

## Cognitive Approach for Oil and Gas Translator Training

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Received: 30/04/2019

Accepted: 25/07/2019

Published: 30/06/2020

### Abstract:

Cognitive science offers fundamental keys for a better understanding of the translation procedures and processes through providing the concepts, strategies and methodologies that enable translators to enhance their competence, widen their knowledge, sharpen their skills and thus improve their performances.

The present paper aims to investigate how cognitive approach contributes in the translation process, more particularly in the oil and gas field. Through analysing the translation of some extracts of oil and gas texts, we will try to answer the following questions: what competencies does a translator in the oil and gas field need? How can cognitive approach in conceptual and intertextual perspectives help the translator overcome the difficulties and challenges encountered in the oil and gas field and make the best decisions? What cognitive methods and strategies are to be incorporated into the oil and gas translator training?

**Key words:** Cognitive Approach; Conceptual and Intertextual Perspectives; Linguistic Competence; Oil and Gas Translation; Translator Training.

### Introduction:

Nowadays, the oil and gas is one of the most international sectors in the world as it operates on a global scale and companies themselves can have different departments and branches across a range of countries which demonstrates the demand for multi-lingual translations and when talking about the success and failure of a project, translation is at the forefront.

In parallel, cognitive approach has integrated almost all the domains. From short-term memory to long-term memory, in addition to think-aloud protocol (TAPs) and mental representations, advances in the cognitive method have combined with the translation process to faster and facilitate the translator's task.

Being a senior translator for an oil and gas industry, I report here on my experience of translation over a number of years, which I hope will be of interest to professional translators as well as providing a reference point for others who may be considering the introduction of the cognitive approach to their teaching programme to prepare future translators to their daily duties and tasks.

This paper investigates the translation of oil and gas documents from English into French and vice versa. The main focus is on the best techniques to adapt and tools to use to increase translation quality and improve its effectiveness.

I first gave an overview of the cognitive approach in the translation studies. Secondly, I tried to prove how cognitive approach in conceptual and intertextual perspectives can help the translator overcome the difficulties and challenges encountered in the oil and gas field and make the best decisions. Thirdly, I exposed the role of cognitive science in the oil and gas translation to finally suggest the integration of cognitive approach in the oil and gas translator training.

### **1- Cognitive approach in the translation studies:**

In the recent years, several cognitive approaches have been developed for the purpose of exploring translation mechanisms and how the translation learning process is working through analysing what happens in the translator's mind while performing. Krings, Jääskeläinen, Séguinot, Königs, Lee-Jahnke, Paradis, Bourdieu, Wildgen, Pym and many other scholars have shed light on the translation process based on cognitive sciences.

To understand how translation studies are linked to cognitive sciences, we will have a close look at the translation process by answering the following questions: "what is translation?" and "how is the source text rendered into the target language?"

### 1.1 Translation process and information treatment:

« Traduire est une démarche cognitive qui ne consiste pas à «déalquer» des mots (encore moins des morphèmes), mais à extraire le sens dont ils sont porteurs, et cette opération passe par l'étape obligée de la déverbalisation, suivie, bien entendu, d'une étape de vérification qui n'exclut aucunement un retour au texte de départ » (Delisle, 2005, p. 48), i.e. Translating is a cognitive process which does not consist in "tracing" words (even less morphemes), but in extracting the meaning they carry, and this operation goes through the obligatory stage of deverbalisation, followed, of course, by a verification stage that in no way excludes a return to the original text.

In the same context Jean Delisle proposed the model of the three-stage translation where he focused on the intellectual process involved in the translation process and the cognitive process of interlingual transfer. He also stressed the non-verbal stage of conceptualization (Baker, 1998, p. 113) which requires a combination of linguistic proficiency and metalinguistic knowledge.

Each language is different from other languages in its fundamentals and purposes. After reading the source text, decoding the linguistic signs and grasping the meaning, the segment is stored in the memory and when the verbalization process starts, the new text in the target language is drawn up in accordance with the rules of the language.

« Selon l'approche cognitive le processus de traduction se définit essentiellement par le traitement de l'information contenue dans le texte à traduire et par sa mise en relation avec les connaissances antérieures (linguistique et extralinguistique) » (Dancette; Halimi, 2005 p. 548), i.e. According to the cognitive approach, the translation process is essentially defined by the processing of the information contained in the text to be translated and by relating it to prior knowledge (linguistic and extra-linguistic).

Through examining the translation pathway and mechanisms underlying the functioning of the learning process, the cognitive approach nowadays plays an increasingly important role in the

continuous improvement not only of the product quality but also of the translation teaching and learning process.

In his study, Prégent (Hannelore Lee, 2005, p. 362) explains which levels of consciousness are activated while performing different types of activities and according to the findings it is proved that while implementing the project teaching methods, the trainees will feel that they are taking greater responsibilities towards the learning process which will thus help them achieve better results as they will apply what they had learned.

One of the most prominent questions related to the translation process is: at which level is information treated and how is this done? The answer will lead us to talk about the mental representation and the translation techniques and strategies used by the trainees or translators in order to solve the problems faced.

## 1.2 Mental representations in the learning process:

The mental representation known also as the “mental models” (Rickheit, 1993) is defined as the structure and representation of knowledge which aims at explaining human behaviour.

As per Wender (1990); Denhière & Baudet (1992); and Risku (1998), representation is one of the most important concepts among all theoretical concepts of the cognitive studies. It is also one of the most interesting subjects of research at the *Centre National de la Recherche Scientifique* (CNRS) in France (Hannelore Lee, 2005).

« ...il faut **visualiser** la scène et suivre d'autres voies que celle des mots : processus cognitif, exploitation intelligente de son bagage cognitif, association d'idées, rapprochements analogiques, etc » (Delisle, 2005, pp. 48-49), i.e. “...It is necessary to visualise the scene and to follow paths other than that of words: cognitive process, intelligent exploitation of one's cognitive baggage, association of ideas, analogical comparisons, etc. ”

Described as the cognitive context in which information is treated (Hannelore Lee, 2005, p. 363), the concept of mental representation explains also why translators who master the subject

matter in the technical field, those who are specialists or who followed a related training will make better and more effective translations.

« Pendant la compréhension du texte, le lecteur se construit une représentation mentale de la structure de surface du texte, il génère une représentation propositionnelle du contenu sémantique, il construit d'après ce texte de base, un modèle mental de la matière décrite » (Tassini, 2019), i.e. During the comprehension of the text, the reader builds a mental representation of the surface structure of the text, he generates a propositional representation of the semantic content, he builds from this basic text, a mental model of the described subject matter.

During classes and more precisely while completing a translation exercise, the students use their brains to seek mental representation for understanding the text, visualize related knowledge, make an interpretation of the source text and produce the text in the target language.

« Mental representations are patterns of organization which comprise the knowledge of the individual, processes of changing this knowledge, deriving new knowledge through conscious and unconscious inferences and generating new activity plans » (Hannelore Lee, 2005, p. 363).

The mental representation is an important part of the translation process and it is a personal conception in every individual mind that is continually changing. For instance, you may have a different visualization and thus interpretation of the same text each time you read it and this mainly applies for literary texts such as fantasy novel. However, the mental representation in technical texts has another perception as understanding a text in the oil and gas field is always objective.

## 2- Oil and gas translation from a cognitive perspective

Oil and gas translation is a professional translation practiced in oil and gas industry. Documentation, procedures, reports, and guidelines must be consistent and uniform across all target languages by talking the same language and using the same terminology as understanding the same document, in the same way, ensures uniformity in operations.

Due to the highly technical nature of many oil and gas translations, strict observation of terminology is highly required which takes time to check, double-check and review. However, oil and gas translation is extremely time-sensitive and it is never acceptable to miss a deadline as this can cost the company a lot.

In (*L'enseignement pratique de la traduction*) Jean Delisle (Delisle, 2005, p. 50) sees that this type of translation, which is usually done into the mother tongue language of the student/trainee, aims to provide him/her with the know-how and the professional qualifications as well as preparing him/her to enter the labour market. The translation exercise contributes, in particular, to instilling in students a good method of work, introducing documentary research techniques, familiarizing with the most specialized languages and using translation aids and useful tools for professional translators.

Translated texts are authentic and contextualized. As a result, the translation strategies applied vary enormously and depend on the type of text to be translated, its function, purpose and target audience.

## **2.1 Oil and gas translation: the challenges:**

Translating in the oil and gas field involves many challenges as the translator's task is not easy. These challenges can be summarised in the following points:

### **2.1.1 Specialised language (Oil and gas jargon):**

The translator task is to render the text and keep the same meaning of the source text as the documents must be uniform and understood the same way. « [...] *specialised discourse presents an organised structure of knowledge. This structure could be represented as a conceptual map formed by nodes of knowledge, which can be represented by different types of units of expression, and by relations between these nodes* » (Cabr , 2003, p. 189).

In the oil & gas sector, specialised industry-specific language and technical terminology are the main characteristics of the documents to be translated. The translator needs to ensure he has the required background in these terms as if he does not have the requisite

knowledge; he will not be able to know all the nuances, details and the equivalents of the technical terms.

### 2.1.2 A time-bound activity:

The task of a translator in the oil and gas sector is conditioned by time as deadlines to present the translation are set and any delay will not be accepted. However, completing the task on time requires can be achieved only by a highly qualified translator who manages time by applying the necessary techniques and strategies to meet the company objectives.

### 2.1.3 Low margin for error:

Documents in oil and gas industry- which usually hire employees from different nationalities, with different background and speaking different languages- must be made understood in the same way. Each detail can make the difference and may even be crucial when it is about operations and safety. In this case we would not be exaggerating to say that it is “a zero tolerance for errors”, the reason why precision is a key factor in the translation process.

To accomplish his mission as it must, the translator needs to eliminate these barriers starting with the language. Problem solving and decision making is one of the main activities in the learning and translation processes. What is a translation problem? A translation problem may be seen as any situation in which the translator cannot render a sentence or a part from the source text to the target text. Various problems at different levels face the translators but through exercise, they learn how to solve them by making the right decision. While talking about technical translation, repetition would be the ideal solution as the students will get familiar with the situation which will be part of the long-term memory and therefore automatically propose a given solution.

## 2.2 Terminology and polysemantic terms:

The primary challenge in oil and gas translation is the highly domain-specific vocabulary. « *As a subject field with explicit premises, terminology emerges from the need of technicians and scientists to unify the concepts and terms of their subject fields in*

*order to facilitate professional communication and the transfer of knowledge » (Cabr , 2003, p. 37).*

One of the most common linguistic issues for translators at the beginning of their professional career is that they are not familiar with the oil and gas domain. What does the translator need to know about the oil and gas field to be able to translate effectively?

Debates in this regards took place; some people believed that only experts in the field can translate these technical texts as for them a translator would never be able to acquire the necessary knowledge in the field.

However, many experts and engineers whomaster - more or less- a foreign language and even if they know the equivalence of the technical terms, find the translation process complicated.

By the other hand, a translator who focuses only on the linguistic competence, syntactic and semantic knowledge without referring to any preparation or documentation will not be able to successfully complete his task because mastering the specialised language and being familiar with technical terminology is one of the most important factors for an effective translation.

Douglas Biber exposed the difficulty related to the polysemantic terms that a translator faces. He says that *« when a word has more than one meaning it is said to be lexically problematic and ambiguous. When a phrase or a sentence can have more than one structure, it said to be structurally vague and frustrating. Thus the central question of the lexicographic work is the meaning of words, hence, from this context; it is possible to identify the different meaning associated with a word »* (Biber, 1998, p. 21). For instance, let's have a look at the following paragraph on calculating plate dimensions which contains technical terms related to petroleum refinery:

*« A distinction is made in most columns between the **stripping section** and the **rectifying section** located on either side of the **feed inlet**. In these sections vapour and liquid **flow rates** and the **slopes** of **operating lines** differ considerably, so column diameter calculations understandably have to be repeated for each section.*



*A different diameter must often be chosen for the **rectifying section** and the **stripping section**. As a general rule, whenever a column has **intermediate feed inlets** or **draw-offs**, **flooding** calculations must be repeated for each of the sections » (Trambouze, 1999, p. 33).*

As you may see technical words are in italics. After selecting technical terms, the student must look for their equivalent and here he may face another difficulty which is polysemantic terms.

The first reference of the translator is a dictionary either monolingual or bilingual but both of them can be of no use if the translator is not able to choose the appropriate equivalent.

For example, if we look for the equivalent of “section” in French we can find: section, article, rubrique, partie, tronçon, zone et segment but while putting this in the context and looking at its representation, it will be easier to select the equivalent.

The following translation into French is proposed:

*« Dans la plupart des colonnes, une distinction est faite entre **zone d'épuisement** et **zone de rectification**, de part et d'autre du **point d'alimentation**. Dans ces zones, les **débites** vapeur et liquide, ainsi que les pentes **des droites opératoires**, diffèrent sensiblement. On comprend alors que les calculs précédents, conduisant à la détermination du diamètre de la colonne, doivent être répétés pour chaque section.*

*On arrive souvent à devoir choisir des diamètres différents, respectivement pour **les zones d'épuisement** et de **rectification**. Plus généralement, chaque fois qu'une colonne comporte des **alimentations** ou des **soutirages intermédiaires**, il est indispensable de répéter les calculs relatifs à **l'engorgement** pour chaque section de colonne».*

When I was given the first document for translation about wells intervention, I was asked if I saw a well before and my answer was « a water well, yes! But an oil and gas well, I can't remember if I've seen one before in some documentaries maybe...»

A site visit was organized later by the petroleum engineer who explained to me the process in general and the different parts and how it works.

This allowed me to get familiar with the related terminology but mainly helped me to have a mental representation of the text I was asked to translate which became a much easier task after the site visit.

### **3- Perspectives on the integration of cognitive approach in the oil and gas translator training:**

What is translation? What are you translating? For whom and for what purpose are you translating? How are you translating? What are the problems? And how to overcome them?

Students should be aware of the answers to the questions cited above as this will allow them to take in charge their own acquisition process.

By integrating the cognitive approach in the oil and gas translation and reviewing the teaching methodologies, students will be able to develop their competences and manage their learning process. In a cognitive based learning environment, students are active actors in the teaching- learning process.

While the classical methods in translation are not mainly dealing with the students' needs to develop their cognitive ability, the integration of the cognitive approach will certainly help improve the teaching-learning process. The teacher should provide the students with all the necessary tools to reach this objective and avoid the traditional role of a knowledge transmitter.

#### **3.1 How translation is taught and what should be improved?**

A translation training based on cognitive science seeks to help students choose the appropriate techniques and strategies (comprehending, decision-making and re-verbalisation), and the relevant tools to be used according to the problems faced.

*« Ce genre de traduction, qui se fait normalement vers la langue dominante de l'apprenti traducteur, vise à faire acquérir à ce dernier un savoir-faire et une qualification*

*professionnelle et à le préparer à intégrer le marché du travail. L'exercice de traduction contribue, notamment, à lui inculquer une bonne méthode de travail, à l'initier aux techniques de la recherche documentaire, à le familiariser avec les langues de spécialité les plus courantes et à l'habituer à se servir des aides à la traduction et des outils de bureautique utiles aux traducteurs de métier » (Delisle, 2005, p. 50), i.e. This type of translation, which is normally done into the dominant language of the apprentice translator, aims to provide the latter with professional know-how and qualifications and to prepare him to enter the labour market. The translation process helps him, in particular, to instill in him a good working method, to initiate him in the techniques of documentary research, to familiarise him with the most common specialist languages and to accustom him to using translation aids and office automation tools which are useful to professional translators.*

The purpose of the training is the acquisition of a professional qualification. This kind of training in specialized translation should be delivered by former translator or specialised translators as they will share their experience and build up the programme based on the market requirements. It should be also noted that *« learning process within the context of real translation projects carried out in a pedagogical setting will not only confirm the inestimable value of such projects for the development of translator competence, but they will also shed light on the cognitive and social aspects of the translation process its self » (Király 2005, p. 1099).*

According to my own experience as a trainee in a multinational industry then as a translator in a petroleum industry, I can say that implementing projects in the translation training will motivate students, allow them to have a deeper understanding of the translation process and consequently help them to improve.

Working in a more process-oriented way is the best approach to be adapted as it is necessary *« to learn how translation experts excel in their own fields of expertise and how the quality of their performance is rated in their own work, instead of using 'academic' quality criteria only » (Jääskeläinen, 2012).*

### 3.2 Course concept proposal:

This is a proposed exercise in the oil and gas translation which was developed based on the cognitive approach.

#### Objectives:

- Develop the students' cognitive abilities and translational competencies.
- Raise students' metacognitive awareness.
- Facilitate the documentary research process.
- Short-term memory and long-term memory development.
- Implement individual translation tests.(Gyde, p. 2).
- Develop self-confidence.
- Motivate learners through giving authentic texts.

#### Pedagogical support:

#### Specialised Text:

##### Natural Gas Composition and Phase Behavior

« Depending on where and from what type of reservoir the natural gas is produced, its composition can vary widely. Generally, it contains primarily methane ( $CH_4$ ) with decreasing quantities of ethane ( $C_2H_6$ ), propane ( $C_3H_8$ ), butane ( $C_4H_{10}$ ), and pentane ( $C_5H_{12}$ ). Some natural gas mixtures can also contain no hydrocarbon gases such as carbon dioxide ( $CO_2$ ), oxygen ( $O_2$ ), nitrogen ( $N_2$ ), hydrogen sulphide ( $H_2S$ ), and traces of rare gases (Ar, He, Ne, Xe). No matter what the natural composition of gas is, the product delivered and finally used by the consumers is almost pure methane. Natural gas phase behavior is a function of pressure, temperature, and volume. Therefore it is very often illustrated by the "PVT diagram" or phase behavior envelope. Understanding phase behavior is critical to the hydrocarbon recovery mechanism and production prediction. Certain concepts, demonstrated in Figure 1-7, associated with phase envelopes are worth introducing before we discuss different types of natural gas behaviours » (Xgas, p. 9).

**Exercise:**

As part of the translation class, the following guidelines in a translation exercise are proposed:

The text to be translated in the upcoming session is to be given as homework. This will give students enough time to apply the following steps:

**1/ Summarize and/or paraphrase the text:** Through this the student's comprehension of the text in the source language will be assessed. « *On ne traduit pas pour comprendre, mais pour faire comprendre. Il faut donc avoir la compréhension la plus parfaite possible du texte de départ* » (Delisle, 2005, p. 55), *i.e. We don't translate to understand, but to make people understand. It is therefore necessary to have the most perfect possible understanding of the source text.* This is why the first step is to make sure the student understands the source text.

**2/ Look for a text in the target language dealing with the same topic as the one given in the exercise:** This step is part of the documentary research. Peter Schwaar says: "*Traduire, c'est aussi se documenter*" (Schwaar; Boesch, 1998, p. 96), *i.e. Translating is also documenting...* In this part of the exercise, the student will learn about the documentary research and get aware of its role in the translation process.

**3/ Make a list of the technical terms and their equivalents:** After reading and understanding the source text, the student will be able to select the technical words. Through the documentary research he will find equivalents to the technical word in the source text and by matching he will get a glossary. This kind of technical glossary is a very good tool that will help the student to memorise the new terminology.

**4/ Translate the text and identify the difficulties:** This part of the exercise is a kind of individual test that will allow the student to identify their weaknesses in terms of translation and prepare a plan, with the teacher's assistance, in order to work on these particular points in order to improve his performance.

While in class, students will expose the difficulties they faced during the translation process and the role of the teacher here will be to guide them and try to provoke representations to help them in the problem solving and decision making processes.

One of the main roles of the teacher is also motivating students through explaining the objectives and showing them the usefulness of the learning process.

The results from process researches indicate that the professional translator uses a range of strategies while doing his job. These strategies vary according to the type of text and its complexity which will have an impact on his performance. However the decision making and problem solving depend on his experience, level and competences.

A cognitive based learning in translation studies is deemed to be important as it goes in parallel with the new wave of socially and culturally oriented research and meets the professional world requirements.

### **Conclusion:**

Oil and gas sector is one of the most international in the world today. The technical content in these multinational projects makes the translation process a critical task which requires an effective and efficient training programme to make sure translators have the necessary tools and ensure they tick all the required boxes.

After the enthusiastic efforts in the recent years regarding the translation process in the cognitive approach perspective, we can say that applying some of the concepts and methods of the cognitive approach will certainly improve the training process and thus the translation product.

The combination between theory and practice will make of the teaching-learning process more effective since the translator's professional problems can find solutions. Knowing the process is without any doubt one of the most important pillars in translation didactics:

*«... it's absolutely essential to know as much as we can about the process, both in order to plan the teaching in a good way, but also to focus on the process and not just fill the classes with texts that students have to translate and tell them that here you translated like this and here you translated like that, but instead actually help students to gain insight into their own process, because processes may vary between different people, and you have to raise that awareness with the student »* (Dimitrova, 2011, p. 350).

To conclude, oil and gas translation required competencies areas are a combination between linguistic and cognitive abilities. Thus adapting an appropriate programme with the purpose of meeting the labour market by applying a cognitive based learning is useful for overcoming challenges in oil and gas translation.

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