

# Technical communication: a two-sided coin?

Koussai HOUSSINE, Laetitia NALY, Axel PETIT

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## Abstract

*Technical communicators like to perceive themselves as go-betweeners who use language to bring tech objects closer to the general public. Still, is technical communication (abbr. TC throughout the article) really a two-sided coin that bridges the gap between the humanities and science, the “two cultures” in Charles Percy Snow’s terms?*

*The aim of this paper is twofold: testing the assumption that makes technical communicators middlemen between the two cultures, and to do so, defining the features of the language of TC by general linguistic standards. A sharp analysis of the language of technical communication provides many interesting clues to define its identity.*

*First, a short history of technical communication since World War II helps us understand how the language of technical communication changed with economic, social and political contexts. Second, we sketch a definition of human language in order to set an accurate theoretical frame and to define the features of the language of technical communication. Third, the discussion of a series of tests completes the qualitative analyses of the first two parts. It provides evidence to support the conclusion of this paper.*

**Keywords:** Technical communication, Language, Synchronic linguistics, Technology, Cognitive psychology, Understandability, User centricity, The two cultures

## Introduction

In 1959, Charles Percy Snow, a British physical chemist, delivered a talk entitled "The Two Cultures" before the University of Cambridge. This talk emphasized that the growing gap between the sciences and the humanities hindered dialogue in the intellectual world. He insisted on the fact that, on the one hand, a lot of people trained in the humanities were unable to understand important scientific concepts and, on the other hand, most of those trained in science had very poor knowledge of literature, writing or history. Indeed, the growing number of learned-people led to the rise of intellectual specialization so misunderstandings increased. This is what C.P. Snow noticed at the early stage of specialization he was living in. This issue is still salient nowadays.

We believe research on TC can provide relevant information about the way the two cultures interact and even position themselves. TC is easily thought of as a go-between. But do the ends really meet? Does TC bridge the gap between the two cultures?

To lead our inquiry, we chose to apply a mainly linguistic approach. Indeed, it enables both quantitative and qualitative studies to define the linguistic features of discourses, and henceforth confront them rigorously.

## **When technology started to speak our language: the advent and development of Technical Communication**

Science and technology need language. Difficult theories, complex technical systems, detailed experimental procedures can only be understood or replicated if they are properly explained. One would be unable to describe how a steam engine works, how planets move, or why it is relevant to use windmills without using language, may it be verbal or written. Language is the most effective way humans have found to express and deliver ideas and practices.

Before World War II, sciences and humanities were closely tied together. Scholars promoted a comprehensive knowledge of the world and did not think a separation was useful nor relevant. But the two cultures slowly distanced themselves. Yet, cannot we imagine that some fields maintained the link and contributed to bridge the gap between the two cultures? The term technical communication indicates an imbrication between technology and language. TC needs language to express how technology works. It is a particular discourse on science. So it appears to be an interesting case study to test our hypothesis.

In this section, we will sketch a brief history of TC since the 1950s, a decade when the industrialized societies of the West reshaped in the socioeconomic post-war context, when science and technology played a major role in the transformation of economy.

The case study of the history of technical communication provides insights to understand the evolution of its language. In particular, it exemplifies a gradual incursion of the languages of computers into traditional language. In that sense, it sheds light on the bridge between CP Snow's two cultures.

### **WW2: The rise of standards**

World War II made technical writing an official profession in the US.

The need of standards and procedures rose with the complexity of weapons, military vehicles, battlefield communication tools and war procedures in general. To seize this complexity, the US Army believed documents should enable people involved in the attention-demanding and exhausting war activities to understand how to quickly use their tools. These documents had to be simple, concise, efficient and clear.

Specialists were needed to write them, they had to know technology, science and writing. But, not so many people had the ability and training to carry out the task.

The US government believed engineers and researchers were the most relevant people to write about standards and procedures, because they mastered the science. At the National Bureau of Standards for example, engineers used to write how to replicate standards. The documents they produced were very specialized and tough to understand. Engineers were selected from their strong commitment to accuracy, precision and ability to carry out fiddly jobs but not on their talent as writers. As a result, they would produce extremely detailed texts. It is no surprise because they were still under the influence of traditional science which required being impressive before being understandable.

## **The language of computers**

### **Innovation in the post-war era**

The military maintained a strong influence on technical communication after the war. Cold War encouraged the US to carry out many efforts on so-called innovation in many technological fields.

Postwar economic growth created new demand supported by technological innovation. To meet the drastically changing demands of the people, the State funded many new research programs which benefited to the Army, car industry, healthcare, air-traffic, etc. In the meantime, industry produced new goods for the consuming public and universities strengthened their research programs in favor of applied science. Those three concurrent elements provided ground to support innovation.

Now the US government acknowledged clarity was needed to promote the economic potential of science and technology. Most of the people were unaware of standards and procedures: nobody knew what the Volt unit was and how a piston engine worked. But they knew how useful could a flashlight and a car be. Going from arduous scientific endeavors

(electricity and thermodynamics, for instance) to useful and effective tools designed to meet the demand of a large audience was not an easy task. The post-war economic boom allowed the creation of many new professions. Being closely tied to technological innovation, the previously narrow technical communication field exploded.

Consumers purchase goods only if they are confident they could eventually use them. To ensure that, user guides had to be part of the package. A new generation of writers trained

to meet this particular need emerged; they progressively replaced engineers to carry out the writing job.

### **Transistors, computers and the simplification of TC language**

One particular object became impossible to ignore. From the 1960s, engineers integrated the transistor in every single electronic device. Among these devices was the computer.

Computers were about to become the most supportive tool to the economic growth. They saved time and optimized costs. As a consequence, it became important for technical communicators to write and publish with computers. They eventually even had to program.

Before the electronic revolution, engineers and technicians used to talk or write about technology with the help of ordinary language. From the 1950s, the language of computers began to spread and influenced the language of technical communication.

The emergence of computer science had a major impact on the work of technical communicators. Consumers needed documentation to understand how to use computers. It facilitated the emergence of user manuals and favored the transformation of the technical communication profession. Desktop publishers, electronic graphic designers, webmaster, etc. were among the new jobs enriching the field.

The way technical communicators worked also changed with the influence of computers. Thanks to the growing computing power, manipulating text was much easier than before. Printers, scanners all provided means to easily reproduce documentation. Paper-based publications left place to electronic format through CD-ROMs and disks. Later, the World Wide Web allowed anyone to share or to access on-screen texts.

Simplification was underway. In the technical communication field, writers tried to structure texts just as computers do. They forced themselves to shape texts so it simplified complicated tasks. First, simplified and controlled languages emerged in the 1970s to minimize the potentially lethal errors users could make using airplanes, boats, weapons or dangerous industrial artifacts, each of them being controlled by computers. Second, structured languages such as HTML, XML and DITA became languages a technical communicator had to master to be credible. It highlights how computer languages started to become inevitable in technical communication. The successes of markup and controlled languages are good examples to support the idea that to talk about technology, one now needs to use technology.

The profession of technical communication has changed a lot since the 1950s. In particular, computer science was key to its transformation during the post-war economic boom. Technical communicators now have to develop skills in computing in order to understand the tools they are writing about and to use them to publish their writings.

Editors still need the traditional writing competencies of technical communicators but they now require them to master the language of computers.

### **...But what is human language anyway?**

Before we delve into the uniqueness of TC language, we have to grasp the specificities of human language in general.

We will only focus on a few of the most widely studied synchronic linguistics theories to enhance the most consensual distinctive traits of human language.

The *Oxford Online Dictionary* provides the following three main definitions of the word "language":

- The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way.
- A system of communication used by a particular country or community.
- (mass noun) The style of a piece of writing or speech.

In English, the word inherently refers to human systems, by contrast with expressions such as "animal languages," for instance.

Language is the preserve of the human species in more ways than one. Comparative studies proved very fruitful to define it even better.

When he studied the dance of bees, German ethologist Karl Von Frisch found critical differences between human and animal languages. By performing specific dances based on the ongoing context, the bees use two contextual set of innate, fixed signals that are always survival-oriented. Animal languages can best be described as sets of signals that are limited both conceptually and contextually.

Human language is not just about communicating the information ensuring our species' survival.

In his 1958 model, Roman Jakobson abstracted six main functions corresponding to the factors of communication:

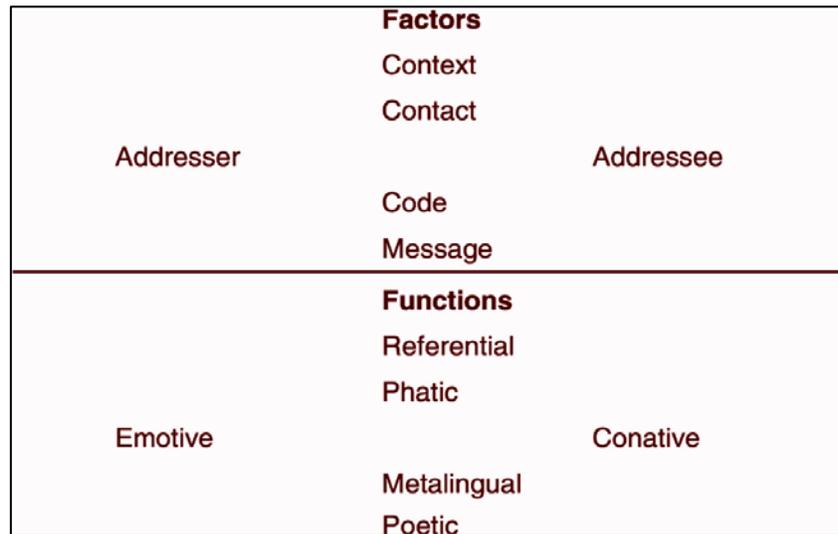


Fig. 1 Jakobson 1958 Factors and Functions of Communication

The model is communication-based, which is relevant to study TC. The detailed mention of each function will be given in the result discussion section.

A third major human language topic is the way it relates to the world. An ageless philosophical concern, the topic was tackled by major semioticians such as Ogden and Richards in their 1923 *The Meaning of Meanings*. The semiotic triangle describes the interactions between semiotic entities, including linguistic ones, and the world and in a ternary way.

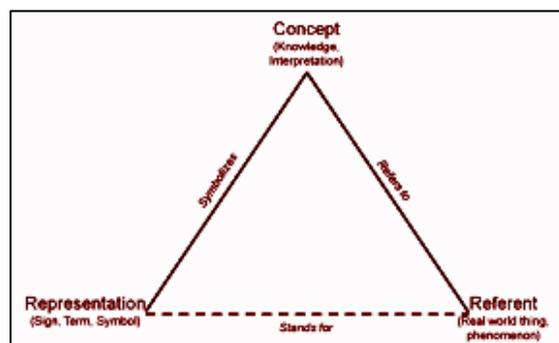


Fig. 2. The semiotic triangle, based on Ogden and Richards' original p.11 graph

Representation, concept and referent define one another by connecting an abstract meaning, a syntagm, and the referred-to real entity. The conceptual partitioning of the world is therefore the product of an interaction.

From the general overview, human language stands out as being unlimited in expansion, systematic yet creative, (self)-reflexive. It is man's elemental and ultimate production, man's preserve, maybe also a yoke and what betrays him. As Jacques Lacan put it, "Le propre de l'homme n'est pas de parler, mais d'être parlé."

Our guess is that TC imposes utilitarian restraints on language. To put it otherwise, in TC, language is a means and never an end. TC language is carefully mastered, if not engineered. What are the features of TC language? To find them, we had to leave aside theoretical texts to study typical TC texts with both qualitative and quantitative methods, which we will now focus on.

## Methods

Within our journey to define the language of Technical Communication, we assumed that research is the key to deep dive into its core principles. Thus, besides reading literature revolving around Technical Communication, its history and evolution, we decided to go through some experiments based on prototypical user manuals.

First, we asked people, presumably users of technical documentation of any kind, if they read any, and if so, what bothered them the most.

Then, we proceeded with both a quantitative and a qualitative analysis of the linguistic and structural traits of some well-designed software user manuals. Below is the list of the 10 technical documents we used for our research:

- Adobe FrameMaker 12 User Manual
- Articulate Storyline 2 User Manual
- Juniper Secure Access 7.0 Administration Guide
- MindManager 2016 User Guide
- Caplio 500SE Software User Guide
- Oracle VM VirtualBox User Manual
- Oracle Balanced Scorecard Install Guide
- Corel VideoStudio Pro X7 User Guide
- Avast Antivirus Home Edition 4.8 User Guide
- Atlassian JIRA 6.4 User Guide

As far as the linguistic approach is concerned, we converted the 684 pages Adobe FrameMaker 12 User Manual into a .txt file and analyzed its content with Antconc. Antconc is a concordance program that enables us to sort certain elements of a document or a corpus such as keywords, list of words, most frequent clusters and collocates.

Based on our experience in technical communication, we noticed that technical documents tend to have common structural traits. So, to look deeper into this fact, we chose to compare the technical documents of 10 different softwares and try to figure which structural traits they have in common.

Finally, once we had the analysis done, we looked closely at the results considering both what we learnt in theory and what we have concretely experimented.

## **Results**

In this section, we discuss what we observed.

### **Survey results**

People's answers were quite numerous and varied. Below are some of the answers we selected based on their relevance to our research.

- Some technical documents include useless information
- Sometimes we don't get easily the information we need
- There is often a lack of illustrations
- Sometimes, the language which is used is quite complex

Of course, we took into consideration the fact that people may have been confronted to what can be considered as "bad" technical documentation.

Figure 3 below shows the percentage of each answer.

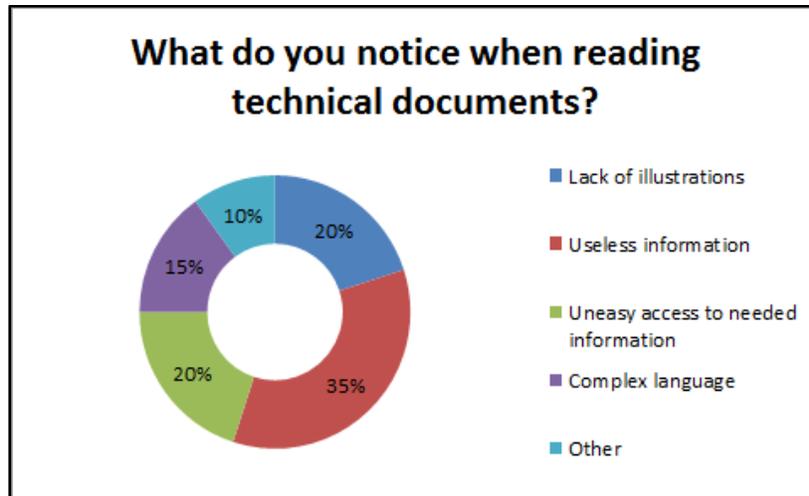


Fig.3

## About linguistic traits

### The “YOU” attitude

We noticed that all the document long, the personal pronoun “You” is the 5th most frequent word. In parallel, there is not a single occurrence of both personal pronouns “he” and “she”. Figure 4 below shows the results in Antconc.

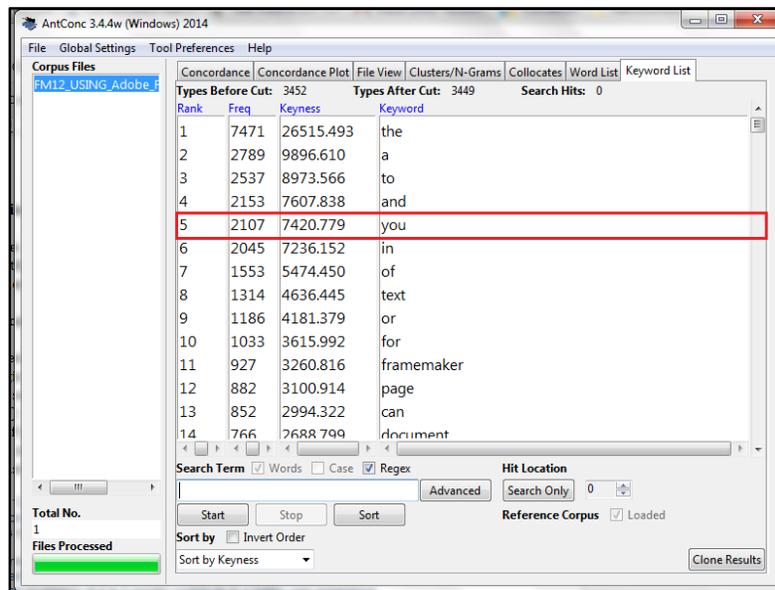


Fig.4

## Simplified Technical Language

The analysis of the Adobe FrameMaker 12 user manual with Antconc shows us that perhaps unlike scientific and literary discourse, the language of technical communication presents linguistic traits that make the access to information both easy and clear. Thus, we decided to list all of these aspects in the same level rather than classifying them as we believe they are complementary and form a whole.

1. One of the most noticeable aspects is that technical documentation privileges the use of simple and short sentences revolving around one verb rather than complex and detailed sentences merging two or more noun phrases.
2. The use of the present tense rather than the future ones. Figure 5 below shows the modal verb is used only 42 times in a 684 pages document.

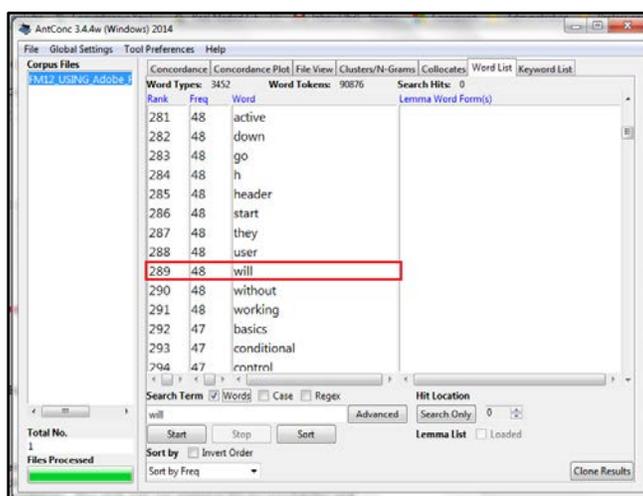


Fig.5

3. The use of the active form rather than the passive form, which gives the reader an idea of who or what performs the action.
4. On a terminological level, this technical document presents very few synonyms. Whether they are verbs, adjectives, nouns or adverbs, the terms used in the analyzed user manual are often unique. However, we noticed that both synonyms “select” and “choose” are used. Yet, when we looked for the collocates of each term and the context in which it appears, we noted that they both seemed not to have the same significance.

5. When it comes to describing a concept, we noticed that technical communicators tend to resort to illustrations, figures, tables and schemas. The more complex the concept is, the more likely it is to have an illustration instead of a piece of text.
6. The last aspect we identified is redundancy. Though the concept is often linked to a pejorative connotation, redundancy here represents a means to clearly designate a single reference. Below is an example showing how many times *document window(s)* has been repeated in one paragraph.

*“This option opens composite documents as tabbed documents. Deselect to open composite **document windows** as floating windows. When you drag **document windows** and place them together, they tend to form tabs in a single document windows. Deselect to open **document windows** as floating windows.”*

### About structural traits

While comparing various software user manuals, we figured out that though content changes depending on the product itself, the structure of the documents are pretty much the same. We noticed as well that most of the documents we looked at presented the same section titles.

Figure 6 below shows that 8 out of 10 technical documents have a “getting started” section at the beginning. However, we noticed that in 2 documents this section had a different title.

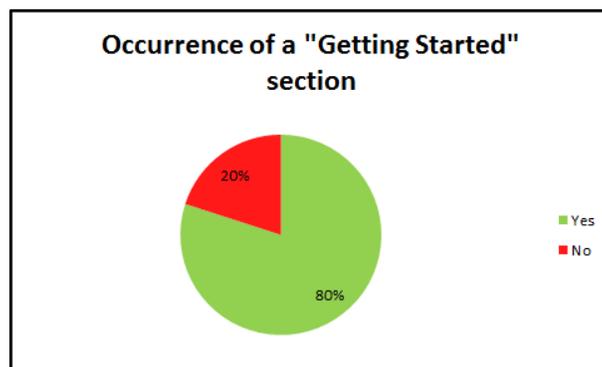


Fig.6

Besides, we noticed that 80% (figure 6) of the selected technical documents started with an "About the product" section, which presents the product, its main features and what's new in this version.

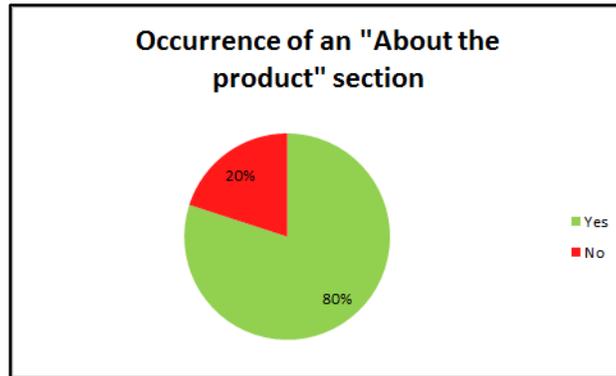


Fig.6

70% of the authors of these software user manuals took into account the fact that users may need help in case a bug or an error occurs. The "Troubleshooting" section describes the potential issues a user may encounter while installing or using the software. Its occurs generally in the end of the technical document.

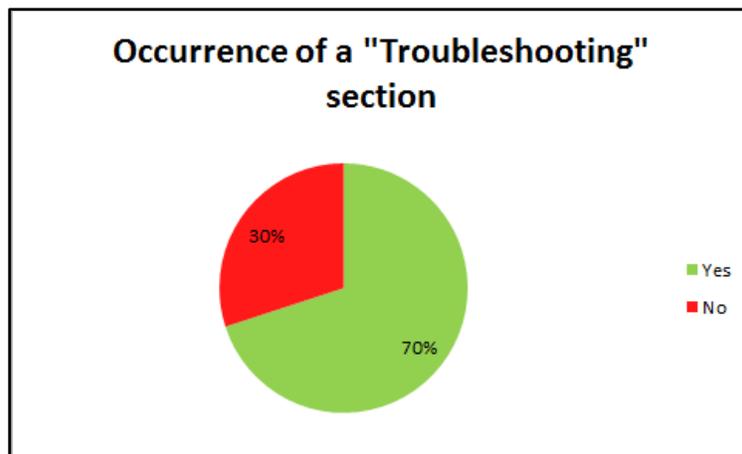


Fig.7

Last but not least, analysis demonstrated that all technical documents had a section dedicated to information about copyright and trademarks. This indeed, leads to the ascertainment that technical communication meets certain standards.

## Discussion

Let us now discuss our findings.

### Linguistic and structural traits

The following traits were abstracted from the linguistic and structural study:

- Brevity ( syntax)
- Simplification, both in procedures and terminology
- Redundancy in structures, but also in syntax and terminology
- Illustrative diversity, with changes in codes and mediums to clarify a point.

How can we interpret these traits in view of general linguistic theories? How does the language of TC differ from general linguistic descriptions?

We will start out with Von Frisch's studies.

Here are the traits TC language shares with animal languages:

- Goal-oriented production
- Context-dependent codes and signs
- Non-ambiguous signs
- Redundancy

From a temporal standpoint, the bee dance is rooted in the here-and-now, whereas the structural traits of TC language are organized by the various phases of the usage process. The partition into 3 elements, the past ("getting started"), present moment (the procedure itself), and the aftermath (troubleshooting, which makes it possible to resume and proceed) are meant to optimize the usage time. Action is the focal point in all cases, but temporal perspective provides the general structure of TC texts.

What TC shares with animal languages ensures its efficiency.

Some of the functions listed by Jakobson are not present in the language of TC. They are:

- **The poetic function**

Language itself is never an end in tech com. The very materials of poetic creation, such as connotation, ambiguity and sonorities, are ignored altogether.

- **The metalinguistic function**

When considering its own rules and functioning, TC does not necessarily use its own language.

- **The emotive function**

It is non-existent in TC as it is not suitable for self-expression.

On the other hand, other functions seem to be enhanced by the language of tech com:

- **The conative function**

It addresses the receiver, and it is enhanced by the numerous injunctions performed , in imperative mode for instance, or with the repeated use of pronouns, very often “you.”

- **The phatic function**

It makes sure the interaction is on. It is often enacted by onomatopoeia, which are absent from TC texts.

However, in TC, redundancy at any level (general structure, terms, syntax...) provides insisting landmarks for users, and thus indirectly performs the function.

- **The referential function is paramount in TC**

Providing an accurate and understandable message, whether predicative or causal, on a real object, is the *raison d'être* of TC.

The interaction with the referred-to object is the standard by which everything else is assessed in TC.

As a result, the language of TC may impose its own lines of force on the semiotic triangle, Somehow, the semiotic triangle is tilted towards the referent.

Indeed, the signifying and the signified are secondary as they are just mediums to the real object.

What can be perceived as a lexical paucity in TC (use of hyperonyms whenever possible, frequent repetitions), may be viewed as a means to enhance the referent, which is the real focus of attention.

The way TC language positions itself, with efficiency as a key word, may be explainable by focusing on the cognitive activities it entails.

**Why is efficiency the key work in TC language? A cognitivist approach to TC?**

In *Comprendre la rédaction technique* (2013), Franck Ganier studies procedural writing using cognitive psychology.

Efficacy and efficiency, i.e. whether or not an agent reaches their goal with a specific object, and how long they takes to do so, are TC's measurement standards. In other words, the language of TC is not assessed linguistically, but in terms of performance.

Besides, the achievement of a given process solely relies on TC. Indeed, user's guides are the only elements that can be modified in the product/user/user's guide triangular interaction, whereas the product and the users just come as they are.

Furthermore, TC should be designed to lighten users' cognitive load. Indeed, according to Ganier et al. (2000), any user willing to follow a procedure has to perform the 5 following tasks:

- Conceiving the pursued goal, then maintaining it in the working memory
- Encoding the instructions
- Encoding the features of the device

- Considering the whole device and setting up an action plan while summoning previous knowledge
- Carrying out the task.

The tasks are numerous, close in time, often inherently complex.

As a result, the language of TC has to lighten the burden of cognitive load by all means necessary. The semiotic clarification process that results in all the traits we found (brevity, redundancy, illustrative devices) all alleviate users' cognitive load.

Users are readers indeed, but they read only to interact with a device. The language of TC is mostly tailored to fit a demanding cognitive process in which reflexion and action are mutually conditioned.

## Conclusion

We started our journey with C.P. Snow's worried musings over the growing gap between the humanities on the one hand, science and technology on the other. Today, the gap is even wider, but the balance of powers has shifted altogether: humanities are left behind in a world where technoscience shapes more aspects of our lives with each passing day.

The advent of TC language does not mark the humanities' comeback to influence, nor is it a longed-for go-between uniting human language to technoscience.

Indeed, the language of TC does not involve the linguistic heritage of the humanities: on the contrary, its very structure is based on both science, as a rational, quantitative approach of the world, and technology, as the dedication of knowledge to the pursuit of a given pragmatic end.

Technical communication is a particular kind of discourse on science and technology. It also seems the simple and concise language of tech com aims at counterbalancing the complexity of the tech artefacts we live among and have to interact with. To do so, it bares itself of all the ambiguities, the overabundance, the creativity that are the hallmarks of human language - all the reasons why language is less a craft than a self-addressed challenge and a never-solved riddle. However, what is lost by the language of TC is compensated in terms of concision, clarity, univocity and focus.

The language of TC enforces a rigorous linguistic economy to bridge the gap separating us from technology. It thus matches a pragmatic, utilitarian view of language, which is, in John Dewey's terms, the "tool of tools" (13).

"Look! the sun follows my syntax!" once exclaimed Russian Futurist Velimir Khlebnikov. His jest stresses that language basically structures reality.

With its clarification processes, organisational devices and pared-down injunctions, the language of TC is a modern artefact inviting us to interact with today's world.

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## About the authors

**Koussai** is an apprentice in User Assistance Solutions Development at SAP and a 2nd year MA student in Technical Writing. He hopes that one day he will become a milestone in the road of history. He strongly believes that communication is the key to a better and more civilized world. Being highly intuitive and emotional, he has always followed Albert Pike's doctrine: "What we do for ourselves dies with us, but what we do for others remains and is immortal."

A former researcher in history of science, **Axel** is now an apprentice in e-learning design at Air Liquide. He is interested in science, technology and training.

A former researcher too, **Laetitia** is currently a TC apprentice with SDMO, and follows the CDMM M2 program.