INTERACTIVE METHODS IN PROFESSIONAL SELF-DEVELOPING TECHNICAL UNIVERSITY STUDENTS VIA LEARNING ENGLISH

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This paper outlines a framework for teaching English implementing interactive methods as a way of promoting and developing much-needed academic and professional skills. We argue that interactive methods, independently or combined, can help technical university students as future engineers to develop their professional skills and advance in a language. Through the methods of case study, problem solving, project work and etc. students can learn to think critically, to make decisions, to solve engineering problems, to work in teams simultaneously improving their language knowledge. Recent research mentioned in the paper indicates that interactive methods are more relevant, effective and affirming of the future professional experiences of students and can be used to teach language and professional skills needed for academic advancement and successful professional employment.

Keywords: Engineering education, Interactive methods, Professional skills.

INTRODUCTION

Modern world presents new requirements to engineering workforce. Most demanded are specialists who do not only possess fundamental and applied knowledge in their professional sphere, but who are also familiar with international leading companies, and are able to work in multinational teams. Therefore educators need new strategies to effectively promote foreign language acquisition and self-development of future engineers in specific areas.

A “PORTRAIT” OF A MODERN ENGINEER

We begin this work here from a professional framework that views all technical university students as future engineers and users of foreign language(s) as participants of multinational collaboration. From there we seek to make meaningful connections between out-of-university practices and academic learning aimed at development of special professional skills. That is why we used a 2005 publication “Competence of Professional Engineers/EUR ING” by European Federation of National Engineering Associations (FEANI) [3].

According to the FEANI publication engineers aware of their professional responsibilities should strive to achieve specific competencies (4.2.3 Professional competence). This paper presents some of them:
A general knowledge of good engineering practice, in their field of engineering and the properties, behavior, fabrication and use of materials, components and software.

An ability to apply appropriate theoretical and practical methods to the analysis and solution of engineering problems.

Knowledge of the use of existing and emerging technologies relevant to their field of specialization.

An ability to work with others on multidisciplinary projects.

An ability to provide leadership embracing managerial, technical, financial, and human considerations.

Communication skills and an obligation to maintain competence by continuous professional development (CPD).

Knowledge of standards and regulations including national and international health and safety legislation appropriate to their field of specialization.

An awareness of continuous technical change and the cultivation of an attitude to seek innovation and creativity within the engineering profession.

Fluency in European languages sufficient to facilitate communication when working throughout Europe.

Thus, all the competencies can be combined into linguistic, social and strategic ones. They are crucial for students’ development of using verbal and non-verbal skills, long-term cooperation and their self-development.

TOMSK POLYTECHNIC UNIVERSITY AS A TRAINER OF UNIVERSAL SPECIALISTS

Being the oldest engineering higher school in the Asian part of Russia, Tomsk Polytechnic University (TPU) has produced generations of graduates who have gone on to become leaders in all areas of society and industry. Today, it is striving to acquire and elevate the best research and education practices accumulated in the national and international academic community [6].

In order to train future engineers who would be highly competitive in labor market, TPU tends to use training programs in science and technology generated by the traditional European and American countries.

As part of data collection we have examined a TPU curriculum of English for specific purposes (ESP). Here are presented the excerpts which correspond to the accepted international standards:

- development of the desire for mutual understanding between people of different communities, tolerant attitude to other cultures;
- development of critical thinking;
- ability to clearly present views in situations of professional and business communication;
- development of skills of team working;
- ability to speak and write in situations of professional and business communication;
- experience in preparing and giving presentations;
- development of various aspects of language specific to ESP;
- formation of images of the world trends in science and technology in a particular area of training;
• experience in effective use of communication strategies specific to the professional and business situations;
• awareness of terms related to the topic sections and appropriate language tips for professional and business communication;
• basic knowledge of international symbols.

Thus, it can be concluded that educators need some special methods or techniques in order to teach successfully. The range of methods for enhancing students’ learning activities are different, they depend on the nature and content of an appropriate method, how they are used, skill of the teacher.

As for Tomsk Polytechnic University, the most popular methods are interactive ones such as IT methods, teamwork, case studies, role play, problem solving, contextual learning, learning from experience, individual learning, interdisciplinary learning, anticipatory self-study [2].

RESEARCH BASE

Context

A research project carried out in 2009 set out to answer the question “How to teach English for specific purposes effectively?” Participants were the 3-year students of Chemical Engineering Department of TPU. Our objective was to study if chosen teaching methods/techniques were effective in developing language and professional skills of students and promoting their self-development.

Method

As a response to curricula intended to training engineers as competitive specialists, we chose and successfully implemented interactive methods and techniques.

In our experimental part of research we used a combination of interactive methods. Basically it was a case study with elements of project work, problem solving, teamwork, working with IT, etc. There were developed case description, special criteria and working materials like visual aids, texts and activities for students.

Thus, students were tasked to examine a real problem at a real chemical enterprise (company) and suggest solutions to the problem. The work was intended for a term (4 months).

Data analysis & synthesis

Formally, we have distinguished some steps of work, and accompanying skills and abilities developed [1,4,5,7]:

**Step 1: Familiarization with the case**
ability to identify important issues, broader understanding the essence of the problem and its relation to various fields of knowledge.

**Step 2: Analysis of the case**
knowledge of technology and equipment related to the area of specialty.
Step 3: Organization of teamwork
ability to negotiate and mobilize human resources; ability to work independently, to be responsible for the process and outcome of work; ability to interact in small groups, including the ability to evaluate their own progress, the progress of other members of the group and the group as a whole.

Step 4: Study of the problem and search for its solutions
ability to search for knowledge required to identify and solve a problem; ability to make contact: surveys, questionnaires, discussions.

Step 5: Presenting results
ability to oral and written communication (clear and persuasive reports); ability to express opinion on technical issues based on scientific analysis and synthesis.

Step 6: Selecting the best solution
ability to find a reasonable compromise between different (conflicting) versions, and choose the best solution.

Outcomes
To sum up, interactive methods do work at TPU. They are efficient but demand further improvement. As a result of our research, we have come up with the following recommendations for teachers:

1. Materials description for case/project should be full and clear to students.
2. As much as possible, curriculum should reflect the experiences of the students.
3. Teachers should understand that students’ knowledge of language can differ. So, sometimes it needs to adapt work materials.
4. Teachers should remember that each student is a person. It is important to keep good working atmosphere because the opposite may cause teamwork losing.
5. In case of a long-term project teachers should be sure the work goes right by occasional or planned monitoring.

CONCLUSION
In order to meet international standards in teaching English for specific purposes TPU focuses on interactive methods and techniques. These methods promote cognitive activity of students. They are built primarily on a dialogue, which implies free exchange of views on the ways of solving a given problem, characterized by high activity level of students. Studies show that if they are focused on specific goals and well organized - students often learn the material more fully and usefully for themselves. The phrase "fully and usefully for themselves" means that students think about what they learn, apply it in real life situations or for further education and can continue to learn on their own.
REFERENCES


