

## ICT IN TEACHING PROFESSIONAL ENGLISH FOR MECHANICAL ENGINEERING

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### Abstract

*One of the main issues language teachers are faced with at technical universities is the fact that curricula impose a relatively low number of teaching hours a week while requiring a relatively high number of students in the class. This goes against all principles of language learning and is a challenge for both teachers and students. Students, who are often true beginners, are expected to reach B1 level in technical English within their bachelor's study. However, there is not enough time to practise all four language skills face-to-face. The most important skill for PhD. students and scientists in general is most probably writing, as they need to be able to present their research results in scientific journals and at conferences. However, teaching writing is extremely demanding and time-consuming and therefore often neglected within engineering education.*

*An effective way of solving the above-mentioned problems has proved to be introducing computer-based support and e-learning activities. At the Faculty of Mechanical Engineering in Brno, both have been integrated into classroom-based teaching as well as presented as a self-study tool.*

*The paper therefore summarizes various ICT-based English teaching projects run by and used at the Institute of Foreign Languages of the Faculty.*

### 1. ICT as a solution

It has been a typical nightmare of many university language teachers - it might as well be the oldest and the most traditional range of problems in language teaching in general – too many students in the class, not enough teaching hours a week, learners of mixed input language skills and mixed learning strategies. For many of us it is a challenge we are faced with every day.

However, an effective solution to these problems has been found: Information and computer technology. As the European Commission envisages, new forms of delivery and methodology may help make language learning more attractive and motivating, as well as effective [1]. And they really do.

ICT-based support works very well with engineering students - taking advantage of their usual and favourite hobbies - working on the computer, surfing the Internet, chatting, watching videos. At the same time, ICT respects their individual learning styles and needs as well as learners' own pace.

A variety of skills and activities can be mixed and blended effectively via technological applications such as Moodle. E-learning activities are available anytime, anywhere, they can be adjusted and allow a large number of students online at the same time.

All these reasons make ICT a valuable tool to fight all the traditional problems mentioned above.

### 2. ICT-based projects at FME

FME language teachers have been intensively developing electronic activities since the year 2000 when CALL was incorporated into the compulsory courses making full use of the computer lab and educational software.

The European Commission and the Bologna Process specifically require and support using ICT in language teaching, student-centred learning and lifelong learning [2] as well as activities encouraging international openness and raising employability [3]. Based on these recommendations, several language teaching projects have been run and successfully completed at FME Institute of Foreign Languages. The outputs, being constructive and helpful, continue to be used today.

## 2.1 Development Projects

The output of Development Projects granted by the Ministry of Education, Youth and Sports in the Czech Republic within the years 2006 to 2008 made it possible for e-learning activities to become an essential part of all compulsory English courses at the Faculty of Mechanical Engineering [3].

After electronic placement tests, various ways of electronic support were developed. Using the university Moodle environment and the exercise creator Hot Potatoes, quizzes based on the course book were created and serve till today as home practice of the areas covered within the regular weekly lessons. Students' work is monitored by teachers and discussed in the actual lessons. E-learning became a part of the end-of-semester/credit requirements.

Apart from interactive exercises, vocabulary and phrase lists were created and then their audio recordings taken. The recordings have proved to be an extraordinary success, especially with the students of lower levels. Also their pronunciation has noticeably improved. The system enables students to download the MP3 recordings and listen to the particular vocabulary anytime and anywhere they want to.

Another area highly appreciated by students are the grammar and pronunciation guidebooks as well as the database of useful Internet links that had been carefully chosen and well tested. All of these activities are presented as self-study tools students can choose from based on their actual needs, interest and level. For some courses there are also special tutorials in the computer lab where e-learning and computer-based activities are completed and discussed. [4]

## 2.2 Writing Professional English

The lack of writing skills has been noticeable with PhD. students at the faculty, who can usually understand most technical texts quite easily but creating their own has turned out to be a catastrophe. This finding was very serious, especially considering the fact that writing is an essential skill for scientists and researchers in order to be able to present their research results at international conferences and/or in scientific journals.



The problem became the objective of the Leonardo da Vinci international project entitled Writing Professional English [5].

Informative research of national markets carried out in the countries of the project partnership has revealed a lack of comprehensive material on professional writing. After investigating the needs of the targeted end-users from various engineering branches, a useful and practical set of reference handbooks, exercises and even methodological guidelines were created. The final version was again based on the real feedback from the end-users (Austria, Czech republic, France, Slovakia, and Slovenia).

The handbook contains chapters on different types of writing (e.g. research papers, proposals, reviews or patent writings) and morphological and stylistic areas accompanied by authentic examples of texts and interactive task-based activities (see Fig. 1). Especially valuable is the focus on areas specific to the particular nationalities involved in the project, e.g. the use of correct articles or word order for Czechs. Problems caused by mother tongue interference are also reflected in the glossaries

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A Language Competences Project

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## Reference modules

- Five reference modules are based on national glossaries of selected linguistic terms used in professional writing (English, Czech, Icelandic, Italian, and Slovene).
- Each module describes selected types of professional writing and identifies the areas that cause writing difficulties.
- End - users may choose authentic examples from among engineering, informatics, chemistry, and pharmacy.
- Modules can be further developed by adding new problem areas, new professional sectors, or by adapting glossaries to the needs of other nationals.

**Types of writing**

**Composition**

**Style**

**Language functions**

**Grammar**

**Words**

**Glossaries**

**Select your professional area:**

Electrical Engineering	Physical and Materials Engineering	Medical Engineering	Process Engineering
Chemistry	Pharmacy	Informatics	Construction Engineering

of the terms that frequently appear in scientific papers (again in Czech, Icelandic, Italian and Slovene). Its self-study, competence-based approach is especially appealing to professionals in the fields of science and technology who need to gain writing skills in English to succeed in the common European market (see Fig. 2).

Last but not least, the Methodological Handbook could be of interest to anyone who would like to adapt this reference handbook to their needs and tailor it to the specific classroom or self-study purposes. [6]

Fig. 1 The organization of the Writing professional English manual

**Points to check in your own writing**

Here are some simple tasks for you to see if you are constructing paragraphs properly.

- *Take one or two pages of your academic writing. Do a 'visual' check on the length of paragraphs – does the text look too heavy or too 'bitty' or about right?*
- *Check whether the average length of the paragraphs is between 7 and 14 lines (3 to 7 sentences).*
- *Count the number of words in randomly selected sentences. Does the average number of words come to between 15 and 25? If so, this is about right.*
- *Do the 'skim' test: read through the first sentences only of your whole text and see if you can follow the gist of your argument. If you can, you are writing your topic sentences well.*

Fig. 2 An example of a practical, self-study checklist on writing paragraphs that enables users to check and correct their own writing

## 2.3 CADOS

Engineering graduates entering the job market soon find out that employers only require staff with appropriate language competence. Being able to express their opinions, to negotiate, to present their research results or a product are essential skills.

Based on the experience with ICT in teaching professional English at FME, the Institute of Foreign Languages took part in a language project developed within the EU Leonardo da Vinci programme and co-funded by EC.

The aim of the project, entitled Communicating in English Between Principals and Subcontractors (CADOS), was to create an on-line training course to improve communication in technical English within the above mentioned target group of end-users [7]

The greatest benefit of CADOS is real-life situations and case studies when users need to solve realistic and meaningful problems they encounter (or will possibly encounter) in their every-day working environment. In each situation useful vocabulary and relevant grammar are introduced and practised using all four skills.

These scenarios are organized into six modules covering topics like Introducing your company, Negotiating a contract, Research and Development or Quality management. Each module is based on authentic materials collected in industrial companies and converted into a series of listening/video sequences followed by task-based exercises developed in the Telos Language Partner programme. The actual e-learning course is based on the Moodle platform as it enables close supervision and continuous assessment and can facilitate a lively, every-day interaction among tutors and learners. [8]

### 2.3.1 Networking experience

In order to acquire feedback on the materials produced, testing was conducted in two phases – piloting and networking. Piloting was carried out locally at the individual partner institutions for the first three modules of the project and international networking for the last three.

The networking part of the project was based on the constructivist approach - the assumption that learners themselves should be engaged actively and they should use their social skills to do group tasks [9].

The most appealing features for the students in the whole networking experience was the possibility of working in an international team of five participants from France, Czech Republic, Latvia, and Finland, dealing with authentic materials and situations and ICT-based learning environment.

Learners worked both on their own and in international teams, each of them guided and helped by an assigned tutor from the respective partner institution. Telos was used to get the background information necessary (e.g. relevant vocabulary and grammar, examples of dialogues connected with the topic), which was then applied in practice on the Moodle platform via a variety of applications like Forums, Wikis, submitting presentations or Skype discussions. In addition, there were several local, real-life meetings, with the particular local national tutor.

Feedback was collected directly from the tutors and the learners through Forums and every-day discussions, as well as through Questionnaires at each module and at the end of the course. These questionnaires then served as a basis for materials final improvement.

Comments on all different aspects of networking and the CADOS course have been gathered. The most positive finding was that 75% of participants showed interest in taking part in another project of this type. The overall experience of blended learning has been highly valued as for most of the learners it was their first one. The unique opportunity of guided and tutored 'learning by doing' appears to be a powerful and effective combination.

The most common complaints were concerned with the length of the course (too short), more careful choice of participants (too varied), clearer instructions and topics closer to participants' professional interests and needs.

Final assessment is being performed at the moment.

The final output of the project will be a multimedia language package available on the web as well as on DVD for employees of industrial companies and students in mechanical engineering. [8]

## Conclusion

Looking back, assessing all the projects carried out at the FME Institute of Foreign Languages, they all proved to be a great success. All based on ICT, the materials and activities have been implemented very fruitfully into the content and curricula of the current English courses at the Faculty. Some products have been offered to professionals outside the university and to public internationally.

Engineering students enjoy ICT-based activities and working on the Moodle platform as a modern and attractive learning tool respecting their pace, interests and needs.

Projects have also been extremely beneficial for all the teachers involved - innovative approaches and teaching strategies were tested, new technologies introduced, original and effective solutions to the common problems were offered.

Finally, it has been found that fighting teachers' demons is actually possible – integrating ICT into regular English courses has brought great changes and is profitable for both learners and teachers.

However, as ICT develops so quickly, it has been bringing new challenges and possibilities into language teaching. To keep up, the FME Institute of Foreign Languages has just started another considerable project called BUT English Campus, trying to find more, and more complex, ways of improving language learning and teaching using ICT [10].

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