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Effective Communication in Technical/Scientific Writing in English

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ABSTRACT

Quality writing skills are essential for the accurate dissemination of ideas, procedures and results achieved in research, development, manufacturing, and sale of engineering products. However, in engineering, these skills are often completely neglected or reduced to lower-level writing that does not reflect the needs of up-to-date science and technology. Therefore the acquisition and mastering of advanced writing skills is a necessity for any engineer who wishes to succeed at the common European labour market. The project **Writing Professional English** offers **11 self-study training modules for professional writers in English**, from which any end-user**,** or national group of end-users, can select what is appropriate for them and enhance the level of their writing skills.
Keywords: professional writing skills, problem areas, reference modules, instructional modules, and national glossaries

INTRODUCTION

The proposed project, entitled **Writing Professional English,** is a language project further developing the results of the previous project entitled Writing in English – A Practical Guide for Technical and Scientific Writers. The four partners (CZ, UK, D and SK) put together a manual of about 75 pages for the benefit of technical/scientific writers. This work, however, was limited, since it only provided users with a handbook or reference approach to their writing problems, and it mainly concentrated on shared writing difficulties of non-English end - users. The aim of the continuation project therefore is to add value to what has been achieved so far. The project "Writing Professional English" addresses professional writers in the fields of science and engineering and provides them with guidance and support in their **needs to write more effectively in English** in order to become more competitive and flexible in the job market. This is of particular importance for the end-users from accessing countries where the development of writing skills has been neglected for a long time. The project group consists of professionals with linguistic skills in the area of ESP and multimedia experts from educational institutions sited in EU, EEA, and accessing countries. In the course of the project development, a team of material developers approaches the end-users /testing partners/ from colleges, universities, research institutes, and industrial enterprises with the aim to validate the outcome of the project.

MATERIALS AND METHODS

A great deal of preliminary information has been collected through an assessment of raw materials (authentic pieces of writing from target professionals), needs analysis and testing stages of the previous project about scientific and technical workers and this is carried forward into the new project. Material developers from educational institutions of the partnership have identified additional needs.

The needs, which are tackled in this project, include:

1. To cater for the opinions of the end-users as to how the materials should be adapted for their own national needs. Resulting modifications include additions and deletions to various sections in the handbook already produced, plus adding of national glossaries.

2. To suggest modifications for professional sub-groups, specifically in the new areas that the project is focusing on, i.e. informatics, physical and materials engineering, medical engineering, etc. A particular attention was paid to the ways in which these target end-users' needs were similar to or different from those identified within the previous project.

3. To develop instructional versions with self-study, task - based exercises equipped with keys for self-assessment

4. To provide material developers with methodological guidelines on how to construct their own materials on the basis of the models offered by the project team.

5. To widen a scope of material formats (CD-ROM and on-line versions)

At the beginning of the project development, the specific requirements of the end-users from different countries and different working sectors were subjected to a thorough evaluation, which revealed the directions of a further diversification of project tasks.

The methods used in the course of the development of **reference and instructional modules** are as follows:

1. To test the developed draft products with potential end-users through testing questionnaires and training sessions

2. To evaluate testing phases in order to get a quality feedback on the methods used and materials developed

3. To make corrections and draft final materials

Throughout the development of the **Methodological Module,** the following methods will be described in a detailed manner:

how to conduct an effective needs analysis among the target groups,
how to evaluate and process needs analysis questionnaires
how to collect and collate raw materials (authentic pieces of writing)
how to design draft materials,
how to test them among the target groups
how to process and evaluate testing questionnaires
how to select and re-draft final materials

RESULTS

The materials are developed in the following directions:

Reference modules offer short explanatory notes on the identified problem areas followed by authentic examples of texts from specific working sectors. The following **problem areas** of technical/scientific writing in English have been identified: types of technical/scientific writing, composition of a piece of writing, style, language functions, grammar, and vocabulary. Whereas the previous product focused on the writing of scientific/technical articles, research papers, proposals and technical reports, the continuation project also deals with reviews/ assessment of other authors' pieces of writing, promotional materials and leaflets (product descriptions), and patent writing.

Authentic examples of texts are related to **specific working sectors**, such as chemistry, pharmacy, physical/materials engineering, electrical engineering, informatics, construction engineering, process engineering, and medical engineering.

National versions make the materials more directly relevant to the writers in particular countries. Each national version is provided with a glossary of the most frequent terms used in technical/scientific writing (English and national languages: Czech, Icelandic, Italian, and Slovene).

Content	**Sector Option of examples**	**National versions**				
		English	Czech	Slovene	Italian	Icelandic
Types of professional writing Structural components Stylistic features Language functions Grammar Vocabulary	Electrical engineering Informatics Pharmacy Physical and Materials engineering Construction engineering Process engineering Medical engineering Chemistry	X	X	X	X	X
Glossaries in Czech			*X*			
Glossaries in Slovene				*X*		
Glossaries in Italian					*X*	
Glossaries in Icelandic						X

Instructional modules will contain:

- **Task - based exercises** consolidating the referential information given in reference modules.
- **Optional exercises** targeted at relevant **national groups** (Czech, Slovene, Icelandic, and Italian) with the aim to highlight specific writing problems stemming from different mother tongues. This would enable professionals to use the materials as a self-study resource while teachers will be provided with materials for taught courses.

Content	**Sector**	National versions				
		English	Czech	Slovene	Italian	Icelandic
Core exercises	Engineering Chemistry	X	X	X	X	X
Optional exercises for Czechs			X			
Optional exercises for Slovenes				X		
Optional exercises for Italians					X	
Optional exercises for Iceland						X
Key to exercises		X	X	X	X	X
Self - testing section		X	X	X	X	X

A methodological module for material developers would provide guidelines on how to extend/modify the material offered.

In a further dimension, the project also involves all the materials in **IT versions – CD-ROM and on-line** – in addition to the original handbook format. In this respect, end-users can feel completely free in how to select the material and construct their own reference modules. Other engineering sectors such as robotics or automation can choose the example texts from among a variety of related sectors (electrical engineering, informatics, materials engineering, or medical engineering). Moreover, an open on-line version provides an appropriate model material for further adaptations tailored to the needs of the target audiences from different working sectors (e.g. robotics and automation). In this way, the new sectors can be covered by the examples specifically tailored for the end-users from these sectors.

DISCUSSION

An innovative aspect of the proposed project can be seen in the methodology applied through all the phases of the material development, testing and evaluating. A diverse partnership, both in terms of transnationality and in terms of subjects involved (technical vocational schools, universities and colleges, industrial enterprises, research institutes, and chamber of commerce and industry) facilitates an effective and fruitful cooperation – when performing projects tasks – between material developers and target groups (needs analysis, testing draft products, evaluating, and dissemination). Thus, from the very beginning, there is a feedback on what has been produced so far**.** This is realised, among others, through up-to-date IT. The interaction between linguists from educational institutions and technicians/scientists from industry gathered in one team proved to be highly effective. The result is a **flexible product** where the end-user can choose a material suited to his or her linguistic and professional needs, can select between a handbook or IT version and can decide whether to use a reference material only or to complete task-based exercises to consolidate his or her knowledge.

The instructional modules include **keys or model texts** in answer to the tasks, which commercially produced books on writing skills often omit.

Web sites can be tailored to the needs of professional writers in different countries and different working sectors that may, on the other hand, be found in any European country. E-learning materials bring about a radical change in the approach to self-study as they solve a number of practical problems (quick and immediate access in the process of writing), this goes beyond the restrictions of a classroom or a library. Recently, **a combination of English and mother tongues** of the target audiences enhances the exploitability of the products for the end-users who experience difficulties with linguistic terminology in English. A focus on the **terminology of specific working sectors** also encourages the interest of relevant end-users.

Open modules can be further developed under national programmes to be used effectively both for self-study and as a basis for taught courses.

CONCLUSION

The expected impact of the project's outcome in the short term is to enhance professional writing skills of the end-users in industrial enterprises, research and educational institutions from engineering fields, chemistry, and pharmacy. These newly acquired competences will give the professionals a greater confidence in performing their working tasks in the internationally competitive working environment. A competence-based and self-study oriented approach is user-friendly and therefore attractive for professionals who seek a quick access to the problems they face in their everyday routine at the workplace.

In the long-term perspective, a group of material developers is expected to base their future research and working activities on the results of the project. The development of writing skills is a lifelong process and the production of appropriate training materials – based on E-learning and tailored to the needs of individual groups of professional writers - is a lifelong task for material developers. An open, flexible structure of reference/instructional modules as well as the guidelines offered in methodological module will enable material developers to cater for specific needs of individual groups of professionals in different countries and different working sectors. Common experience gathered by the transnational partnership can be further developed under national programmes. In this manner, up-dating/extending/modifying of final products will be ensured after the completion of the project.

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