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Human vis-à-vis Artificial Intelligence in Trans-disciplinary Research

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Abstract[1]

*Based on the claim that **only** human mind/intelligence (nous) (HI) - with the aid of artificial intelligence (AI) and through different mental/cognitive processes (noesis) - can communicate an inter-disciplinary and a trans-disciplinary research to an international scientific community, my discussion will develop around three axes. First, what happens when English and non-English scientists (noes), who carry out an inter-disciplinary and a trans-disciplinary research project, "hit" on polysemy of scientific discourse (issues of inter-scientificity and reverse inter-scientificity, as discussed in Section 3) and have difficulty to communicate with each other. Second, how terms such as the "grid" in English and "αποτίμηση" (: valuation, evaluation or assessment] in Greek), become examples of inter-scientificity and reverse inter-scientificity respectively (i.e. terms that are used in different scientific domains with totally different semantics), and can lead to a possible total breakdown of communication, when scientists (noes) from different scientific domains, being unaware of the complexity of the polysemy of these terms, try to communicate their inter-disciplinary and trans-disciplinary research project. The interconnectedness of inter-scientificity and reverse inter-scientificity with inter-disciplinarity and trans-disciplinarity will also be discussed. Finally, I will try to establish certain criteria in choosing appropriate terms, so that an inter-disciplinary and trans-disciplinary research can be communicated properly, and thus (international) scientific communication can be achieved effectively.*

Key words: *nous, noes, noesis, inter-scientificity, reverse inter-scientificity, intra-linguistic communication in local context inter-linguistic communication in glocalized context, inter-disciplinarity, trans-disciplinarity,*

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1. Introduction

Based on the claim that **only** human mind/intelligence (*nous*)[2] (HI) - with the aid of artificial intelligence (AI) and through different mental/cognitive processes (*noeisis*)[3] - can communicate an inter-disciplinary and a trans-disciplinary research to an international scientific community, my discussion will be presented in four parts.

In the first part, it will be discussed what occurs when an **inter-linguistic communication** takes place in a ***glocalized*** context; that is, what happens when English and non-English scientists (*noes*)[4], who carry out an inter-disciplinary and a trans-disciplinary research project, "hit" on polysemy of scientific discourse (issues of *inter-scientificity* and *reverse inter-scientificity*, as discussed in Section 3) and have difficulty to communicate with each other in international conferences, like IMCIC'22.

In the second part, I will provide: (a) the term "grid," as a notorious example of *inter-scientificity* (since it is used in various scientific domains, such as telecommunications, archaeology, geography, city planning with different meanings), and (b) the Greek term "αποτίμηση" (valuation, evaluation, assessment) as a confusing example of *reverse inter-scientificity* (since it is used in economics and geography with different significations), and will discuss how misusing these terms can generate inter-disciplinary and trans-disciplinary confusion and a possible total breakdown of communication, if scientists/researchers (*noes*) from different scientific domains, being unaware of the complexity of the polysemy of these terms,

[2] *Nous* (*νοῦς*) is an ancient Greek noun from which the ancient Greek verb *noein* [*νοεῖν*] cognates and describes *noesis* [*νόησις*]. *Noesis* usually describes various mental/cognitive processes among of which is that of 'being aware of something', as discussed in various sections of the present study.

[3] Nikolarea, E. (2021). The Interface of Human (*Nous*) and Artificial (Computer) Intelligence in Inter-disciplinary Research, International Communication and Education *Journal of Systemics, Cybernetics and Informatics (JSCI) 19*.7, 57-81. ISSN: 1690-4594; available at http://www.iiisci.org/Journal/SCI/FullText.asp?var=&id=ZA630OW21

[4] *Noes* is the plural of *nous* (*νοῦς*) in ancient Greek.

try to communicate their inter-disciplinary and trans-disciplinary research project. At this point of the study, I will try to show how the issues of *inter-scientificity* and *reverse inter-scientificity* are interconnected and interwoven with inter-disciplinarity and trans-disciplinarity.

In the third part of the paper I will discuss how English and non-English researchers (*noes*) can overcome "terminology" problems - with the aid of AI (e.g. a combination of monolingual, bilingual and/or multilingual electronic dictionaries, Word reference fora, CAT (: Computer-Assisted Translation) tools; and Corpora).

Given the multi-leveled complexity of the interface of human and artificial intelligence in trans-disciplinary research within an international *glocalized* scientific context, in the fourth part I will make an effort to establish certain criteria in order for English and non-English scientists (*noes*) to communicate "correctly" and "appropriately" their trans-disciplinary research in an international *glocalized* context.

The final part will be a brief discussion of the limitations of this study, showing **how difficult it is**, despite the existence of AI and IT tools, for human minds/intelligences (HIs - *noes*) to **get out of their "comfort zone"** (i.e. their acquired knowledge and the practice of their "old-fashioned" teaching methodologies) and explore the unchartered waters of the polysemy of scientific discourse, as presented in the issues of *inter-scientificity* and *reverse inter-scientificity*.

2. Inter-linguistic communication in a *glocalized* context – A challenge

In international conferences, like IMCIC'21, English-speaking scientists/researchers (*noes*) interact with non-English speaking scientists/researchers (*noes*) and try to establish ways to communicate their research across language barriers in a common

language that is usually English (*lingua franca*). In other words, they try to establish an **inter-linguistic communication**. Nevertheless, international conferences, in which English and non-English scientists participate, are never a globalized context; they are rather a ***glocalized*** one, since international researchers (*noes*) [i.e. English- and non-English-speaking ones], from different disciplines and different linguistic systems try to communicate their ideas and research in English, the *lingua franca.*

Within this study, ***glocalized* context** is understood as diverse types of interrelations and interdependency between ***glo*bal** (English as *lingua franca*) and **loc*al*** [*glocal*] linguistic and cultural processes, which reveal the impact of the ***global*** [English] upon the ***local*** (i.e. Spanish, French, Chinese; Greek, in this study). Yet, a ***glocalized*** **(**academic or professional) context is not usually as easy as it may be thought of; it is rather a **challenge** for all the participants because, when an inter-linguistic communication takes place, it is very likely that English and non-English scientists, who carry out an inter-disciplinary and a trans-disciplinary research project, may "hit" on **polysemy of scientific discourse** and have difficulty to communicate with each other or, much worse, there can be a total breakdown of communication. This breakdown of communication is usually generated by the complexity of the polysemy of specific terms that scientists from different scientific domains are **unaware** of and, thus, there can be a good number of misunderstandings when scientists try to communicate their inter-disciplinary and trans-disciplinary research project.

In the following part of the study, I will define the terms *inter-scientificity* and *reverse inter-scientificity*, by providing: (a) the term "grid," as a notorious example of *inter-scientificity* (since it is used in various scientific domains, such as telecommunications, archaeology, geography, city planning with different meanings), and (b) the Greek term "αποτίμηση," (valuation, evaluation or assessment), a confusing example of *reverse inter-scientificity* (since it is used in finances, economics and in general sense), and discuss how **unawareness** of the

aforementioned issues can lead to misunderstandings and total communication breakdown.

3. Issues of *inter-scientificity* and *reverse inter-scientificity and how they are interconnected and interwoven with inter-disciplinarity and trans-disciplinarity*

3.1. An issue of *inter-scientificity* – A neologism

3.1.1. The origins of this concept: A debate between a translation scholar (Ekaterini Nikolarea) and a Spatial Analyst (Professor Kanaroglou)[5] on ***monosemy*** or ***polysemy*** of the term '**grid**' became the springboard for the search into the **polysemy of scientific discourse** when an **inter-linguistic** (e.g. English: Greek) **communication** occurs.

3.1.2. A Definition: ***Inter-scientificity*** in an **inter-linguistic communication** [i.e. English → mother tongue (e.g. Greek)] is **a skill** that is acquired by a non-English researcher (*nous*) who ***can distinguish between various readings and/or meaning of a* polysemous terminological entity** (or ***polyseme*)** in English and can render it and use its equivalent ***polyseme*** in his/her own mother tongue (e.g. Greek) ***accurately***. In other words, it is the linguistic competence of a non-English researcher *to move at ease at least in two different linguistic discourses (e.g. English ↔ Greek).*

[5] Professor Kanaroglou, who died in 2016, was the Chair of the Department of Geography at the University of the Aegean in 2000. From that debate, on the one hand, Nikolarea started developing new teaching methodologies in ESP (: English for Specific Purposes) and EAP (: English for Academic Purposes), and, on the other hand, Kanaroglou and Nikolarea co-operated and compiled a bilingual (English: Greek) TDB (Terminological Data Bank) on Spatial Analysis in 2001, which is now available; see Kanaroglou, P., Nikolarea, E. Anomeritou, S. (2021). Chapter 1: English-Greek Dictionary of Spatial Statistics. In K. Kalampokidis, G. Korres, N. Soulakellis, and Ch. Feidas (Eds.), *Social Sciences and Geography: Theory, Methods and Techniques of Spatial Analysis* (pp 9-52). Mytilene, Lesvos (Greece): Dept. of Geography, University of the Aegean (in Greek; only the Dictionary is bilingual; that is, in English and Greek).

A peculiar example of inter-scientificity [English: Greek]

Grid: (1) *Πλέγμα, σχάρα (εσχάρα)*. (Γενικά). (2) *Κάνναβος*. Σύνολο γεωθετικών σημείων που χρησιμεύει στην κατασκευή χάρτη και σε πολλές άλλες εφαρμογές όπως π.χ. στις αρχιτεκτονικές συνθέσεις, την πολεοδομία, τις δομικές κατασκευές, κ.α. (βλ. επόμενες διαφάνειες). (ΑΕΡΟΜΗΧ, ΑΡΧΑΙΟΛ, ΑΡΧΙΤ, ΓΕΩΓΡ, ΓΕΩΜ, ΜΑΘ, ΜΗΧ, ΟΠΤ, ΠΛΗΡΟΦ, ΡΟΜΠΟΤ, ΣΓΠ, ΣΤΑΤ, ΤΗΛΕΠ, ΦΤΓΡΑΜ, ΦΥΣ, ΦΩΤΟ, ΧΑΡΤ, ΧΩΡΑΝΑΛ). (3) *Εσχάρα*. (ΣΤΑΤ). (4) *Πλέγμα δικτυωτό, σύστημα ηλεκτρικού δικτύου.* (ΗΛΕΚΤΡΟΛ, ΤΗΛΕΠΙΚ).

Figure 1: Greek polysemes of 'grid'[6]

Grid: (1) *Grid, grill*. (Generally). (2) *Grid [Kánnavos]*. Set of geometric points used in the construction of a map, as well as in other applications as for example in architectural syntheses, in urban land use planning, in structural engineering, etc. (see following slides). (AEROMECHANICS, ARCHAEOLOGY, ARCHITECTURE, GEOGRAPHY, GEOMETRY, MATHS, ENGINEERING, OPTICS, INFORMATICS, ROBOTICS, GIS, STATS, REMOTE SENSING, PHOTOGRAMMETRY, PHOTO, CARTOGRAPHY, SPATIAL ANALYSIS). (3) *Grill*. (STATS). (4) *Grid, system of electrical network.* (ELECTRICAL ENGINEERING, TELECOMMUNICATIONS).

Figure 2: A Literal Translation of Figure 1[7]

Both in English and in Greek, 'grid' can be used in different scientific domains, as shown in red; yet, in Greek four different lexical items (*lexemes*) are used to indicate the general and a specific scientific meaning in a very specific scientific context; see **Figures 1**, and **2**, (1), (2), (3) and (4) respectively. In other words, these *lexemes* are semantically different, thus being *polysemes*.

[6] This **Figure** is taken from the author's personal Terminological Data Bank (: TDB) for Geography and Related Sciences, which is being compiled in accordance with international lexicographic rules, and is going to get published in a year.

[7] At this point, it should be emphasized that the *italicized renderings in English* in **Figure 2** are a literal translation of the respective Greek terms for the convenience of a wider English readership. In English, **only the term 'grid' is used in all cases.**

Nevertheless, what is really peculiar both the English term ‘grid’ and its Greek polyseme *Κάνναβος (: Kánnavos:* Grid*)* [**Figures 1**, **2**] can be used in the same domains (which are indicated in red in both **Figures**) in both languages but they have different signification for each of these domains. For example:

(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.

(2) An architectural grid is a regular framework of reference lines to which the dimensions of major structural components of the plan of a building are fixed.

(3) A city planning grid is a checkerboard network of intersecting streets and avenues forming the basic layout of a city or town.

(4) A Grid in Cartography, Geography, GIS and Spatial Analysis 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.

If we observe the aforementioned analysis of the English term ‘grid’ and one of its Greek polysemes **‘***κάνναβος* (: *kánnavos*)’ [**Figures 1** and **2** (2)], we soon realize that there is a peculiar case of *inter-scientificity* of multileveled complexity for both English and non-English researchers (*noes*) for the same reasons, which can cause either (scientific) misunderstandings or a total breakdown of scientific communication.

In the ***glocalized*** **context** of international conferences, like IMCIC’21, when English and non-English (e.g. Greek) researchers from various disciplines, such as archaeologists, architects, geographers, urban planners and spatial analysts, mention ‘grid’ [*κάνναβος* (: *kánnavos*), in Greek] they mean totally different things, as discussed in (1)-(4) above, and, then multi-leveled misunderstandings and a total breakdown of scientific communication among scientists (*noes*) coming from

different scientific domains and/or general public can be generated, if the scientists (*noes*) do not provide a definition of the term or if they do not state from which point of view they use this term; i.e. archeological, architectural, geographical etc.

3.2. An issue of *reverse inter-scientificity* – A neologism

3.2.1. A definition: ***Reverse inter-scientificity*** in a **reverse inter-linguistic communication** [i.e. mother tongue (e.g. Greek) → English] is **a skill** that is acquired by a non-English researcher (*nous*) *who* ***can distinguish between various readings and/or meanings of a*** **polysemous terminological entity** (or ***polyseme*****)** in his/her own mother tongue (e.g. Greek) 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 (*nous*) *to move at ease at least in two linguistically different scientific discourses (e.g. Greek ↔ English).*

An example of *reverse inter-scientificity* that create serious problems of scientific misunderstanding and breakdown of communication between Greek Social Sciences students and their English-speaking counterparts, when the former use wrongly the English polysemes of the Greek terms 'αποτίμηση', as shown in **Figure 3**.

There have been so many times that Greek social scientists (*noes*), when presenting in international conferences in English, have used 'appraisal' (**Figure 3**, (3)) for αποτίμηση instead of 'evaluation or assessment' (**Figure 3**, (2)), with the consequence of a total breakdown of communication.

Αποτίμηση: (1) *Valuation* with its meaning in Finances. (2) *Evaluation* or assessment in its general and economic meaning. (3) *Estimation*, *appraisal*, or *accounting* in its meaning in Economics.

Figure 3: English polysemes of 'αποτίμηση'.

3.3. How *inter-scientificity* and *reverse inter-scientificity* are interconnected and interwoven with *inter-disciplinarity* and *trans-disciplinarity*

If examined much more deeply, the peculiarity of the *inter-scientificity* of the term 'grid', as discussed in 3.1. above, reveals **two** interrelated factors:

(1) How the *inter-scientificity* of the term 'grid' – both in English and in Greek (as *kannavos*) – can generate multi-leveled misunderstandings and a total breakdown of scientific communication among English and non-English researchers (*nous-noes*) who come from different scientific domains, if they are **unaware** (lack of *noesis – νόησις*) of the situation; that is if they are unaware of the polysemy of the specific term or its *inter-scientificity*. It is the presence of *inter-scientificity* (i.e. different scientists from different linguistic systems) combined with *inter-disciplinarity* (i.e. different scientists from different scientific domains) that can lead to *inter-disciplinary* and *trans-disciplinary* misunderstandings and a breakdown of inter-linguistic communication in an international *glocalized* context.

(2) How *inter-disciplinarity* and *reverse-interdisciplinarity* can be interconnected and interwoven with *trans-disciplinarity* in intra-linguistic communication in *local* context and inter-linguistic communication in an international *glocalized* context.

(a) Intra-linguistic communication in *local* context means the communication of specialists and non-specialists in a domain that comes from the same linguistic system and context; for example, Greek specialists and non-specialists who speak Greek and work in a Greek scientific environment. At this point, the author of this study (a translation scholar but not a specialist in Geography) will give **two** examples of this kind of communication from her own experience.

(i) Despite the fact that she knew that the term '**grid**' can be rendered in Greek in four different terms / *polysemes*, as shown in **Figures 1** and **2**, and that, for Geographers, '*kannavos*' was the best equivalent in Greek, she was **unaware** (: lack

of *noesis*) of the different significations of the term both in English (i.e. 'grid') and in Greek (i.e. '*kannavos*'). It was only in 2021, while preparing the keynote presentation for IMCIC'21, that she realized that 'grid/*kannavos*' has at least four different significations for a variety of different domains both in English and in Greek. And she realized that with the help of Professor Kourliouros, who is a trained Economic Geographer and an Architect. Thus, the author of the study - a non-specialist *nous*– became **fully aware** (*noesis*) of the different significations of the term both in English (i.e. grid) and in Greek (i.e. *kannavos*) with the help of a specialist *nous*. In this case, *trans-disciplinarity* and *inter-disciplinarity* are present, interconnected and interwoven in the **intra-linguistic communication** (i.e. in Greek) between the author of the study (a non-specialist *nous*) and Professor Kourliouros (a specialist *nous*) which took place in a ***local* context** (i.e. in Greece).

(ii) Michael Soutsos (a non-specialist *nous*: in Linguistics and Translation Studies),[8] the author's former student in her ESP/EAP classes and now a Ph.D. candidate in Engineering at the National Technical University of Athens, contacted the author of this study (a specialist *nous*: a translation scholar and an ESP/EAP teacher) and asked her how he should use the Greek term 'αποτίμηση' in a cover letter that he was writing to an international company at the time. He was thinking of using the term '*valuation*' (**Figure 3**, (1)). After a short discussion about the context, the author of this study suggested to her former student to use either '*evaluation* or *assessment*' (**Figure 3**, (2)), since he wanted to use it in its general sense. Thus, the author's former student – became **fully aware** (*noesis*) of the different significations of the term both in Greek (i.e. 'αποτίμηση') and in English (i.e. '*evaluation* or *assessment*') with the help of a specialist *nous*. In this case, *trans-disciplinarity* and *inter-disciplinarity* are interconnected and interwoven **both** in the **intra-linguistic communication** (i.e. in Greek) between the author's former student (a non-specialist) and the author of the study (a specialist) which took place in a ***local* context** (i.e. in Greece) and in the **inter-linguistic communication** (e.g. Greek → English) in an **international *glocalized* context**, when Michael Soutsos

[8] The student's name is mentioned with the student's consent.

uses his knowledge acquired to communicate his own ideas to an international ompany in English.

(b) Inter-linguistic communication in an international *glocalized* context is meant the communication of specialists and non-specialists in a domain that comes from two, at least, different linguistic systems and contexts; for example, American specialists and Greek non-specialists who communicate in English and work in two different linguistic contexts. At this point, the author of this study (a translation scholar but not a specialist in Cybernetics) will give her own experience. She was invited to write an article for the Special Issue *Cybernetics and Philosophy*. Despite the fact that she had heard of Cybernetics, she was unaware of the different levels of use in real life and how it could be possibly applied to a study of theater text like Sophocles' *Oedipus the King*. It was with the help of the Professors Callaos and Marlowe (specialist *noes*) that the author of the study - a non-specialist *nous*– became **fully aware** (*noesis*) of how Cybernetics can be applied to a variety of domains. In this case, *trans-disciplinarity* and *inter-disciplinarity* are present, interconnected and interwoven in the **inter-linguistic communication** (i.e. in English and Greek) between the author of the study (a non-specialist *nous*) and Professors Callaos and Marlowe (specialist *noes*) which took place in a ***glocalized* context** (i.e. between the USA and Greece).

4. AI comes in help

As it has been conspicuous from the aforementioned Sections, scientists (specialists and non-specialists) or Human Intelligences (HIs) can overcome "terminology" problems - with the aid of AI (e.g. a combination of monolingual, bilingual and/or multilingual electronic dictionaries, Word reference fora, CAT (: Computer-Assisted Translation) tools; and Corpora).[9] Nevertheless, I claim that when issues of

[9] Nikolarea, E. (2021). The Interface of Human (*Nous*) and Artificial (Computer) Intelligence in Inter-disciplinary Research, International Communication and Education *Journal of Systemics, Cybernetics and*

inter-scientificity and *reverse inter-scientificity* are encountered, it is only *the human mind (HI) who can decide which is the most appropriate term* to use in a **specific *glocalized* scientific and/or general context**. As shown in the case of the anthropological terms 'affinity' (: an in-law relationship) and 'kinship' (: blood relationship or consanguinity) are not ideal synonyms, as they are suggested on an Internet site.[10] The anthropologist / scientist should, first, become **aware** (*noesis*) of the issue of *inter-scientificity* (in this case); second, s/he should know how to search in monolingual and bilingual (if there are any) dictionaries, printed, electronic and/or on-line; and, finally, s/he decides what kind of criteria s/he can establish when choosing appropriate terms and expressions, through specific examples of mental/cognitive processes (*noesis*), so that s/he can communicate his/her inter-disciplinary and/or trans-disciplinary research properly in an international context, and, thus, s/he can establish **inter-linguistic communication in a** (scientific and/or professional) ***glocalized* context**

5. Criteria established

1. Awareness (noesis) that there are such issues such as *inter-scientificity* and *reverse inter-scientificity* **inter-linguistic communication in a *glocalized* context**. As it will be discussed in Section 6, some scientists and academics (*noes*) are resistant to this awareness due to the fact that this awareness take them out of their **comfort zone** – that is, what they 'comfortably' know – and requires them to think hard and find alternative ways of thinking and practicing **inter-linguistic communication in a *glocalized* context**.

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[10] See pp. 15-17 in Nikolarea, E. (2021). Human Intelligence (HI –*nous*) and Artificial Intelligence (AI) in ESP/EAP teaching and editing of Inter-disciplinary Research for International Communication. Case Studies and Methods. *Proceedings of the 25th World Multi-Conference on Systemics, Cybernetics and Informatics: WMSCI 2021*. (Vol. II). Available at https://www.iiis.org/CDs2021/CD2021Summer/papers/SA636OK.pdf

2. **Knowledge of <u>not just</u> how to use AI and IT tools <u>but also</u> how to find and use monolingual and/or bilingual/multilingual dictionaries, bilingual corpora**,[11] something that is time consuming and requires effort, patience and critical thinking.

3. **Comparison and contrast of terms.** When a scientist (*nous*) encounters *inter-scientificity* and/or *reverse inter-scientificity*, s/he should compare and contrast these terms and juxtapose them with the specific scientific *glocalized* context. This is not an easy way thing to do because it requires training of mind, analogical thinking as well as critical and lateral thinking to "see"/"understand" and recognize various significations of the term that s/he could not do it earlier.

4. **Critical thinking.** When a scientist encounters **polysemy** in scientific discourse either as *inter-scientificity* and/or *reverse inter-scientificity* as in **Figures 1**, **2**, and **3**, then s/he has three choices: (1) s/he can ask a specialist and discuss the multileveled meaning of the term encountered (in this case, there is interconnectedness of *inter-scientificity* and/or *reverse inter-scientificity* with *trans-disciplinarity* and *inter-disicplinarity*, as discussed above in 3.3. (a) above); (2) s/he can search and find the equivalent terms in his/her mother tongue (or language of instruction) and, taking into consideration the scientific context, s/he could decide which term is the most appropriate for his/her writing or oral presentation, exercising his/her best judgement; and (3) s/he can combine the information gets from the specialist with his/her own research (in this case, there is interconnectedness of *inter-scientificity* and/or *reverse inter-scientificity* with trans-disciplinarity and inter-disicplinarity, as discussed above in 3.3. (a) and (b) above).

[11] (1) Nikolarea, E. (2021). The Interface of Human (*Nous*) and Artificial (Computer) Intelligence in Inter-disciplinary Research, International Communication and Education *Journal of Systemics, Cybernetics and Informatics (JSCI) 19*.7, 57-81. ISSN: 1690-4594; available at http://www.iiisci.org/Journal/SCI/FullText.asp?var=&id=ZA630OW21; and (2) Nikolarea, E. (2021). Human Intelligence (HI –*nous*) and Artificial Intelligence (AI) in ESP/EAP teaching and editing of Inter-disciplinary Research for International Communication. Case Studies and Methods. *Proceedings of the 25th World Multi-Conference on Systemics, Cybernetics and Informatics: WMSCI 2021*. (Vol. II). Available at https://www.iiis.org/CDs2021/CD2021Summer/papers/SA636OK.pdf

5. Associative thinking. In this kind of thinking, there can be three different manifestations.

(a) A scientist may have encountered the *inter-scientificity* or *reverse inter-scientificity* of a specific term in the past and may have the knowledge (*epistēmē* - *ἐπιστήμη*) which s/he should retrieve it either from his/her glossary or from his own memory. This kind of awareness (*noesis*) requires an **association of skills**, that is, recalling where the scientist (*nous*) has encountered the term; comparing and contrasting the equivalences; and exercising his/her best judgement according to local and/or *glocalized* context.

(b) A university student may have encountered the term in his/her parallel classes where the instructor may have provided him/her the term not only in the language of instruction (i.e. Greek, Spanish, French) but also in English. This kind of associative thinking reveals how *inter-scientificity* and/or *reverse inter-scientificity* are interconnected and interwoven with *trans-disciplinarity* and *inter-disciplinarity* in a local/*glocalized* context, as discussed in 3.3. (a) and (b) respectively. In this case, an instructor (a specialist *nous*) makes aware (*noesis*) his/her students (non-specialist *noes* yet) of the term and its signification / *polyseme* (1:1 equivalence) or its various significations / *polysemes* (1: ν equivalences) in the local (i.e. Greek) and possibly *glocalized* (i.e. Greek → English) context.

(c) A lay person may have encountered the term as a "jargon" in his/her work. Once s/he asks a specialist for help to understand the meaning(s) of the term, then there is the process of **awareness** (*noesis*) and understanding and an interconnectedness between *inter-scientificity* and/or *reverse inter-scientificity* with *trans-disciplinarity* and *inter-disciplinarity* as described in (b) above.

All three aforementioned kinds of associative thinking require a personal development of comparative and contrastive skills as well as critical thinking.

6. Conclusions

In the present study, through different examples of *inter-scientificity* and *reverse inter-scientificity* and my own experiences as a translation scholar and an ESP/EAP teacher, I have tried to analyze the following:

(1) What is involved in **an inter-linguistic communication in a *glocalized* context**, when various scientists (HIs) from different linguistic systems come in contact; that is, when issues of *inter-scientificity* and *reverse inter-scientificity* arise.

(2) How these issues have been interconnected and interwoven with *inter-disciplinarity* and *trans-disciplinarity* in a local and *glocalized* contexts; and

(3) How the **awareness** (*noeisis*) of these issues are critically important for scientists and people (specialist and non-specialist *noes* respectively) in general, if they want to communicate and make known their own research and/or views in a wider international scientific or professional *glocalized* public; that is, international scholars that include both English- and non-English-speaking scientists and people (HIs).

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opportunity to express overtly my challenging point of view, as discussed in 3.3., (b) of this study.

I dedicate this study to all my past and present university students who, with their questions, have made me **aware** (*noeisis*) of the issues of *inter-scientificity* and *reverse inter-scientificity*, and I can state, as Solon did: *Γηράσκω ἀεί διδασκόμενη*,[12] that is, "I am getting older but I am always taught (of things)" or "live and learn", as it is said in English.

References

Kanaroglou, P., Nikolarea, E. Anomeritou, S. (2021). Chapter 1: English-Greek Dictionary of Spatial Statistics. In K. Kalampokidis, G. Korres, N. Soulakellis, and Ch. Feidas (Eds.), *Social Sciences and Geography: Theory, Methods and Techniques of Spatial Analysis* (pp 9-52). Mytilene, Lesvos (Greece): Dept. of Geography, University of the Aegean (in Greek; only the Dictionary is bilingual; that is, in English and Greek).

Nikolarea, E. (2021a) Cybernetics and Philosophy in a Translation of *Oedipus the King* and Its Performance. In N. Callaos, J. Horne, Fr. J. R. Laracy and Th. Marowe (Eds.), *Cybernetics and Philosophy 19*.4, 160-190. Available at: http://www.iiisci.org/journal/sci/Contents.asp?var=&next=ISS2104

Nikolarea, E. (2021b). The Interface of Human (*Nous*) and Artificial (Computer) Intelligence in Inter-disciplinary Research, International Communication and Education. *Journal of Systemics, Cybernetics and Informatics (JSCI) 19*.7, 57-81. ISSN: 1690-4594; available at http://www.iiisci.org/Journal/SCI/FullText.asp?var=&id=ZA630OW21

Nikolarea, E. (2021c). Human Intelligence (HI –*nous*) and Artificial Intelligence (AI) in ESP/EAP teaching and editing of Inter-disciplinary Research for International Communication. Case Studies and Methods. *Proceedings of the 25th World Multi-Conference on Systemics, Cybernetics and Informatics: WMSCI 2021*. (Vol. II). Available at https://www.iiis.org/CDs2021/CD2021Summer/papers/SA636OK.pdf pp 13-19.

[12] Actually, Solon said: "*γηράσκω ἀεί διδασκόμενος*", but the author, being a woman, has changed the gender of present participle from masculine into feminine.