



ORIGINAL PAPER

“Meeting the Goals”: Enhancing English Language Skills for Students in Engineering

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Abstract:

The present paper aims at describing the importance of developing English language skills for the students who currently study in the field of engineering. English for Science and Technology (EST) is part of the general domain of English for Specific Purposes (ESP), which has grown in importance during recent years due to the constant developments in science, technology and business. Thus, the paper is structured into four sections, the first offering a brief view on what EST means and requires, as well as on the specific features it is based on. Nevertheless, learners' needs and expectations are always to be taken into consideration afore the development of any specific course, and, the second part of the paper includes facts and characteristics related to the learner-centered approach of teaching the language. Attitudes and motivation, together with the importance of a needs analysis questionnaire are briefly discussed. The third section deals with the description of receptive and productive skills tailored on engineers' needs as well as with the metacognitive skills which aren't to be forgotten due to their importance in the process of acquiring knowledge and using information in real-life instances. Considering the given facts, the paper ends with the conclusions which outline the importance of focusing on learners' needs, improving, at the same time, various skills which students need in order to become proficient users of a language in their future careers.

Keywords: *EST; learners' needs; metacognitive skills; productive skills; receptive skills.*

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Introduction: the importance of EST

Undoubtedly, nowadays, due to the processes of globalization and internationalisation, English teaching and learning have become a vital part of the educational activity for all non-native speakers who embark on the quest of acquiring the necessary skills in order to effectively perform on worldwide markets. At the academic level, the focus is shifted from the general knowledge of the language to the more specific one, meant to help future professionals in their areas of study. Thus, out of the EFL (English as a Foreign Language) domain, the area of ESP (English for Specific Purposes) emerged, right after the World War Two. In the 1960s, ESP developed as a new discipline, opening the gates for in-depth research and study.

Dudley-Evans and St John state that “The original flowering of the ESP movement resulted from general developments in the world economy in the 1950s and 1960s: the growth of science and technology, the increased use of English as the international language of science, technology and business, the increased economic power of certain oil-rich countries and the increased number of international students studying in the UK, USA and Australia” (Dudley-Evans, St John, 1998: 19). In Romania, we can talk about the prevalence of ESP, especially after the Revolution in 1989, when the country fought for its democracy and succeeded in achieving its place among the democratic countries worldwide. Professionals in different domains were faced with the challenge of working with peers from other countries, being employed by multinational companies where the use of English was and still is a 'must'.

Taking into consideration the purpose/ objective of the teaching activity, as well as learners' needs and expectations, ESP is divided into two major areas: EAP (English for Academic Purposes) and EOP (English for Occupational Purposes). When it comes to teaching English to Engineering students, the subcategory of EST (English for Science and Technology) prevails. Accordingly, one cannot speak about a 'stand-alone' definition of EST, but of one related to the definition of ESP, with features belonging to the specificity of the technical area.

After having identified the origins of ESP, its development and categories included, Hutchinson and Waters consider ESP as “an approach not as a product. ESP is not a particular kind of language or methodology, nor does it consist of a particular type of teaching material. Understood properly, it is an approach to language learning, which is based on learner need. The foundation of all ESP is the simple question: Why does this learner need to learn a foreign language? From this question will flow a whole host of further questions, some of which will relate to the learners themselves, some to the nature of the language the learners will need to operate, some to the given learning context. [...] ESP, then, is an approach to language teaching in which all decisions as to content and method are based on the learner's reason for learning” (Hutchinson, Waters, 1987: 19). Later on, Laurence Anthony defines ESP as “an approach to language teaching that targets the current and/or future academic or occupational needs of learners, focuses on the necessary language, genres and skills to address these needs, and assists learners in meeting these needs through the use of general and/or discipline-specific teaching materials and methods” (Anthony, 2018: Introduction).

English for Science and Technology was among the first subcategories to appear in the area of academic studies, because of the developments in science and technology which flourished in Europe right after World War II. At the beginning, ESP was based on scientific texts, with a focus on the included vocabulary and grammar practice. Yet, learners' needs and developments in society have turned the process of

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teaching and learning towards more communicative approaches. Besides the technical vocabulary learners become accustomed to, their need of communicating in the foreign language (be it spoken or written) has grown as importance, thus, the materials addressing such students needed to be changed so as to meet such goals. Aside technical vocabulary and grammatical structures widely used in scientific texts, a special focus was offered to the development of other skills, such as listening, writing and speaking, alongside metacognitive skills which the future engineers will definitely need in their careers. Not to mention that, the studying of engineering includes several areas which cannot be considered perfectly independent. Engineering students are specialised in different fields – mechanical engineering, aero spatial engineering, computer engineering, electrical engineering and so on, which makes the task of a teacher working with such a variety of students rather difficult. Nevertheless, these specializations have a common core which an EST course can address. In the end, Woodrow considers that “the focus of EST is on the technical and semi-technical vocabulary of scientific texts, the commonly found grammatical structure in them and their genres- for example, a laboratory report. [...] The role of the EST teacher is to help the learners integrate into their intended disciplinary community by using accepted ways of communicating” (Woodrow, 2018: 13-14).

Rao remarks, “English for science and technology or EST is a sub category of the larger field of English for Specific Purposes in which it shares some basic characteristics with the larger field of ESP. It emphasizes purposeful and utilitarian learning of English. The communicative needs of the learners are important consideration of course design. EST is concerned with both the oral and written discourse of English for academic or professional, occupational or vocational purposes. It mainly deals with learners at the tertiary level for whom the learning of English takes on a service role for their specific needs in study, work or research” (Rao, 2014: 3-4).

Thus, we can define EST as an approach to language learning and teaching with a focus on the development of specific skills the future engineers will use in their careers. The content of the course primarily depends on the needs of its attendees, while the materials used would help in meeting these needs.

Challenges and expectations

It is known that ESP is a learner-centered approach, and the processes of both teaching a specific language as well as that of acquiring it, need to meet the needs and expectations of learners. In the case of English for engineering, students' main motivation is that of performing well in their future careers. EST has evolved a lot throughout years, since, at the beginning the focus was on technical vocabulary and grammar structures, while in time, other necessary skills grew in importance. As Parkinson states, “The initial interest of EST teachers and researchers was on linguistic forms, with later emphasis on skills, a more recent focus has been on disciplinary socialization, and most recently, a critical perspective, which considers how literacy practices express societal or disciplinary power differences” (Parkinson, 2014: 155).

Prior to any attempt of actually teaching a specific language, the teacher/trainer needs to consider both the attitude and motivation of learners. Even if they are interrelated, there is a distinction which needs to be made clear: attitude refers to the feelings of students towards the language being taught, while motivation is linked to the reasons of learning the language. In terms of attitude, the learning background of a student weighs heavily in his/her positive or negative attitude towards English. There are

students who had a nice and interesting experience in acquiring the language while in high school, as well as students who show a reluctant attitude towards the process of learning the language since they might have found it dull or difficult in their previous studying years. And here comes the challenge of the teacher: how to turn the entire process of learning into a pleasant one, a positive experience even for the unenthusiastic ones.

Motivation, on the other hand, deals with the reasons which lie behind the wish of acquiring as much knowledge as possible in the field. It should be taken into consideration the fact that, according to Bălănescu, “[...] there are students who come to classes with a relatively weak motivation and then, again, by bringing in interesting subjects and exercises, teachers have the possibility to build and increase these students’ internal drive to learn and succeed” (Bălănescu, 2019: 60). Nevertheless, most students are aware of the requests of the international labour markets nowadays, and, the knowledge of English represents an important part in the process of selecting new employees. So, their main motivation is that of finding 'a good job' in the future. Gardner (1985), Gardner and Wallace (1972), Basturkmen (2006; 2010), Nation and Macalister (2010), Huhta, Vogt, Johnson and Tulkki (2013), Brown (2016), etc. conducted several studies in the area of students' motivation when acquiring a new language. Gardner describes motivation as “a very broad-based construct that has both cultural and educational components when applied to the language learning situation. It has cognitive, affective, and behavioral characteristics, and the motivated individual demonstrates all facets” (Gardner, 2010: 10).

Afore the actual unfolding of a course, the needs analysis questionnaire has proven to be a great tool in determining the expectations of students when it comes to learning English from a different perspective – that of combining general knowledge with the specificity of their domain of study. The questionnaire is not at all simple to be assembled, since, to get the most out of the students' answers, it needs to include topics related to their previous experiences, the skills they are interested in improving by attending the course, the level of knowledge they wish to reach, what they consider difficult to work with or different activities which they may find engaging. According to Brown (2016), the concepts of needs analysis and needs assessment are interchangeable, meaning the same thing. When dealing with a needs analysis questionnaire, four viewpoints need to be included: the democratic view, where the target is on what students need from various stakeholders' viewpoints (by stakeholders he refers to teachers, administrators, etc.); the discrepancy view, i.e. the difference between what students should be able to do and what they can currently do; the analytic view, what the students should learn next based on their acquired experience; and the diagnostic view which establishes which elements will do most harm if they are missing (Brown, 2016: 5-9).

The teacher or the analyst of the questionnaire should bear in mind, right from the beginning, that the survey could comprise different results, since not all students will answer the questions in the same way, opinions vary, as well as expectations vary. We are different as individuals and our expectations are also varied. Yet, a balance should be found when deciding upon the materials to be used in class, the skills that need a higher amount of time for the students to properly acquire, so that the entire experience of attending such a class at university should not only meet the target but also remain as a positive experience in the learners' mind. Lăpădat reminds us that “the modern world continues to change and it is the role of teachers to respond to current challenges. The

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teaching process should reflect the needs of a modern society and develop the student’s critical thinking and skills” (Lāpādat, Lāpādat, 2020: 147).

Developing skills

Bearing in mind that the main focus of acquiring a foreign language is to be able to use it in both oral and written communication, the development of language skills prevails no matter the specialization of students. The same is the case of engineering students, they will need to further use the language in order to communicate in both their professional and everyday lives. Huckin and Olsen remark, “Scientists and engineers may be technically brilliant and creative, but unless they can convince co-workers, clients and supervisors of their worth, their technical skills will be unnoticed, unappreciated and unused. In a word, if technical people cannot communicate to others what they are doing and why it is important, it is they and their excellent technical skills that will be superfluous. From this perspective, communication skills are not just handy; they are critical tools for success, even survival in ‘real world’ environments” (Huckin, Olsen, 1991: 3). Thus, we should always have in mind ways of improving different skills in English, be they reading, listening, writing or speaking skills. These language skills are not independent; they are related to one another in several ways and their development helps students become proficient users of a foreign language in their future careers.

Receptive skills –reading and listening, show students’ ability to understand language, to make the right meaning out of a written or spoken message. As Sreena and Ilankumaran observe, “Language is received and meaning is decoded for the easy understanding of the message. Imagination is increased through listening and reading” (Sreena, Ilankumaran, 2018: 670). Most engineers will face situations when they need to read technical texts in order to understand a process or to find out technical specifications of certain products. It becomes the task of the teacher to search and select the right type of written text and messages to be in accordance to their specialization. When working on such an input, written messages offered by native speakers, students get accustomed not only with the language needed but also to other important aspects such as correct layout, accuracy and specific style. Technical books in English as well as the Internet become valuable sources for teachers to select proper materials to be used in class.

When dealing with various reading requests, we should always consider the fact that most students bring their knowledge of the subject matter to the task, since they have already studied such technical items in their native language. So, for them, reading about technical processes or products in a foreign language becomes more of an activity of enriching their vocabulary in English, finding out how certain terms are used and pronounced in the foreign language and not so much a new and totally unknown field of study. The process represents more like a transposition of already acquired knowledge of the subject matter into a foreign language since their background information helps them tremendously in the reading process. Whether students are asked to read for the general information or for the specific one, the objective is for them to demonstrate the ability of understanding the message and the further use of specific vocabulary in different tasks.

Listening comprehension is also vital in developing the receptive skills of students. The main purpose of this activity is to get students accustomed to different spoken explanations or dialogues on technical facts, go beyond the textual understanding and use the language effectively on their own. Thus, critical and effective understanding

are not to be forgotten. Jian reports, “In doing the task, students are expected to: develop their critical thinking ability by forming their own idea and use the language and idea they have learned in the listening process. By involving students in doing these, students will also have a better comprehension of the text and have a better real-world motivation for listening” (Jian, 2019: 31). In a study conducted by researchers of Lhokseumawe State Polytechnic in Indonesia on a number of 22 students specialized in Civil Engineering, it’s been shown that a great help in the listening activity of students is to use visuals combined with the verbal mode. Students’ response to using verbal and visual mode in understanding the listening extract was higher than when using only the verbal mode. As a result, the authors conclude, “multimodal analysis is a great choice for language teachers to be used in the teaching. In real life, most of listening contexts involve more than one mode listening, combining verbal and visual modes. Hence, the students need to be exposed to this kind of situation. They will obtain more advantages by exposing themselves to enough exposure of the context” (Yusnimar, Ernawati, Ismaniar, 2020: 422).

Both reading and listening tasks aim at applying authentic materials to help students enrich vocabulary, develop understanding skills and use the newly-acquired knowledge in similar situations. Receptive skills are highly connected to the productive ones, since it is impossible to teach/develop them separately. Many listening tasks comprise reading activities as well as writing and post-activity speaking.

In terms of the productive skills, i.e. writing and speaking, again, the target is to use tasks connected to students’ specialization. Engineers need to be able to write particular types of materials (explanations, instructions, e-mails, reports, etc.) as well as speak in various contexts with colleagues or partners and be able to explain processes or issues encountered in their professional lives, even conduct presentations of different technical products.

In order to improve the writing skills of students, it is important to gradually work on assignments, expanding activities from paragraph-based models to longer pieces of written messages. Engineering students seem interested in how to write descriptions of devices or processes, how to interpret diagrams, illustrations or charts as well as filling-in forms related to their subject matter. At the same time, of great help in developing their writing skills is to send and receive written correspondence among one another or from students to teachers so that they get accustomed with the adaptation of style and register depending on the correspondent. Golkova and Hubackova observe that “There are more and less successful students in the area of productive skills, but the truth is that they should not be discouraged in any phase of learning process. Continuous chase for more effective activities in order to meet the learners’ needs and even more activate their productive skills should be one of the teacher’s main objectives and motivations” (Golkova, Hubackova, 2014: 480).

Speaking is the activity that most students are somehow afraid of, especially because such an activity inhibits them, they do not feel at ease to use a foreign language in front of their colleagues, they focus more on accuracy and forget about fluency, they consider difficult to find the right words or terms to use in their spoken act, so it usually takes time and patience to help students develop such skills. Role-plays, simulations, group discussions and debates are useful ways to lead students into the ability of conducting their own oral presentations. The same as with working on the development of writing skills, speaking tasks are to be used gradually, starting from shorter acts of

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speech to longer debates and presentations. The main idea is to offer students confidence in their knowledge and power of using such knowledge in their speeches.

At the same time with developing language accuracy and fluency, it is important to work on the metacognitive skills that help students in achieving tasks successfully and prepare them for their future. It is important to guide students towards the process of reflecting upon their learning process as well as the factors which lead to performance, to be able to plan, evaluate and correct their performance. Metacognition is applied in various situations alongside the learning process, such as during a reading task when a student comes across an unfamiliar word and uses the context to deduct its meaning before looking it up in a dictionary, or during speaking or listening activities when students are asked to work in groups to reach a common conclusion, instances which request conscious behavior in terms of recognizing and using the best strategies to handle tasks. Thus, students collaborate frequently and better and create bonds with one another which form a relaxed, harmonious environment in class. Wilson and Conyers (2016) use the term *assets* for the cognitive strategies which help students in their learning process and remark,

“* Maintain an outlook of practical optimism about their learning performance,
Set learning goals and plan to achieve them,
Focus their selective attention and optimize working memory,
Monitor their learning progress, and
Apply their learning experiences across core subjects and in their personal lives” (Wilson, Conyers, 2016: 9).

The receptive, productive and metacognitive skills go hand in hand in the process of foreign language acquisition, being impossible to be completely separated one from the other, yet, certain sessions may focus on some of the skills rather than others. It is important for the teacher to try to cover all fields of expertise, and combine them into a pleasant and interactive atmosphere. Ostbye notes, “An interactive exploitation and combination of skills stimulate new pedagogical perspectives that require using language in new and more technical ways. Emerging technologies are transforming the teaching/learning process and changing the traditional role of the teacher. Hopefully, in the future, more and more students and teachers will be experimenting with the Learning Revolution” (Ostbye, 1997: 103).

Conclusions

Worldwide developments in science and technology together with the processes of globalization and internationalization have opened the gate for newer and continuous interactions among professionals in various fields. Engineers from all over the world have started working together for different projects and processes, international companies have emerged in order to advance in the field. The common language of communication in the engineering field is English, which nowadays prevails as *lingua franca* in many activities. Students studying the field of engineering are more and more aware of the importance of acquiring and developing English language skills necessary in their future careers. EST has evolved a lot, shifting the focus from vocabulary and grammar to the development of more communicative skills. The need to communicate in a foreign language has changed not only the materials selected for the study of English but also the approach of teaching and learning the language. Besides the technical vocabulary and grammatical structures widely used in scientific texts, a special focus is offered to the holistic development of receptive, productive and metacognitive skills. A

prerequisite of the English language course is to address the specific expectations of the attendees; materials are to be selected in order to meet students' needs while the chosen tasks should target the development of different skills necessary in their future career. All these activities should unfold in a relaxing and engaging atmosphere and be supported by a tight collaboration between teachers and students.

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