Understanding Technical and Scientific Translation: A Genre-based Approach

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Abstract: In the recent past, 30 or 40 years ago, the terms *technical* and *scientific* were used interchangeably when discussing about communication, texts, terms, vocabulary or writing. Due mainly to this reason, the lines separating technical and scientific translation became increasingly blurred and little or no distinction was made between the two terms; as such, technical and scientific translation was regarded as one type of LSP translation. Using genre knowledge, in this article we show that technical translation and scientific translation can and should be treated separately, as two distinct types of LSP translation, for both educational and research purposes. We present two genre-based models for setting-up the technical and scientific curricula, aimed at familiarising students with these inter-related, yet different types of LSP translation, and which can also be used as starting points for research in these two fields.

Keywords: LSP translation, technical translation, scientific translation, translation curriculum, genre analysis, professional genres, scientific genres

1. Introduction

LSP translation is part of all undergraduate programs in translation studies. Technical translation, in particular, is a core discipline which plays an important part in preparing students for a very demanding and challenging translation market. Its importance was highlighted by Kingscott (2002), who claimed that "90% of the translations on the global market are technical translations" (Kingscott 2002: 247). The need for research in this field was justified by Byrne (2006), whose claim that "technical translation has been neglected in the literature of translation theory" (Byrne 2006: 1) is a rational impetus for translation researchers and scholars who aim to contribute with their findings to the development of the discipline and of the market,

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as well. The present paper aims to contribute to the research in the field by suggesting a distinction between technical and scientific translation, two types of LSP translation which have been a constant source of confusion among students and linguists.

2. Approaching technical and scientific translation for research or didactic purposes

An overview of the specialised literature reveals that there are two major trends which claim that (1) there is little or no distinction between technical and scientific translation and that (2) technical and scientific translation are two distinct types of LSP translation.

2.1. Technical and scientific translation seen as one type of specialised translation

In his study of technical and scientific translation, Aixelá (2004) shows that technical and scientific translation is seen as one type of translation as opposed to literary translation. We may think of a multitude of reasons for this association.

First, the lack of research and of clear-cut delimitations between technical and scientific translation favoured the association and the overlapping of the two terms. A comparison is apt: translation studies was seen for decades as a branch of linguistics and has become only recently a discipline in its own rights, with its own concepts and research methodologies.

Second, science and technology have been usually seen as one unified field under the umbrella of applied sciences. Language studies, as well, approached science and technology as a whole, and from this perspective, the second half of the last century witnessed the publication of many books for foreign language teaching and learning or for professionals working in these fields, which focus on technical and scientific English (German, French, etc.) or English for science and technology (figure 1).
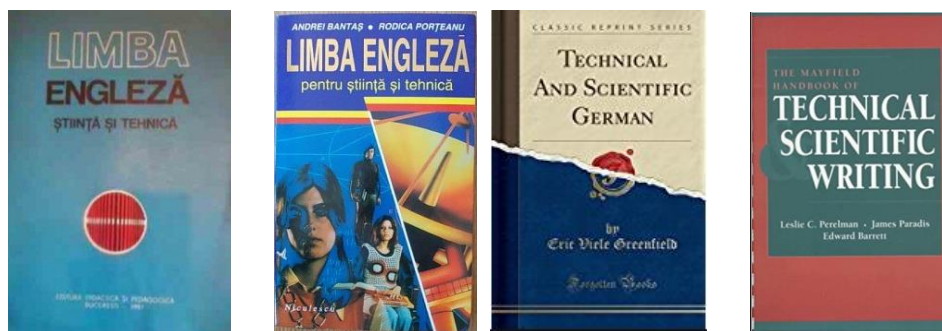

Fig. 1. Language studies in science and technology

In addition, an online search will reveal that the two terms collocate to such an extent that specialists are talking about technical and scientific acronyms, symbols, abbreviations; technical and scientific communication; technical and scientific texts; technical and scientific terms; technical and scientific vocabulary; or technical and scientific writing. Terminologists brought their own contribution to the development of this field by publishing specialised dictionaries of technical and scientific terms (Fig. 2)
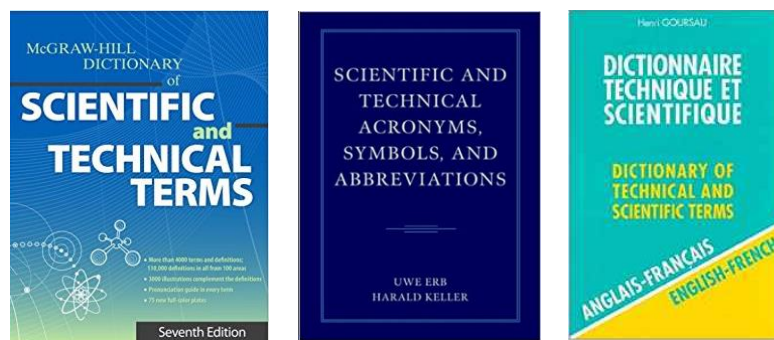

Fig. 2. Technical and scientific dictionaries

From the publication of these books to the study of *technical and scientific translation* as one field of education and research, part of an emerging discipline, was a simple and natural step.

Third, science and technology are seen as a unified whole in social and economic environments, as well. In the Romanian Nomenclature of economic activities – NACE codes [Clasificarea Activităților din Economia Națională a României], there is no clear-cut distinction between technical activities and scientific activities: professional, scientific, and technical activities fall under the same classification – NACE code 74. As a direct consequence, translation companies offer technical and scientific translation services, as one type of activity, or have technical and scientific translation departments, while universities offer translation programs which "prepare specialists for the following qualifications established in the Romanian and European space: specialized translator (technical-scientific, economic, legal field) [University of Pitești – our translation].

2.2. Technical and scientific translation seen as two distinct types of specialised translation

Recent studies make a clear-cut distinction between technical and scientific translation as two distinct areas of education and research. In his book, *Scientific and Technical Translation Explained,* Byrne (2006) states that "Despite their similarities, technical and scientific translation are not interchangeable terms." (2006: 2). Byrne

(2006) believes that the reason for which training institutions offer translation modules focusing on *scientific and technical translation* "has to do with the way in which these subjects are traditionally taught, rather than any similarity between the two" (Byrne, 2006: 2).

In addition, a basic online search reveals that in the past two decades most studies which focus on technical translation and scientific translation treat them separately – Hann 1992, Byrne 2012, Dejica 2016, Dejica & Stoian 2016, Montgomery 2010, Kruger 2015 – to name just a few.

Last but not least, the EMT terminology used to describe the European Master's in Translation – a partnership project between the European Commission and higher education institutions offering master's level translation programmes (EMT website, 2020) – also treats the two areas separately, i.e. "scientific translation and writing" or "collaborative technical translation".

3. LSP Translation and genres

Genre analysis and translation studies have a recent, yet strong relationship. The publication of a series of fundamental books (Swales 1990, Bhatia 1993) turned genre analysis into a discipline in its own rights, and soon after, the importance of genre peculiarities for translation studies was highlighted in the specialised literature (Schäffner 2000, Trosborg 2000).

As shown in Dejica (2011),

> "the relevance of genre knowledge to translation is twofold: on the one hand, when translating, translators could use knowledge on existing genre classifications […] business genres: business letters, advertisements, brochures and booklets, catalogues, annual reports, meetings, minutes, etc., and on the other hand, they could (or *should*) take into account genre peculiarities or characteristics, i.e. those aspects which are particular to specific genres as opposed to other genres in the same language, or those aspects of a particular genre which are similar or different in the source and target languages." (Dejica 2011: 160)

Genre classification and genre peculiarities are the two aspects which are taken into account in this paper to distinguish between two different types of source texts, technical and scientific, which give the name to the two types of LSP translation as well, namely technical translation and scientific translation.

3.1. A genre-based classification of technical and scientific texts

When classifying genres (Bhatia 1993: 22), one should consider a series of aspects such as placing the given genre-text in a situational context, surveying existing literature, refining the situational/contextual analysis, or studying the institutional context in which genres were created and uses. In addition to these aspects, we believe that a very useful aspect for genre classification and distinction is the

identification of the communicative purpose (informative, persuasive, phatic, etc.) and of the intended audience for which the genre was created (Swales 1990).

Based on these aspects and on various surveys of existing classifications of technical and scientific texts, we suggest the following classification of genres which can be used as a basis for technical translation and scientific translation:

Technical translation	Scientific translation
Examples of technical genres	Examples of scientific genres
- instruction manuals / user guides / maintenance guides - technical brochures / technical information materials / presentations of a technical product - technical drawings - product catalogues - technical reports / technical bulletins - technical specifications - feasibility studies - technical projects - technical lists / technical forms - letters, technical correspondence	- Abstracts - Scientific reports - Scientific articles - Scientific works (extended publications): thesis, dissertations - Scientific presentations (PowerPoint-based conference presentations)

Table 1. LSP translation and technical and scientific genres

3.2. Genre peculiarities used to differentiate technical and scientific texts

In addition to the classifications of technical and scientific genres, a series of additional aspects are very useful when it comes to identify, label, and classify new or existing genres or sub-genres. As Swales (1990) shows, "exemplars of a genre exhibit various patterns of similarity in terms of structure, style, content and intended audience (Swales 1990: 58). Bhatia (1993), in his analysis grid for new genres, suggests a series of aspects such as lexico-grammatical features, text-patterning or textualization and structural interpretation of the text-genre (1993: 22).

Based on Swales (1990) and Bhatia (1993), we consider that the genre peculiarities which translators may have in mind when labelling and classifying a particular genre belonging to the technical or scientific fields include aspects related to structure, text patterning, style, and content (lexical and terminological load).

In addition, genres may also differ from culture to culture. Ground-breaking studies (Clyne 1987) showed that as opposed to English, the German academic register is marked by agentless passives and impersonal and reflexive constructions, hedged performatives and passive infinitives, nominalizations and compound words,

syntactic complexity (German syntactic constructions not shared with English: participial clauses and left-branching embedding) (Clyne 1987: 78-79).

The English technical and scientific discourse has been long investigated and there are many guidebooks for professional writers in these two areas. However, we believe that the analysis of technical and scientific genre characteristics from a translator's perspective is an area which can still be researched, since genre knowledge may be of particular help in differentiating genres and sub-genres belonging to these, used in different areas, and at the same time, it may be one of the keys to felicitous translation. A model for genre analysis and its integration into the translation process was developed and exemplified by Dejica (2011) and can be used for the translation of technical and scientific texts as well.

3.3. Domains in which technical and scientific texts are used

A source of confusion between technical and scientific texts is that they are used to a great extent in the same domains. Table 2 displays a selection of the study programs at Politehnica University of Timișoara, Romania, in the fields of engineering at BS level. Many other programs may be found at universities of applied sciences around the globe.

What is common to all these programs is that specialists use different types of texts to communicate scientific or technical information in the same field. For instance, in the field of automation and computers, a product description for the latest model of a particular phone published on an e-commerce website is a technical text, while an article which describes the way in which its processor was created, functions and is different from other processors, published in a journal, is a scientific text. This is similar for the texts written in other fields of engineering such as chemistry, civil engineering, mechanical engineering, and so on.

Automation and Computers
- Computers
- Automation and Applied Informatics
- Information technology
- Informatics

Chemistry
- Chemical engineering
- Environmental Engineering

Civil engineering
- Metal constructions and construction mechanics
- Civil, industrial and agricultural constructions
- Land communication routes, foundations and cadastre
- Construction installations

Electronics and Telecommunications
• Applied electronics
• Technologies and Telecommunication Systems
Electrical Engineering
• Electrical systems engineering
• Electrotechnics
Management in Production and Transport
• Economic-industrial engineering
• Economic engineering in constructions
Mechanical engineering
• Road vehicles
• Transport and traffic engineering
• Machine building technology
• Materials science
• Thermal systems and equipment
• Robotics
[…]

Table 2. Exemplification of technical fields and subfields (Selection of study fields at Politehnica University of Timișoara, Romania)

Scientific texts are different from technical texts in that they are used in all branches of science, even arts. Examples include philology, communication, architecture, law, medicine, and others. For illustration of the variety of branches of science, we will use here a classification of sciences based on the Nomenclature of fields and specializations / university study programs [Nomenclatorul domeniilor şi al specializărilor/programelor de studii universitare] (Table 3):

Mathematics
Informatics
Physics
Chemistry and chemical engineering
Earth and atmospheric sciences
Civil engineering
Electrical engineering, electronic and telecommunications
Geological engineering
Transport engineering
Plant and animal resource engineering
Systems engineering, computers, and information technology
Mechanical engineering, mechatronics, engineering industrial and management
Biology
Biochemistry
Medicine
Veterinary medicine

Dental Medicine
Pharmacy
Legal Sciences
Administrative sciences
Communication science
Sociology
Political Sciences
Military sciences, intelligence, and public order
Economics
Psychology and behavioural science
Philology
Philosophy
History
Theology
Cultural studies
Architecture and urbanism
Arts

Table 3. Branches of science

In the case of scientific texts, the same distinction applies as in the case of technical texts: for instance, a written commercial for a drug is a medical text, falling under the scope of medical translation, while an article which describes how the drug was created and works, is a scientific text, falling under the scope of scientific translation.

The fact that in the same field, different genres can be used to communicate technical or scientific information may be one of the sources which generates confusion between these two types of LSP translation. What translators should have in mind in the fact that even if technical and scientific texts coexist in the same fields, they are different (as shown in 3.2) in terms of structure, text patterning, style, content and intended audience.

4. Aspects to be considered when building the curricula and teaching technical and scientific translation as two distinct types of LSP translation

One way to avoid perpetuating the confusion between technical and scientific translation is to familiarise translation students with the peculiarities of these two different types of LSP translation. In this respect, it is suggested here that the technical and scientific translation curricula be genre-based and focus on the differences between the two fields, namely the domains in which technical and scientific texts are used, their generic peculiarities, their classification and exemplification, and most common translation strategies used for technical and scientific translation. In addition, the curricula may include in both cases the presentation of CAT tools (especially in the case of technical texts). Table 5 presents

a framework which could be used as a basis to develop the curricula for technical and scientific translation classes:

	Technical translation	Scientific translation
1.	Presentation of the main technical fields (mechanical engineering, electronics, chemical engineering, nuclear engineering, etc) and of their sub-fields (car, naval, spatial industry, etc) (Table 2 in this article)	Presentation of the main branches of science (technical, medical, social, etc.) (Table 3 in this article)
2.	Highlighting the role of technical translation in social and professional environments and its position on the LSP translation map	Highlighting the role of scientific translation in social and professional environments and its position on the LSP translation map
3.	Presentation of the main generic peculiarities of technical texts (structure, organization of information, content, purpose, audience, etc.)	Presentation of the main generic peculiarities of scientific texts (structure, organization of information, content, purpose, audience, etc.)
4.	Presentation and classification of the main technical genres: instruction manuals / user guides / maintenance guides, etc. (Table 1 in this article)	Presentation and classification of the main technical genres: Abstracts, Scientific reports, etc. (Table 1 in this article)
5.	Presentation of the main CAT tools used by the technical translator (including reference works, specialised dictionaries and glossaries, etc.)	Presentation of the main CAT tools used by the scientific translator (including reference works, specialised dictionaries and glossaries, etc.)
6.	Presentation and exemplification of the main translation strategies used to solve most frequent translation problems encountered in technical texts	Presentation and exemplification of the main translation strategies used to solve most frequent translation problems encountered in scientific texts
7.	Revising and proofreading technical texts	Revising and proofreading technical texts
8.	Student translation of the most frequently used technical texts (based on Table 1)	Student translation of the most frequently used scientific texts (based on Table 1)

Table 5. Genre-based curricula for technical and scientific translation

The general framework presented in Table 5 should be regarded in a flexible manner and adapted taking into account other disciplines which set-up the translation program at bachelor or master's level and the level of specialization of such programs. For instance, it the master's curriculum includes disciplines such as *discourse analysis and production, technical writing, scientific writing, genre analysis,* less teaching hours should be allotted to the aspects presented during these classes (points 1-5 in Table 5), and more hours should be dedicated for student-centered activities (points 6-

8 in Table 5). The topics presented in the framework could be also used as starting points for research in the fields of technical and scientific translation.

5. Conclusion

We started this article by showing that in the past, the terms *technical* and *scientific* were used interchangeably when discussing about communication, texts, terms, vocabulary or writing. Soon, the lines separating technical and scientific translation became blurred and little or no distinction was made between the two terms. Using genre knowledge, we showed that technical translation and scientific translation can and should be treated separately, as two distinct types of LSP translation, for both educational or research purposes. The two genre-based models for setting-up the technical and scientific curricula suggested here (Table 5) are aimed at familiarising students with these inter-related, yet different types of LSP translation, and can be used as starting points for research in these two fields.

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