic communicative functions and to be elaborated by experienced workers who daily perform the activities with respect to the actual meaning that needs to be communicated.

Furthermore, it would be helpful if workers could be aware of the language they use and the impact it has on mutual understanding. Simple activities could be developed and made available as part of their operational training (in person or online) in order to enhance their skills toward optimized communication practices.

Among the limitations of the research, there lies mainly in data assessment. Studies on communications in the OGI are scarce and reaching specific linguistic information is difficult. This is why more exchanges would be helpful not only to confirm some of these conclusions but also to reinforce the suggestions and cover a wider number of operations. More studies are highly suggested and much needed to more punctually address certain issues raised by this research and offer elements to bridge gaps that are directly associated to safety. Especially, studies that foster the interface and collaboration between academy and industry: applied linguistics was of great help to uncover and better understand communication processes in the OGI industry, as well as information about the complex functioning of the industry was highly beneficial as original and real data for applied linguistics.

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