To use or not to use Artificial Intelligence (AI) to solve terminology issues?

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ABSTRACT

This study will turn around the difficulties non-English speaking researchers encounter when they try to communicate their local research in the globalized context of international conferences (such as IIIS), where English is used as *lingua franca*. The presenter will embroider her presentation around a technical term in English – such as **grid**[1] - and in Modern Greek – such as **θέμα** (: t*opic* of an essay; t*heme*, as in 'thematic units'; and i*ssue*, as in "there is an issue here")[2], compare them with their equivalent terms in Spanish, French and German and try to systematize the research steps (or advanced translation steps and tools) required for a non-English speaking scientist to find the right term in order to make himself/herself understood by a wider international public who communicates in English. During the discussion, the author of this study will try to show how far the AI can help HI (Human Intelligences or *nous*[3]) in this kind of research, depending on whether researchers are: (1) aware of the polysemy of scientific discourse (i.e. the non-existence of 1:1 equivalence of terms between at least two different linguistic systems), and (2) trained in using comparative and associative thinking. As the writer of this study will claim, it is finally HI who decides which term(s) s/he is going to use, exercising his/her own judgement after s/he has taken into consideration the scientific and social context of the term.

Keywords: globalization, glocalization, lingua franca, inter-scientificity, reverse inter-scientificity

1. INTRODUCTION: GLOBALIZED VIS-À-VIS GLOCALIZED[4] SCIENTIFIC CONTEXT

Glocalized **scientific context** is an interchangeable term of **linguistic *glocalisation*** and **interlinguistic communication** [1] and is understood as diverse types of inter-relationship and interdependency between global and local linguistic and cultural processes, which reveal the impact of the global (English as *lingua franca*) upon the local (in the present context, all non-English languages). Within the present context, **glocalized scientific context** is understood the context of international conferences and/or various schemes (such as Erasmus schemes) where different scientific discourses come in contact in a globalized scientific environment where local (non-English speaking) students/scientists/academics interact with other local (non-English speaking) and/or English-speaking students/scientists/academics using a *lingua franca* – that is, a common language of communication – which is defined / specified by the organizers of the given international conference; that is, English, or English, Spanish and Portuguese (as in IIIS), English and Greek, English and Turkish etc. Since the end of World War II, the **English language** has been established as the *lingua franca*, the **global** language of communication in international conferences and international publications,.

Within this international scientific environment, non-English speaking researchers, academics and/or students (from different **local**ities or countries) want to communicate their **local** knowledge-based environment to wider **global** knowledge-based environment (that uses English) - and discuss with their international colleagues the advancement in their scientific fields. In order to achieve that they communicate in the defined *lingua franca* – in most cases is English, thus moving between at least two different linguistically scientific discourses, that is, between the *global* (English) and the *local* (Greek, Spanish, French, German etc.), by getting involved in a *glocal* discourse, without realizing it.

2. DEFINITION & CLARIFICATION OF SOME TERMS THAT WILL BE USED

International scientific context and *lingua franca*

When scientists, academics and/or student from different **local**ities (i.e. different countries) come in contact with each other, they (should) interact in this *lingua franca* (i.e. the common language of communication, which is defined by the specific conference and/or the specific project, that is, English, Spanish etc.) Then, in order to communicate in the specific *lingua franca*, the participants should use a scientific discourse with ***correct terminology*** in *lingua franca*, if they want to communicate their research and want to be understood by other local/international scholars.

Despite the fact that in this situation non-English speaking scientists interact in a *lingua franca* (i.e. English), they have to move between at least <u>two</u> linguistic environments and

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[1] This is a case of *inter-scientificity*, the author's neologism with will be explained during the presentation.

[2] This is a case of *reverse inter-scientificity*, the author's neologism with will be explained during the presentation.

[3] For Human Intelligence or *nous*, see [20], [21], [22] and [24].

[4] For the coof *glocalisation* and *glocal*, see [2] – [5].

discourses, a situation that involves translation studies and linguistics, since the interaction occurs in **natural languages**.

Thus, within this context, five terms, such as **terminology**, **equivalence**, **polysemy**, **inter-scientificity** and **reverse inter-scientificity** - which come the first two from Translation Studies (TS), the third from linguistics and the last two are neologisms of the author of this study - should be defined and clarified within the context of an international conference, where **English** as the *lingua franca* is used by local non-English speaking scientists.

Terminology: According to Merriam-Webster dictionary [6], **terminology** is: (1) the technical or special terms used in a business, art, science, or special subject; and (2) nomenclature as a field of study. It is well known that academic discourse that occurs in academia and in every international conference, like IIIS, abounds with terminology.

Equivalence - Understanding this concept/term and its origins: The concept of equivalence has been and still is undoubtedly one of the key concepts of TS, which is one of the most problematic, challenging and controversial ones in this field of study. Despite its controversial nature, **equivalence** presupposes two common denominators: (1) the reference to the two languages involved in the translation process (source language [SL] and target language [TL]); and (2) the creation of equivalence between the original and the translated text, in order to preserve the original's characteristics.

To understand why this concept is so challenging in TS we should keep in mind that the historical origin of equivalence in TS came from the field of mathematics, the concept of which means equality of value in a given formula; for example, $B = A$. Then, it was introduced to TS to refer to the relationship between source and target text (ST and TT respectively). Nevertheless, the use of equivalence as such in TS is a difficult venture, since mathematics uses a numerical language (artificial), unlike the natural languages used in TS which are human languages, where the degree of subjectivity is higher or lower compared to mathematics.

Generally speaking, translation scholars have taken one of three views on equivalence: (1) it is a defining condition for translation, and a conceptual tool useful for describing translation, ([7], [8], [9], [10]); (2) it is an impediment for advancement in TS ([11]) and/or its value that has to be rejected in TS ([12]); and (3) it must simply be ignored, since it is out of bounds for their frameworks ([13]).

At this point, it should be noted that in TS there is also the distinction between **equivalence in language** and **equivalence of meaning**. This distinction points out the significant gap that often exists between equivalence given out of context and equivalence that is imposed under the pressure of any kind of discourse (scientific discourse included). It also indicates that translation – when it is made either at professional level (when a person is a professional translator and/or an interpreter) or at a personal level (when a person/scientist moves between at least two different linguistically scientific discourses) - is the result of a personal interpretation based on the **meanings of the language** and on **situational factors**, which take into consideration the

polysemy of words and a multi-level interpretation of terminology and scientific discourse.

Polysemy comes from ancient Greek πολύ- [*(polý-)*]: 'many' and σῆμα [*(sêma)*]: 'sign' and is a linguistic phenomenon in which **a single word has multiple meanings**. This is especially common in any language (English included), where **words can have different interpretations depending on the context in which they are used**. To make this concept more understandable, we give as an example the word 'bank', which can refer either to *a financial institution* or *the edge of a river*. Understanding polysemy is essential for correctly interpreting texts in any language (English included), avoiding misunderstandings and enhancing communication. **Context** is fundamental for determining the specific meaning of a *polysemous word* or *polyseme* like 'bank'. Without context, it can be difficult or even impossible to understand which meaning of a word is being used. Context includes the sentences, paragraphs, and situations in which the word appears, as well as non-verbal elements such as gestures and intonation. Understanding context is a fundamental skill that goes beyond reading and writing, extending to oral communication. By paying attention to context, academics, scientists and/or students can avoid misunderstandings and improve their comprehension of texts and conversations in English, when it is used as the **glo**bal language of communication (i.e. *lingua franca*) and/or in their own lo**cal** language (e.g. Greek, Spanish, French, German, etc.).

'Inter-scientificity' and 'Reverse Inter-scientificity' – Methodological *Novelties* explained. The terms 'inter-scientificity' and 'reverse inter-scientificity' are neologisms, which the former was coined and introduced by the writer of the present article, first, in 2004 [14], whereas the latter was coined and introduced by author of this study from 2019 until 2022 [16]-[21]

Although the second compound of the term is 'scientificity', this term is not used in a positivistic way but rather to indicate the application of linguistic methods and principles *either* to overcome problems of "*untranslatability*" of scientific terms *or* to solve the problem of linguistic asymmetries between a pair of different linguistically scientific fields – for example, English: Greek etc. The problems of "*untranslatability*" or linguistic asymmetries are usually created by the **polysemy** of scientific discourse in a *glocalised* context – that is, when the **glo**bal [English] meets and interacts with the lo**cal** [a language of instruction which is different from English]. The linguistic asymmetries are also common issues in Translation Studies that should be dealt with by translators [15], and a solution should be found if *glocalized* 'scientific' communication can be achieved. Nevertheless, what is common practice in Translation Studies is almost totally unknown to most scientists of other disciplines at non-English and English universities, due to the fact these scientists are not trained (as translation practitioners are) to recognize these issues.

Therefore, on the one hand, '**inter-scientificity**' in a *glocalized* academic environment is **considered a skill** acquired by all those parties involved who can distinguish between various readings of a polysemous terminological entity (or *polyseme*) in English (the **glo**bal language) can render it his/her lo**cal** language or mother tongue or language of instruction (e.g. Spanish, Greek, French, German)[5] and, thus, s/he can use its *equivalent polyseme*

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[5] Mother tongue may not necessarily coincide with the language of instruction, when a scientist/academic and/or a student is of

different origins at the university s/he carries out his/her research and/or teaches.

accurately in at least two linguistically different scientific discourses (e.g. English: Spanish, Greek, French, German).

On the other hand, the term '**reverse inter-scientificity**' is a reverse interlinguistic communication (e.g. from the mother tongue/local language to English/global language). It is also **considered a skill** acquired by a non-English student or researcher who can distinguish between various readings of a polysemous terminological entity (or *polyseme*) in his/her lo**cal** language, mother tongue or language of instruction (e.g. Spanish, Greek, French, German) and can render it and use its *equivalent polyseme* or term accurately in English. In other words, it is the linguistic competence of a non-English researcher to move at ease at least in two linguistically different knowledge-based environments (e.g. Spanish, Greek, French, German: English).

3. EQUIVALENCE VIS-A-VIS POLYSEMY

As discussed above, equivalence is considered one of the most challenging and controversial concepts in Translation Studies (TS). Nevertheless, it is so due to the fact that most translation scholars start from the assumption that there is a **1:1 equivalence**, an assumption that has been proven to be **false**, since all natural languages are characterized by **polysemy**, as discussed above.

In the following sub- sections the author of this study is going to deal with **polysemy** of scientific discourses, first, between global (i.e. English) and local (i.e. Spanish, Greek, French, German) discourses in relation to *inter-scientificity*, and, second, the other way around, that is, **polysemy** of scientific discourses between local (i.e. Spanish, Greek, French, German) and global (i.e. English) ones in relation to *reverse inter-scientificity*.

A case of not a 1:1 equivalence but of polysemy that are related to 'Inter-scientificity'

Table 1 is a Table (a kind of Contrastive Analysis) that shows how complex, and confusing may be the English term **grid** by various non-English speaking scientists, such Spanish, Greek, French and German, to name a few.

As we can observe in Table 1, the English term **grid** is *polysemous* and has different equivalent terms in Spanish, Greek, French and German according to the scientific field. Nevertheless, we can observe three interesting things about the **polysemy** of this term. First, in the second row when the English term **grid** is used in the construction, **grille** and **Gitter** are used in French and German respectively (these terms are highlighted). Second, we see that the French term **grille** in the second row of the fourth column as well as the German term **Gitter** in the second row of the fifth column are the **same** with those of the third row of the fourth and fifth column. Third, and the *most fascinating* but also *frustrating issue* (from a polysemic point of view) is that the English term **grid** in the fourth row is the same as the Spanish term **cuadrícula**, the Greek term **κάνναβος**, the French term **grille** and German term **Gitter,** which, however, is used with *different signification* in *different fields*, such as archaeology, architecture, geography, spatial analysis and topography.

Table 1: Some *polysemes* of the English term **grid** in other languages

IN ENGLISH	IN SPANISH	IN GREEK	IN FRENCH	IN GERMAN
grid, in construction	**red** (f)[6], in construction	**πλέγμα** (nt), in construction	**grille** (f), in construction	**Gitter** (n), in construction
grid, in electricity	**red** or **línea eléctrica** (f), in electricity	**ηλεκτρικό δίκτυο** (nt), in electricity	**Réseau** (m), in electricity	**Überland(leitungs)netz** (n), in electricity
grid is used in Archaeology, Architecture, Geography, Spatial Analysis & Topography **but** with different signification	**cuadrícula** (f), in Archaeology, Architecture, Geography, Spatial Analysis & Topography (In **English** and in **Spanish** it used in the same scientific domains with different signification)	**κάνναβος** (m) in Archaeology, Architecture, Geography, Spatial Analysis & Topography (In **English** and in **Greek** it is used in the same scientific domains with different signification)	**grille** (f) in Archaeology, Architecture, Geography, Spatial Analysis & Topography (In **English** and in **French** it is used in the same scientific domains with different signification).	**Gitter** (nt) in Archaeology, Architecture, Geography, Spatial Analysis & Topography (In **English** and in **German** it is used in the same scientific domains with different signification).

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[6] Spanish, Greek and German have three (3) genders, that is, masculine (m), feminine (f) and neuter (nt), whereas French has only two (2) gender, that is, masculine (m) and feminine (f).

To understand the complexity and perplexity in use of this *polysemous* scientific term, we explain how this English term (**grid**) and its equivalent terms in Spanish (**cuadrícula**), Greek (**κάνναβος**), French (**grille**) and in German (**Gitter**) acquire *different significations in specific different fields* below:

(1) An **archaeological grid** is related to *stratigraphy*, since it is a square – an autonomous unit - that is excavated, captured, photographed independently, and identified with a letter and a number to facilitate descriptions of the location of the finds. Each square is excavated up to half a meter on each side of the grid, as shown in Photo 1.
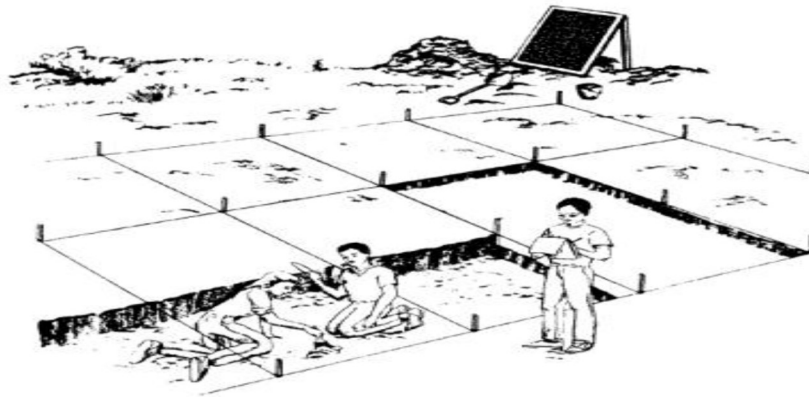

Photo 1

2) Architectural grid: a regular framework of reference lines to which the dimensions of major structural components of the plan of a building are fixed, as shown in Photo 2.
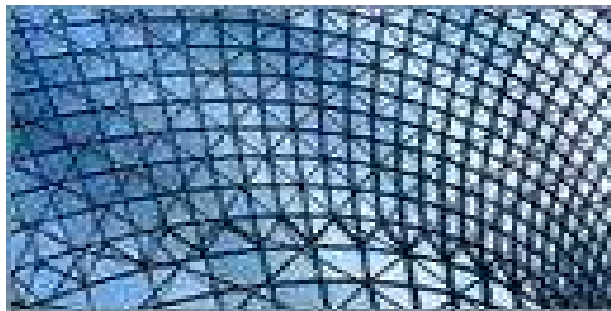

Photo 2

(3) City planning grid: a checkerboard network of intersecting streets and avenues forming the basic layout of a city or town, as illustrated in Photo 3.
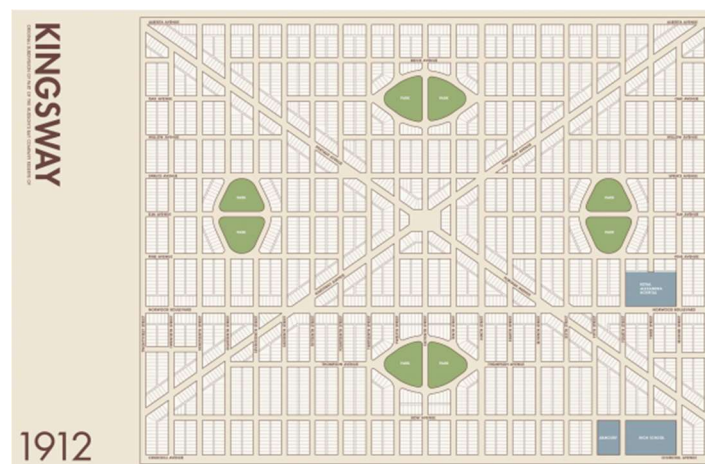

Photo 3

(4) Grid in Cartography, Geography, GIS, Spatial Analysis, Topography is geometric shape of a network of squares on a map whose design is an accurate way to determine the vertices of a polygonal path on a map based on their orthogonal coordinates, as delineated in Photo 4.
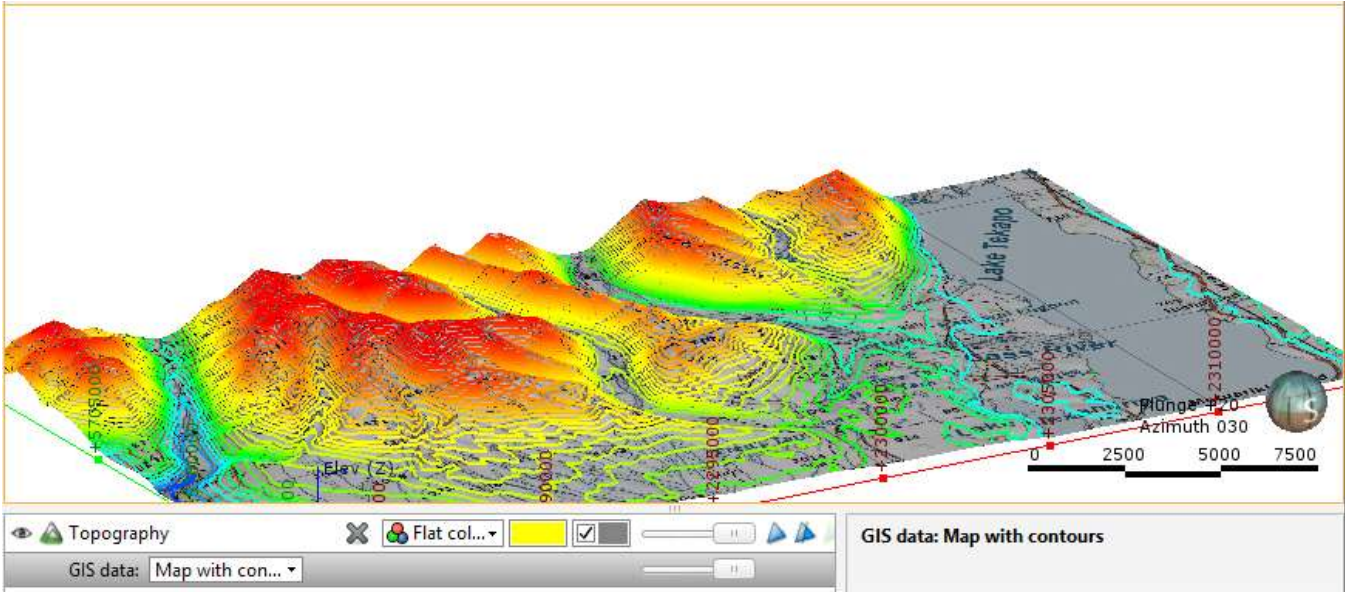

Photo 4

From the above example of the English term **grid** and its various *polysemes* not only in English but also in other local languages - such as Spanish, Greek, French and German – show how critical it is the awareness of concept of **inter-scientificity** on behalf of non-English speaking scientists/ academics/students when trying to communicate international research written in English to their colleagues at their local college and/or university. In other words, **inter-scientificity**, as mentioned in Section 2, is a skill acquired by a <u>non-English</u> researcher *who can distinguish between various readings of a* polysemous terminological entity (or *polyseme*) written in <u>English</u> and can render it and use its equivalent *polyseme* in <u>his/her own mother tongue or language of instruction</u> (e.g. Spanish, Greek, French, German) *accurately*. In other words, it is the <u>linguistic competence of a non-English researcher</u> *to move at ease in at least <u>two</u> linguistically different scientific discourses (e.g. English: Spanish, Greek, French, German etc.).*

A case of <u>not</u> a 1:1 equivalence but of polysemy that are related to '*Reverse Inter-scientificity*'

A characteristic example of 'reverse inter-scientificity' is the Greek term **θέμα** (as shown in Table 2) whose English equivalents confuse not only Greek students and specialists of all scientific fields but also Spanish, French and German, either when presenting their research in an international conference or when using it in an essay they want to have it published in English. Greek, Spanish, French and German specialists and university students use repeatedly the *polyseme* 'theme' or **tema** or **thème** or **Thema** for *θέμα* instead of the *polyseme* '**topic**', as presented in the second row of Table 2. There are <u>two</u> other interesting points. <u>First</u>, Greeks use **θέμα,** Spanish use **tema** and French use **thème** for **theme** in English to describe either thematic units or central ideas in the third row. <u>Second</u>, in contrast with Greeks who use **θέμα** for the English term **issue**, Spanish, French and German render the English term **issue** into **problem** [**problema**, **problème**, **Problem**] or **question [cuestión, question, Frage]**, as shown in the fourth row in Table 2.

Table 2: Some *polysemes* of the Greek term: **θέμα** (nt) in other languages

IN ENGLISH	IN SPANISH	IN FRENCH	IN GERMAN
(1) **Topic** of an essay.	(1) **tema** (m): Topic of an essay	(1) **thème** (m): subject, topic	(1) **Thema** (nt)
(2) **Theme**, as in 'thematic units' (or central ideas).	(2) **tema** (m): central idea	(2) **thème** (m): central idea	(2) Haupt**sache** (f) [die Hauptsache ist –central idea]
(3) **Issue**, as in "there is an issue here".	(3) **problema** (m) or **cuestión** (f) [hay un/una]	(3) **problème** (m) or **question** (f) [Il y a un/une]	(3) **Problem** (nt) or **Frage** (f) [es gibt ein/eine)

Therefore, **'reverse inter-scientificity'** is a **reverse inter-linguistic communication** (e.g. local language [i.e. Greek, Spanish, French, German]: English); that is, **a skill** acquired by a non-English speaking researcher *who can distinguish between various readings of a* **polysemous terminological entity** (or *polyseme*) in his/her own mother tongue or language of instruction (e.g. Greek, Spanish, French, German etc.) and can render it and use its **equivalent** *polyseme accurately* in English. In other words, it is the linguistic competence of a non-English researcher *to move at ease in* two *at least linguistically different scientific discourses (e.g. Greek, Spanish, French, German: English).*

4. TO USE OR NOT TO USE AI TO SOLVE TERMINOLOGY ISSUES IN ENGLISH OR IN ANY OTHER LANGUAGE? – THE SOLUTION: 'ADVANCED SEARCH FOR TRANSLATORS'

Having discussed the difficulties that non-English speaking scientists encounter when they should between two at least linguistically different scientific discourses, we will now discuss how AI can be used
as a part of **advanced translation tools** by non-English speaking international scholars in order to communicate their research globally.

We can use AI in the following ways:

1. We search on an **engine machine** on the Internet, e.g. Google, and we type up the term in English or in any other Source Language (SL), whose meaning we are looking for in another language; that is, in the Target Language (TL); for example:

> **Grid** (SL) in Greek, in Spanish, in French, in German or in any other TL
> **Θέμα** (SL) in English, in Spanish, in French, in German or in any TL.

2. We press 'Enter'
3. Then, we usually get either **one term** or **a variety of terms** in the TL we search for the equivalent term.
   a. If we get only **one term** in the TL, it means that the SL term is **monosemic** or **univocal term**, that is, this term has 'only' one meaning in the TL.
   b. If we get **a variety of terms** in the TL, it means that the SL term is **polysemous** or has a **variety of polysemes** in the TL.
4. If the SL term is **polysemous** or has a **variety of polysemes** in the TL and we are ***not sure*** about the use of the term we found on the Internet (AI), we take the following steps to find out how to use this term appropriately in the TL:
   ⬡. We ask a **specialist** if s/he knows the term (SL) in the local language (TL).
   ⬡. If we get **no specialist** who can help us, we take the following "Advanced Steps for Translators" which consist of three steps.
   Step 1: We search for specialist electronic monolingual and/or bilingual dictionaries **(AI)** and/or printed dictionaries to check **which of the polysemes** is *the most appropriate* in our *scientific context* (as discussed in the sub-section of '**Polysemy**' in Section 2).
   Step 2: We search for a definition of the term in both SL and TL onto the Internet (AI).

Step 3: If we are still not sure that we have found the ***most appropriate polyseme*** in our scientific context, we search for synonyms in the SL and the TL.

As the aforementioned methodology is understood, apart from being time consuming, it can be **frustrating**, and requires **high analytical, comparative and contrastive** as well as **synthetic skills**. On the one hand, it can be **frustrating** due to the fact that during the search if the scientist finds nothing, s/he usually quits the search and, most times, uses the wrong term in the TL. On the other hand, this methodology requires high analytical, comparative and contrastive as well as synthetic skills because, if the scientist does not know the term, then s/he should search: (a) on the Internet (AI); (b) in electronic (AI) and/or printed dictionaries; (c) s/he should make a comparison of the terms s/he has found. By taking the above-mentioned steps, the scientist goes through some **cognitive processes**, such as **comparing** and **contrasting** the two scientific terminologies (i.e. use of comparative and contrastive skills), and making some **linguistic associations** (i.e. use of associative skills) that lead him/her to very critical decision-making as to which term(s) are the ***most appropriate*** in the scientific (con)text s/he wants to use.

5. LIMITATIONS OF THIS STUDY

Apart from oscillating between Translation Studies (TS) and Linguistics, this study involves Contrastive Analysis, a field that requires very good knowledge of different languages and discourses and very good development of comparative, contrastive and synthetic skills, which a scientist can develop slowly by practicing through his/her lifetime.

To the best of the author's knowledge, there are no studies dealing with such issues because either the scientists are not aware of the **cognitive processes** occurring when local scientists (whose language is not English) try to communicate their research in a *lingua franca* (which is usually English) or they do not want to deal with the issue because it involves **too complex cognitive processes** for them.

In order for scientists to do that, they should want to get trained by translation scholars, linguists, interlinguistic scholars and/or lexicographers, and they feel that they are too busy to waste their time on this kind of issues.

6. CONCLUSIONS

In this study, the author has discussed show what difficulties non-English speaking researchers may encounter when they try to communicate their local research (written in Spanish, Greek, French, German etc.) in the globalized context of international conferences (such as IIIS), where English is used as *lingua franca*. Through two comparative and contrastive Tables (1 and 2) has embroidered discussion around the technical English term **grid**- and the technical Modern Greek term **θέμα** (: topic of an essay; theme, as in 'thematic units'; and issue, as in "there is an issue here"), compare them with their equivalent terms in Spanish, French and German and try to systematize the research steps that she calls them 'advanced translation steps and tools' which are required for a non-English speaking scientist to find the ***right term*** in English in order to make himself/herself understood by a wider international public.

During the discussion, the author of this study has also tried to show how far the AI can help HI (Human Intelligence or *nous*) in this kind of research, depending on whether a HI or a researcher is: (1) aware of the **polysemy** of scientific discourse, that is, the **non-existence of 1:1 equivalence of terms** between at least two different linguistic systems;, and (2) trained in using comparative and associative thinking.

Finally, the writer of this study claims that HI or *nous* or a researcher who decides which term(s) s/he is going to use, by exercising his/her best judgement after s/he has taken into consideration the scientific and social context of the term.

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