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DESIGNING AN ESP COURSE FOR METALLURGY STUDENTS

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Abstract

The paper presents an attempt of designing an ESP course for Metallurgy students in a technical university. In the age of globalization English has become the world's most widely spoken language in the areas of modern science and technology and many engineering students are quite motivated to learn English for specific purposes as they realize prospects of the international labour market where they need a certain level of English proficiency at work. The paper provides a brief ESP history review and analyses different approaches to an ESP course design. The authors determine some guiding principles of developing an ESP course intended for technical university students. The study also discusses some challenges that ESP instructors are likely to face in their practice. The authors give a precise definition of an ESP instructor's responsibilities in relation to teaching some aspects of students' major subjects and highlight the importance of their collaboration with vocational subjects instructors. Finally, the authors generalize their own experience of designing and teaching an ESP course for Metallurgy students in the first technical university of Russia, outline the main steps they followed and share some information on its syllabus design and activities. The great part of the developed ESP course activities is based on the Internet resources, video materials in particular, that promote communicative competence development in the classroom by immersing students in situations of authentic communication.

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Keywords: ESP course design, ESP instructor's role, Internet resources, students' needs analysis, teaching materials selection.



1. Introduction

Nowadays we are living in the age of globalization due to the Internet and multimedia technologies development where English has proved to be the language of international communication. A great number of graduates of technical universities consider employment in multinational companies as an excellent chance to gain relevant work experience and become competitive candidates in the global labour market. Therefore, they need a certain level of English proficiency. To meet these needs of students it is necessary to design an ESP course that comprises development of both language practice and soft skills.

1.1. An ESP term definition

The term ESP has a number of different definitions. According to Oxford Companion to the English Language, which is considered to be an authoritative source for referencing, ESP (*English for Specific / Special Purposes*) is the English language used for professional, vocational, and other specified purposes. Originated in the form of courses of business English for foreigners, ESP evolved into courses aimed at development of practical and functional skills rather than educational and cultural ones (McArthur et al., 2018).

Such prominent scholars as Dudley-Evans and St. John (1998), Hutchinson and Waters (1987), McDowell and Toohey (2001), Robinson (1991) etc. have studied theoretical and practical issues of ESP aspects and made a great contribution to the increase in scientific awareness in this field of knowledge.

Hutchinson and Waters (1987) explain the prerequisites of ESP emerging and development by the demands of “the new brave world when a whole new mass of people wanted to learn English because it became the accepted language of technology and commerce” (pp. 6-8). It was the first time when English courses were developed with relevance to the learners' needs and interests depending on their specialist area of work or study.

Dudley-Evans and St John (1998) offer an extended and flexible ESP definition in terms of 'absolute' (meeting specific needs of the learners, making use of underlying methodology and activities of the disciplines it serves, focusing on the language, skills, discourse and genres) and 'variable' (being related or designed for specific disciplines, using a different methodology from that of General English, being designed for adult, intermediate or advanced learners) characteristics.

As Anthony (1997) notes, English for Specific Purposes (ESP) has grown to become one of the most prominent areas of EFL teaching from the early 1960's. Later, in his book “Introducing English for Specific Purposes”, the researcher defines ESP as an approach to language teaching that is focused on the current or future academic or occupational needs of the target audience with a special attention to the necessary language, genres, and skills to address these needs, and proper use of general and discipline-specific teaching materials and methods (Anthony, 2018).

Johns (2012) in the chapter “The History of English for Specific Purposes Research” summarizes a great number of sources on the subject and her own experience as a previous ESPJ (English for Specific Purposes Journal) co-editor to review the ESP history by dividing it into the four sections characterized by certain features.

The period from 1962 to 1981 centred on English for Science and Technology (EST) in academic contexts and descriptive research involving statistical grammar counts with rhetorical concerns being taken into account later.

The period from 1981 to 1990 is illustrative of the research scope broadening and emergence of ESP central concepts such as needs assessment, linguistic devices and their rhetorical purposes, ESP technology, error analysis etc.

The period from 1990 to 2011 is marked by an unequalled increase in international ESP-related articles publications, predominance of intercultural rhetorics, genre analysis and corpus studies.

The period from 2011 onwards anticipates building bridges among researchers through international conferences and publications, accessibility of difficult concepts and current research to the student and practicing teacher, new ways of employment of the existing ESP issues. The author argues for the future ESP to be enriched by variety (in topics, methodologies, rhetorics, writer's stance etc.), context (classroom, business, online media, etc. as the scope for research becomes diversified), complexity (through methodological triangulation), and critique (not only of researcher's work and pedagogies but of the researcher him/herself, through self-reflection).

Many researchers have made an attempt to define the essence of ESP by distinguishing it with English for General Purposes (EGP). Ibrahim (2019) highlights the difference between GE and ESP teachers as follows: ESP teachers spend great effort to do other functions such as needs analysis; material provider and syllabus designer. Whereas GE teachers equip their learners with grammar rules, phonemes, morphemes, history of language and just to be learnt by heart in most cases. ESP teachers focus on communicative needs.

1.2. Approaches to an ESP course design

There are also different approaches to ESP course design. Traditionally scientists analyse four of them such as language-centred, skills-centred, learner-centred, and learning-centred. But some researchers state that the number of approaches may vary and be as great as the number of ESP course developers. This situation can easily be explained by the fact that all these approaches have their own advantages and disadvantages and there is no universal one (Bauer, 1989; Chirimbu & Chirimbu, 2014).

Therefore, to overcome certain limitations some researchers believe these methods should be combined into an integrated technique (Nurpahmi, 2016).

As designing a course can be compared with a process of asking questions with the aim of grounding of subsequent steps of syllabus design, material writing, classroom teaching and evaluation (Hutchinson & Waters, 1987):

But most scientists agree that ESP course design is a sequential process which undergoes a number of stages: students' needs analysis, syllabus design, materials production, course teaching, and evaluation (Bula & Díaz-Ducca, 2017; Du & Wang, 2019; Hafner & Miller, 2018; Ibrahim, 2020; Oblovatskaya, 2017; Ureña Salazar, 2017) that will be discussed below.

1.3. Challenges in an ESP course designing

Traditionally ESP courses are based on a grammar-translation method and focus on developing reading skills. Therefore, students mainly read and translate authentic texts on professional issues. ESP

instructors set different tasks to make their students achieve complete comprehension of texts and offer various vocabulary drilling activities to learn professional terms. This approach is rather efficient for occupational vocabulary learning but in this case students lack listening and speaking practice. However, these skills are crucial for communicative competence development which is required for their successful professional life. Furthermore, a traditional approach to ESP teaching in technical universities does not comply with the up-to-date federal educational standards of higher vocational education in Russia which aim at communicative competence acquisition in all language activities.

Lebedev et al. (2020) remark that all ESP practitioners must be prepared to adapt the content and the duration of ESP courses to the new requirements due to several changes in educational standards and curricula currently taking place in higher education institutions. The authors' teaching experience shows that the requirements of the Russian federal educational standards are rather demanding taking into consideration insufficient number of academic hours allocated for teaching ESP courses in technical universities.

Apart from federal educational standards it is necessary to design ESP courses in accordance with the requirements of occupational standards which are paramount for training engineering students in technical universities (Sishchuk et al., 2020).

Teaching ESP courses English instructors are likely to face some other challenges. Firstly, most of English instructors have a degree in linguistics or humanities and consequently they are not specialists in the students' professional fields. What is more, each of them has to design and teach several different ESP courses and obviously they cannot be experts in all these subjects.

Secondly, second-year students do not have profound knowledge in their major at this stage of their studies and sometimes they happen to even learn something new related to the future profession during their ESP classes.

Thirdly, students have different levels of English, motivation and goals. Some learners will need English for Occupational Purposes (EOP) after graduation, others interested in research activities may take a postgraduate course and in this case they will need English for Academic Purposes (EAP). As most ESP courses are intended for a heterogeneous group of students consequently the design of these courses requires a profound analysis of the target audience needs (Balaci & Ahour, 2018).

2. Problem Statement

There are no universal rules that can be applied for any ESP course design as in every case there are a number of factors that should be taken into consideration. When designing an ESP course instructors face a very challenging task of selecting specific topics that are the most relevant for their students' professional development. The frequently asked questions are: What do students already know about their major? What do they need to learn? In what order should the necessary topics be included into the syllabus? What vocabulary should they be taught? On the basis of advanced Russian and foreign experience analysis the authors find it necessary to outline the key principles of a successful ESP course design in order to develop such a course intended for technical university students.

3. Research Questions

The present research focuses on the issues of designing an ESP course for Metallurgy students and its further practical testing and evaluation. Some other important questions like ESP teaching materials, responsibilities of an ESP instructor, general guiding principles for a course design are touched upon: Are the available materials really helpful for developing the competencies needed in the professional environment? What are the duties of an ESP instructor? How can the requirements of up-to-date federal educational standards of higher vocational education be met?

4. Purpose of the Study

The Mining University in Saint-Petersburg (Russia) being the first higher technical university in the country has been training students in more than 90 engineering programs. In accordance with the national educational standards the first-year students are to take an EGP course, while the second-year students study ESP. The second-year students have only 2 academic hours of class work per week that makes 34 hours a semester. The teaching staff of Foreign Languages Department at the Mining University are to teach ESP courses to the second-year students majoring in various engineering sciences such as Oil and Gas Industry, Geology, Mine Surveying, Civil Engineering, Automation, Electrical Engineering, Metallurgy, etc.

The main objective of the study is to develop some basic principles for an ESP course design in correspondence with the new Russian federal educational standards of higher vocational education and implement them by creating and teaching an ESP course to the university students. Metallurgy students have been chosen as a target group for this project.

5. Research Methods

5.1. Students' Needs Questionnaire

Before teaching an ESP course instructors should understand what their students already know about their major, how they imagine their future professional duties and what their interests and constraints are. The authors have developed a questionnaire to define students' expectations from an ESP course and their weaknesses. Over the past four years 96 first-year students of Metallurgy at the Mining University were given a questionnaire aimed at collecting data about their needs and expectations before their ESP course (Table 01).

Table 01. Students' Needs Questionnaire

No	Questions	Options
1	Do you use English outside the class?	Yes / No
2	Why are you studying English? (You have to choose the most important reason.)	<ul style="list-style-type: none"> ▪ I'm going to take an examination; ▪ I enjoy learning foreign languages; ▪ I will definitely need it for work; ▪ other reasons.
3	Which classroom activities do you expect to be most helpful during your ESP (English for specific/professional purposes) classes? (You may tick up to 3 answers.)	<ul style="list-style-type: none"> ▪ reading and translating authentic texts concerning professional issues; ▪ watching and discussing videos on professional topics; ▪ revising Grammar rules and doing exercises; ▪ participating in role plays with future occupation scenarios; ▪ doing research projects and making presentations in English; ▪ writing business letters, technical reports, abstracts to scientific papers.
4	Which activities do you consider to be the most difficult and effort-consuming during your ESP (English for specific/professional purposes) classes? (You may tick up to 3 answers.)	<ul style="list-style-type: none"> ▪ reading and translating authentic texts concerning professional issues; ▪ watching and discussing videos on professional topics; ▪ revising Grammar rules and doing exercises; ▪ participating in role plays with future occupation scenarios; ▪ doing research projects and making presentations in English; writing business letters, technical reports, abstracts to scientific papers.
5	Would you like to undertake an internship in a multinational company while studying at the Mining University?	Yes / No
6	Would you like to apply for a job in a multinational company after graduation from the Mining University?	Yes / No

5.2. Engineering Programs Analysis

Engineering programs should be thoroughly analysed so that the most relevant professional issues could be included into the ESP course syllabus. The first-year students of Metallurgy in our University in accordance with their Bachelor's training programs are delivered lectures and practical studies on several courses: "From the History of Mining and Metallurgy", "Introduction to Metallurgy", "Metallurgy of heavy and precious metals", "Technogenic Raw Materials and Their Application". The second-year students have lectures and practical classes on the courses "Nature and Man", "Materials Science", "Process Simulation and Optimisation", "Pyrometallurgical Processes Research Design", "Modern Topics in Metallurgy and Material Engineering" and "Hydraulic Engineering and Aerohydrodynamics".

In our opinion, an ESP course should help students learn and understand some basic concepts of their major in English better and they should deal with the familiar content, something they have already

studied before the ESP course with their vocational subjects instructors. The authors believe that in ESP classes students should be presented some basic information related to their major's, like an introduction into the subject. Therefore, designing the ESP course for the students of Metallurgy we focused only on the two of the above mentioned courses: "From the History of Mining and Metallurgy" and "Introduction to Metallurgy".

5.3. An ESP Course Practical Testing

Any course needs to be tested and evaluated. So during the 2019/20 academic year the authors used the designed course with the second-year Metallurgy students of the Mining University. Theoretical analysis of the advanced ESP teaching practice, long-term observation of the educational process and regular interviewing of students were essential for the course comprehensive assessment.

6. Findings

All in all, we followed several stages in designing our ESP course for the students of Metallurgy.

6.1. Students' Needs Analysis

The survey results show that even being first-year students they already understand the importance of a foreign language for their future professional development. 47 % of the students stated that they would need English for their future work. Among the other popular reasons for learning English mentioned by them were the following: taking an examination (25%), interest in learning foreign languages (20%), and other personal needs (Figure 01).

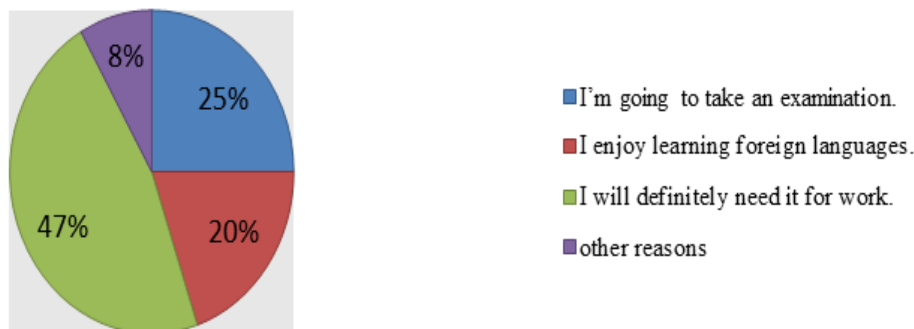


Figure 01. Why are you studying English?

87 % of the surveyed students said that they would like to take an internship in a multinational company (Figure 02).

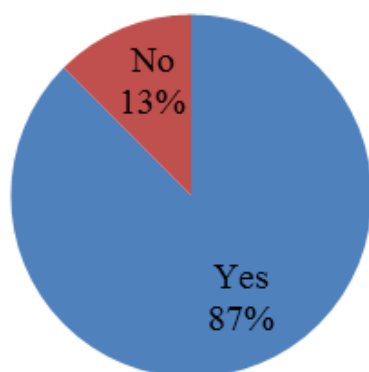


Figure 02. Would you like to undertake an internship in a multinational company while studying at the Mining University?

88% of students considered the possibility of applying for a job in multinational metallurgical companies (Figure 03).

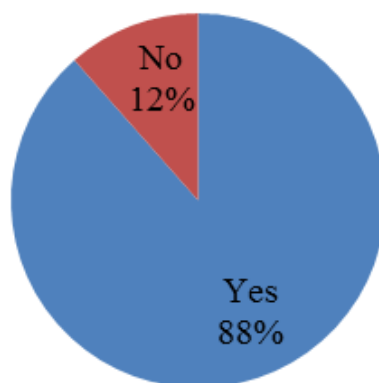


Figure 03. Would you like to apply for a job in a multinational company after graduation from the Mining University?

Among the most useful English learning activities during the ESP course 96 surveyed students chose the following options in the descending order: reading and translating authentic texts concerning professional issues (68 respondents), watching and discussing videos on the metallurgical issues (58 respondents), revising Grammar rules and doing exercises (55 respondents), developing writing skills (34 respondents), taking part in role plays (25 respondents), and making presentations in English (18 respondents) (Figure 04).

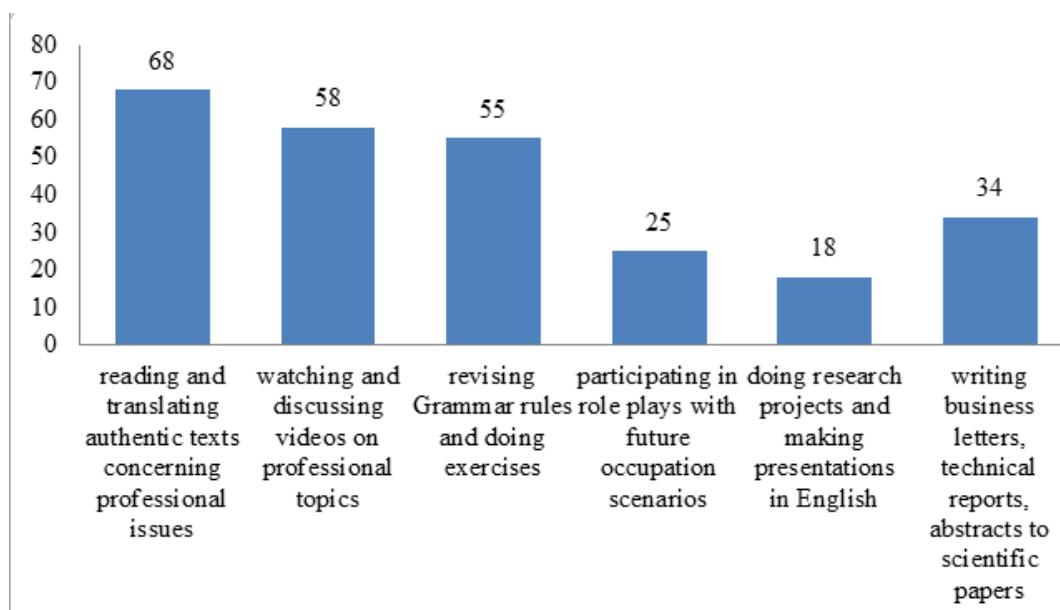


Figure 04. Which classroom activities do you expect to be most helpful during your ESP (English for specific/professional purposes) classes?

6.2. Syllabus Design

At the stage of syllabus design ESP instructors should work in cooperation with the vocational subjects instructors who can give expert recommendations on the ESP course content, answer some questions concerning the subject matter and suggest some occupation-related role plays or case studies to be included into the course. This stage also implies certain acquisition of occupation-related information by English instructors who are to get some basic competence in the students' major to be able to select the most important topics and basic vocabulary for the course. For instance, if the instructor does not know much about metallurgical furnaces design and their performance principles, he/she might tackle great difficulties in preparing their own teaching materials on the topic for ESP classes.

Some researchers underline that an ESP instructor should gain knowledge in three main fields: the target language, the academic discipline and the foreign language methodology which makes the tasks set very complicated (Spasić et al., 2015).

However, the authors have a different point of view on this issue. We are firmly convinced that ESP instructors are not responsible for teaching students' major in English which is the function of vocational subjects instructors. In our opinion, the mission of an ESP instructor is:

- to focus on training students' communicative skills demanded in the professional environment;
- to teach students' technical terminology in English on the basis of authentic subject-related materials;
- to explain students how to cope with lexico-grammatical challenges of technical translation;
- to improve students' critical thinking skills when analysing the information;
- to develop their abilities to process a huge scope of their occupation related information in English available on the different resources.

The designed ESP course consists of three units “The History of Metallurgy”, “Modern Equipment and Technology”, “Career Prospects”. They present some basic ideas relevant for the Metallurgy students and provide a sufficient amount of authentic occupation-related materials which are useful for learning the core vocabulary.

The first unit provides students with some basic Metallurgy vocabulary on the topics “Bronze and Iron Ages” and “Bloomery Process”. The second unit comprises the following topics: “Materials Properties”, “Metal Working Processes”, “Production Engineering of Metals”, “Metallurgical Coke”, “Different Types of Furnaces”. The third unit is devoted to the topic “My Future Profession”. The students discuss what key skills are necessary for metallurgists, what their possible employment prospects are, and what qualifications and training are required to make a good career in the metallurgical industry. The course book is also supplied with a “Vocabulary notebook” comprising all the terms from the 3 units.

6.3. Search for appropriate authentic materials

Many researchers agree that ESP instructors often take a role of materials collector and designer to one degree or another (Marjanovikj-Apostolovski, 2019; Nekrasova-Beker et al., 2017; Xu, 2018).

According to Anthony (1997) both 'General English' teachers and ESP practitioners are often required to design courses and provide materials. One of the main controversies in the field of ESP is how specific those materials should be. The authors believe that there should be a balance in the course syllabus between language skills and content learning. As a rule, students are mostly interested in the issues that are of practical importance in their professional area. But those materials should not be too complicated and highly specialised.

Searching for appropriate authentic materials for our ESP course we made great use of the Internet resources (metallurgical companies websites, blogs, news articles and reports for reading, videos, podcasts, dictionaries, etc.) and managed to find a lot of relevant and up-to-date materials.

Moreover, the Internet gives people possibilities for communication, and there are platforms that allow specialists of different professional areas share their ideas and knowledge, which can be particularly important for developing an ESP course.

One way in which information computer technology has changed the way how languages are learned is that it allows learners to immerse themselves in the target language and community easily, which, in the past, was only possible by more or less extended stays in the country where the target language was spoken (Warschauer, as cited in Kern, 2013).

So, the Internet served as an indispensable source of authentic materials for training various language skills in our course.

6.4. Teaching materials development

For the time being, some globally recognized publishing houses offer a number of ESP textbooks with multimedia materials. Some of them are intended for language learners who are professionals in Metallurgy working at international companies, some for those who have achieved a high proficiency in English (B2-C1). The second-year students are a quite different category, as they have not been taught many special subjects yet and that is why the ESP course content for them has to be much simplified and adapted in respect of its specific information. And in accordance with the annual placement tests

conducted in our university most second-year students tend to have B1 level in accordance with the common European framework of reference of languages.

When ESP instructors at higher educational institutions fail to find an ideal study pack for a particular group of their students they have to design ESP courses themselves and develop original materials to support them. Some researchers state that a course book plays the most significant role in ESP teaching/learning process (Purwanti, 2019). Unfortunately, not being able to find an appropriate course book available, the authors had to design their own ESP course book for Metallurgy students. It was compiled from different, mostly Internet-based resources including videos from *Youtube*, online dictionaries, etc.

Borisova (2017) distinguishes the following fundamental principles for ESP course books development:

- most activities should be characterized by communicative approach;
- use of visual aids (the course book is to include tasks supplied by podcasts, videos, illustrations and figures, etc. in sufficient scale);
- careful selection of educational materials;
- the principle of appropriate vocabulary and grammar coverage (educational materials are to comprise the most frequently used patterns and items of specific area's language);
- the level of task complexity should be increasing step by step on a “simple-to-complex” basis.

The authors found most of these principles useful while designing the ESP course for Metallurgy students and as a result of its practical testing the activities based on the Internet video resources were also concluded the most effective means of developing students' communicative competence.

6.5. Teaching an ESP course

The ESP course designed by the authors has been used during classes with Metallurgy students starting since September, 2019. As it was stated above, the course book was developed in accordance with the academic course program of the Foreign Languages Department at the Mining University. The teaching materials were used for both in-class activities and students' extracurricular individual work during two semesters.

6.6. Assessment and evaluation of the results

The ESP course teaching testing has shown that some vocabulary exercises were too complicated for our students. For example, some students found it difficult to match some pairs of antonyms, like “plastic” and “elastic”, or “brittle” and “ductile”. After a short insight into Materials Science it was much easier for them to match such pairs of antonyms. In the long run, the majority of the designed activities proved to be relevant to the students' needs and the language command. At the beginning of the course most students considered that traditional activities like reading texts and revising Grammar seemed the most attractive options for them. While later the students assumed that English was not just a target language but a powerful means of professional self-development. They also got interested in doing research projects, making presentations in English and writing evaluating abstracts and technical reports.

Apart from the progress in English the students managed to develop some of their soft skills. There was an increase in the number of students who knew how they could use English in real life situations and workplace environments, they became more motivated, and, therefore, now they are likely to achieve better results in their future work.

6.7. Correlation of the ESP course

There is always room for improvement, and correlation of the ESP course may go nonstop. It can be influenced not only by the ESP instructor's assessment and evaluation of the ESP course delivery results but by the target students' feedback as well.

It goes without saying that an educational process is double-sided as it suggests person-to-person interaction between instructors and students. Instructors can motivate their students by their own enthusiastic attitude towards the course and commitment to their subject. On the other hand, students also have an impact on teaching strategies. For example, they can raise some questions during the classes that have never occurred to their teachers. And if a teacher realises that the activity suggested to students quicken their interest in the subject, then he/she may develop some other similar activities and include them in the course.

Most teachers are rather reflective in their work and try to analyse students' feedback, define their real needs and offer extra solutions for the language practice. For instance the authors were rather puzzled summing up the results of first-year students answers to the needs questionnaire. Many students pointed out reading and translating authentic texts concerning professional issues as the most helpful activity in ESP course. This fact could be explained as follows: students are used to reading and translating texts during their English classes, find this activity the least effort-consuming and stressful for them, whereas their desire to take part in communicative activities like role plays, presentations, etc. can be restricted by their fear of public speaking.

But teaching practice has shown that they got really interested while watching and discussing videos on professional topics. This activity can be named highly useful as it mobilises students' listening skills and provides visual support especially if some metallurgical processes should be demonstrated in dynamics. If the video is supplied with subtitles it also facilitates reading skills. The same video can be shown with different pre-viewing tasks. Making notes while watching the video is often expected. That's why watching and discussing videos on professional topics was finally integrated in every topic of our ESP course.

Up till now the ESP course for Metallurgists is being correlated and the course book is provided to students in the form of an electronic textbook.

7. Conclusion

The ESP course designed for Metallurgy students can be characterized by some distinguishing features:

- the ESP course content was thoroughly selected due to a limited number of academic hours and covers the most topical aspects of professional communication.

- the ESP course is focused on development of all language skills with extra practice on listening and speaking in accordance with a communicative approach.
- the ESP course content is based on the Internet materials whereby reading for specific information is of primary importance. In this way students learn how to search for the relevant information on the Internet. Students are given links and QR codes to find this information. Nowadays most professionals search, share and exchange information on the topical professional issues on the Internet. To be able to read online research journals, conferences, professional blogs is an everyday necessity for those who are eager to be aware of the latest scientific developments and trends in their field of occupation.
- the ESP course has been designed in collaboration with the vocational subjects instructors from the University's Metallurgy Department. They gave their recommendations concerning the syllabus design and shared their ideas for role plays.
- the designed ESP course also develops students skills to use the Internet resources for their further professional self-development. The authors give students instructions on how to find reliable sources of information on the Internet.

All these characteristics of our ESP course proved to be successful while implementing them in practice and in the final analysis may definitely be regarded as guidelines for any ESP course design for students in the technical university.

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